Indonesian State Law Review (2025) **8(2),** 153-169
https://doi.org/10.15294/islrev.v8i2.20873

OPEN ACCESS

ARTICLE

Law in Action During Disaster Recovery in Lampung Coastal Village

Rudy*[1], Helvi Yanfika[2], Dorothy Rouly H. Pandjaitan[3], Martina Anggi Silova[4], Chaidir Ali[5]

[1] Faculty of Law, Universitas Lampung, Kota Bandar Lampung, Indonesia
[2] Faculty of Agriculture, Universitas Lampung, Kota Bandar Lampung, Indonesia
[3] Faculty of Economics and Business, Universitas Lampung, Kota Bandar Lampung, Indonesia
[4] Department of Land Resources and Environmental Engineering, Politeknik Negeri Lampung, Kota Bandar Lampung, Indonesia
[5] Faculty of Law, Universitas Lampung, Kota Bandar Lampung, Indonesia

* Corresponding author: rudy.1981@fh.unila.ac.id

Abstract
Post-disaster recovery serves as a crucial step within the broader framework of disaster management, restore affected communities and environments to a state of resilience. However, the effectiveness of these recovery efforts is significantly undermined when they are not implemented in an integrative manner. This lack of cohesion can render the entire disaster management approach less impactful. This situation exemplifies the persistent challenges faced by disaster management models in Indonesia, particularly in the aftermath of significant events such as the 2018 tsunami that devastated the coastal regions of Lampung. This study employs socio-empirical research methods to analyze the post-disaster recovery model enacted by the National Disaster Management Agency (NDMA) across three coastal villages in Lampung. Through a comprehensive examination of the implemented strategies and their outcomes, the research team has identified critical shortcomings: specifically, the failure to adopt an integrative approach has led to inefficiencies and a lack of sustainability in the recovery efforts. As a response to these findings, this paper aims to establish an analysis of how law interacts with the reality of disaster recovery through case studies on Tsunami Disaster Recovery by the Government.

Keywords
Integrative, Disaster, Management, Coastal, Village

Introduction

As an archipelagic nation with significant vulnerability to natural disasters, Indonesia continually faces the threat of tsunamis. The most recent event occurred on December 22, 2018, when a tsunami, triggered by the eruption of Mount Anak

Krakatau in the Sunda Strait, impacted three regencies in Lampung Province, namely South Lampung, Pesawaran, and Tanggamus.

The disaster had widespread ramifications, affecting the local communities, critical infrastructure, coral reefs, and the regional economy. According to NDMA data (24/12/2018), the tsunami that struck both Banten and Lampung Provinces resulted in 281 fatalities, 1,016 injuries, 57 missing persons, and the displacement of 11,687 individuals. Physical damage included the destruction of 611 houses, 69 hotels and villas, 60 shops, and 420 boats. The total economic losses were estimated at IDR 202 billion.

In Lampung Province, the tsunami devastated the villages of Pulau Legundi, Punduh Pidada District, Pesawaran Regency, and Kiluan Negeri, Kelumbayan District, Tanggamus Regency. In these regions, dozens of homes across three neighborhoods were severely damaged, and one fatality was recorded. The economic losses were significant, with damage in Tanggamus Regency estimated at IDR 3 billion, while Pesawaran Regency suffered losses to IDR 9 billion.

To facilitate recovery from the tsunami, NDMA, in partnership with several universities, implemented post-disaster recovery programs from 2020 to 2023. These initiatives aimed to restore the affected areas' social and economic conditions, natural resources, and infrastructure.

Collaborative efforts involving universities, local governments, village administrations, and affected communities represent a novel approach to post-disaster recovery in disaster-prone coastal regions. This recovery process seeks to fortify these vulnerable coastal areas, transforming them into sustainable, disaster-resilient communities. The restoration of coastal zones is anticipated to positive impact on the blue economy in these areas.

The necessity for an integrated approach to Disaster Risk Management (DRM) arises from the complex interdependencies between societal processes and actors, which transcend the traditional purview of civil protection and risk management. Achieving such integration requires a nuanced understanding of development processes and societal relationships at the community and individual levels.[1]

In this context, it is imperative to conduct research that aims to establish an analysis of how law interacts with the reality of disaster recovery through case studies on Tsunami Disaster Recovery by the Government.

Problem Statement

Simonovic categorizes disaster management into two integral phases that require attention: the pre-disaster phase, which includes mitigation and preparedness, and the post-disaster phase, also known as the recovery phase, which represents the final stage in the disaster management cycle.[2] Furthermore, Phillips explains that post-

---

1 K. T. Erikson, *Everything in Its Path* (New York: Simon & Schuster, 1976).

2 Slobodan P. Simonović, *Systems Approach to Management of Disasters: Methods and Applications*, *Systems Approach to Management of Disasters: Methods and Applications*, 2010,

disaster recovery is divided into two categories: short-term recovery and long-term recovery.[3]

To date, recovery models have been applied in a fragmented and segmented manner, utilizing approaches based on housing recovery, social capital recovery, economic recovery, natural resource recovery, and coastal community empowerment.

In numerous studies, researchers such as Putnam and Fukuyama emphasize the importance of social capital in disaster recovery.[4] According to Lawang Partha, and Ismail S,[5] social capital is rooted in the social strength of communities, constructed by individuals or groups in reference to social structures that are believed to effectively and efficiently achieve individual and collective goals. Social capital is embedded in the network of relationships between actors.[6]

Meanwhile, the housing recovery model constitutes , particularly those residing in disaster-prone areas.[7] Furthermore, community involvement is required in the planning process, population and economic adjustments, as the handover of responsibilities during housing recovery.[8] Housing recovery goes beyond the reconstruction of physical buildings andaims to provide inhabitants with a safe, equitable, and sustainable living environment.[9]

The economic recovery model, on the other hand, is expected to encourage disaster-affected communities to develop economic self-reliance.[10] Various post-disaster economic recovery efforts include:[11]

1. Business recovery assistance for entrepreneurs and MSMEs.
2. Training and counseling for creative economic enterprises.
3. Provision of business capital.

---

https://doi.org/10.1002/9780470890363; B. Kusumasari, *Manajemen Bencana Dan Kapabilitas Pemerintah Lokal* (Yogyakarta: Gava Media, 2014).

3 Brenda D. Phillips, *Disaster Recovery* (Florida: CRC Press, 2015), https://doi.org/https://doi.org/10.1201/b19328.

4 Robert D Putnam, Robert Leonardi, and Raffaella Y Nonetti, *Making Democracy Work* (Princeton, NJ: Princeton University Press, 1993), https://doi.org/10.2307/j.ctt7s8r7; G. John Ikenberry and Francis Fukuyama, "Trust: The Social Virtues and the Creation of Prosperity," *Foreign Affairs* 75, no. 2 (1996), https://doi.org/10.2307/20047503.

5 R M Z Lawang, *Kapital Sosial Dalam Perspektif Sosiologik: Suatu Pengantar* (Jakarta: Fakultas Ilmu Sosial dan Ilmu Politik, Universitas Indonesia (FISIP UI) Press, 2004), https://books.google.co.id/books?id=mGVIMwAACAAJ; Dasgupta, Partha and Ismail Serageldin, *Social Capital: A Multifaceted Perspective*, *The World Bank*, vol. 23, 1999.

6 S. Eko, "Modal Sosial, Desentralisasi Dan Demokrasi Lokal," *Jurnal Analisis CSIS* 33, no. 3 (2011): 1–12.

7 S L Becker and D E Reusser, "Disasters as Opportunities for Social Change: Using the Multi-Level Perspective to Consider the Barriers to Disaster-Related Transitions," *International Journal of Disaster Risk Reduction* 18 (2016): 75–88, https://doi.org/https://doi.org/10.1016/j.ijdrr.2016.05.005.

8 S. Costas, O. Ferreira, and G. Martinez, "Why Do We Decide to Live with Risk at the Coast?," *Ocean and Coastal Management* 118 (2015), https://doi.org/10.1016/j.ocecoaman.2015.05.015.

9 Elizabeth Maly, "Building Back Better with People Centered Housing Recovery," *International Journal of Disaster Risk Reduction* 29 (2018), https://doi.org/10.1016/j.ijdrr.2017.09.005.

10 Agus Lukman Hakim et al., "Pemulihan Ekonomi Pasca Bencana Untuk Masyarakat Pesisir Di Kabupaten Pandeglang," *Jurnal Ilmu Administrasi Negara ASIAN (Asosiasi Ilmuwan Administrasi Negara)* 10, no. 1 (2022), https://doi.org/10.47828/jianaasian.v10i1.100.

11 *Ibid*

4. Provision of soft loans, credit restructuring for disaster victims, and optimization of cooperatives.

The natural resource recovery model restoring ecosystem functionality and sustainability following a natural disaster.[12] This model encompasses various strategies and actions to reduce environmental degradation, restore ecosystems, and build greater ecological resilience against future disasters.[13]

Finally, the coastal community empowerment model is characterized by the achievement of self-reliance. Empowerment is realized through the active participation of coastal communities,[14] focus on promoting self-reliance in managing coastal resources by providing training and knowledge to maximize the available potential.[15]

The selection of these recovery models is typically subjective and often driven by short-term needs rather than sustainable recovery. This study will analyze the coastal village recovery model implemented by the National Disaster Management Agency (NDMA) in collaboration with universities and local governments.

Understanding the recovery process is challenging, part due to inconsistencies in definitions and the use of varying metrics and indicators to assess disaster recovery. Some studies rely on the subjective perceptions of affected populations, such as their satisfaction with recovery progress.[16] In contrast, others use objective metrics and indices, like the domestic assets index, to measure recovery.[17]

A deeper understanding of the recovery process and its influencing factors can lead to more effective post-disaster planning and recovery.[18] Various disaster recovery theories have been developed to guide relief efforts and ensure successful recovery;[19] however, many models and theories lack comprehensiveness and empirical

---

12 E. B. Barbier, Et.al, "Rehabilitating Coastal Ecosystems: A Global Review of Wetlands and Mariculture Impacts and Their Management," *Ocean & Coastal Management*, 2011.

13 *Ibid*

14 G. Sumodiningrat, *Visi Dan Misi Pembangunan Pertanian Berbasis Pemberdayaan* (Yogyakarta: IDEA, 2000).

15 Nuryanto Nuryanto and Haryono Haryono, "Pemberdayaan Masyarakat Nelayan Pesisir Pantai Utara Jawa Tengah Melalui Koperasi Nelayan Dan E-Commerce," *Jurnal Sains Dan Teknologi Maritim* XVII, no. 1 (2017), https://doi.org/http://dx.doi.org/10.33556/jstm.v0i1.157.

16 Hong Cheng Liu, "Effects of Crisis Leadership in Public Sectors on Satisfaction with Post-Disaster Recovery," *Revista de Cercetare Si Interventie Sociala* 47 (2014).

17 Sudha Arlikatti et al., "Assessing the Impact of the Indian Ocean Tsunami on Households: A Modified Domestic Assets Index Approach," *Disasters* 34, no. 3 (2010), https://doi.org/10.1111/j.1467-7717.2010.01166.x.

18 Ali Nejat, Zhen Cong, and Daan Liang, "Family Structures, Relationships, and Housing Recovery Decisions after Hurricane Sandy," *Buildings* 6, no. 2 (2016), https://doi.org/10.3390/buildings6020014.

19 Yuko Nakagawa and Rajib Shaw, "Social Capital: A Missing Link to Disaster Recovery," *International Journal of Mass Emergencies & Disasters* 22, no. 1 (2004), https://doi.org/10.1177/028072700402200101.

replicability.[20] Similarly, most disaster studies are based on single or limited case studies, making them difficult to generalize.[21]

Bhattarai et al.,[22] broadly categorized disaster recovery into four main domains: social, physical/environmental, economic, and institutional/procedural. Each domain encompasses various factors assessed using a range of variables. For instance, variables such as networks, community participation, organization, voter turnout rate, internal bonds, and membership in councils are indicators of social capital within the social domain, influencing disaster recovery.

The integrated disaster risk recovery (IDRR) concept emerged three decades ago. Since the 1990's, discussions on integration and disaster risk management (DRM) have increasingly intersected with change. Nevertheless, defining IDRM remains elusive, partly because it has not been central to disaster discourse and partly because "integration" holds different meanings for various fields, including system research, sociology, and anthropology.[23]

The Sendai Framework expands on these integration concepts by reducing vulnerabilities and exposure while strengthening resilience. For instance, recent mid-term reviews highlight "risk-informed sustainable development," underscoring the connections between disaster risk reduction (DRR) and development, such as addressing the root causes of inequality, poverty, and other vulnerabilities.[24] The Sendai Framework states that achieving DRR necessitates "the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political, and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience".[25]

---

20 Daniel P. Aldrich, "The Externalities of Strong Social Capital: Post-Tsunami Recovery in Southeast India," *Journal of Civil Society* 7, no. 1 (2011), https://doi.org/10.1080/17448689.2011.553441.

21 Robert B Olshansky et al., "For the Rebuilding of New Orleans," *Journal of the American Planning Association* 74, no. 3 (2008): 273–87, https://doi.org/10.1080/01944360802140835.

22 Sailesh Bhattarai et al., "Development of an Integrated Pathways Model of Factors Influencing the Progress of Recovery After a Disaster," *Asia-Pacific Journal of Public Health* 32, no. 5 (2020), https://doi.org/10.1177/1010539520935386.

23 Vicente Sandoval et al., "Integrated Disaster Risk Management (IDRM): Elements to Advance Its Study and Assessment," *International Journal of Disaster Risk Science* 14, no. 3 (2023), https://doi.org/10.1007/s13753-023-00490-1.

24 Sayema Haque Bidisha, Tanveer Mahmood, and Md Biplob Hossain, "Assessing Food Poverty, Vulnerability and Food Consumption Inequality in the Context of COVID-19: A Case of Bangladesh," *Social Indicators Research* 155, no. 1 (2021), https://doi.org/10.1007/s11205-020-02596-1; Angela María Padilla Sánchez and Joan Ramon Sanchis Palacio, "The Cause-Effect Relationship between Social and Financial Exclusion/Inclusion. A Theoretical Approach," *REVESCO Revista de Estudios Cooperativos* 138 (2021), https://doi.org/10.5209/REVE.69168; Nourhan M. Waly, Hany M. Ayad, and Dina M. Saadallah, "Assessment of Spatiotemporal Patterns of Social Vulnerability: A Tool to Resilient Urban Development Alexandria, Egypt," *Ain Shams Engineering Journal* 12, no. 1 (2021), https://doi.org/10.1016/j.asej.2020.07.025.

25 Margareta Wahlström, *Sendai Framework for Disaster Risk Reduction 2015 - 2030*, n.d.; "Sendai Framework at a Glance," accessed October 26, 2024, https://www.preventionweb.net/sendai-framework/sendai-framework-at-a-glance.

Methods

The research method used in the article "Law in Action During Disaster Recovery in Lampung Coastal Village" adopts a qualitative approach with a case study design. This study analyzes the post-disaster recovery model implemented by the National Disaster Management Agency (BNPB) in three coastal villages in Lampung, where each town serves as a unit of analysis to understand different recovery practices. Primary data is collected through in-depth interviews with stakeholders, including BNPB officials, local government representatives, community members, and academics involved in recovery programs and through direct observation of ongoing recovery activities. In addition, secondary data is obtained from official documents related to disaster recovery policies and regulations, as well as statistical data on the impacts of the disaster, such as casualty figures and economic losses. Data collection is conducted through semi-structured interviews, participatory observation, and document analysis, allowing the researcher to understand the recovery process deeply. Data analysis is performed using thematic analysis to identify key themes from the interviews and observations, along with data triangulation to enhance the validity of the findings. Through this approach, the research aims to provide a comprehensive analysis of the effectiveness of legal approaches in disaster recovery in Lampung coastal villages, as well as to recommend improvements in policies and practices for the future.

Results and Discussion

I. Legal Framework

There are several laws and regulations regarding disaster management in Indonesia,[26] which encompasses:

a. Law Number 24 of 2007 concerning Disaster Management;
b. Regulation Number 21 of 2008 concerning Disaster Management;
c. Regulation Number 22 of 2008 concerning Disaster Aid Financing and Management;
d. Regulation Number 23 of 2008 concerning Participation of International Institutions and Foreign NGOs in Disaster Management;
e. Presidential Regulation Number 8 of 2008 concerning the National Agency for Disaster Management; and
f. Guideline Number 22 of 2010 on the Role of International Organizations and Foreign Non-Governmental Organizations during Emergency Response.

[26] IFRC, "Disaster Recovery In Indonesia: A Legal and Policy Survey," 2023, https://disasterlaw.ifrc.org/sites/default/files/media/disaster_law/2023-07/Disaster Recovery in Indonesia %28Final%29.pdf.

As mentioned in Section 2.1 within Law of the Republic of Indonesia Number 24 of 2007 Concerning Disaster Management,[27] the NDMA was established as Indonesia's national disaster management agency, with regional NDMA reporting to it.[28] One of NDMA's key roles is to oversee post-disaster recovery for affected areas and communities, ensuring better coordination in rehabilitation and reconstruction with a focus on disaster risk reduction.[29] This responsibility is reflected in NDMA's organizational structure, which includes a deputy specifically for rehabilitation and reconstruction, along with deputies for other disaster management phases. The primary duties of this deputy include:

a. coordinating and implementing general disaster management policies during the post-disaster phase;
b. developing general disaster management policies for the post-disaster phase;
c. managing relationships related to disaster management in the post-disaster period;
d. monitoring, evaluating, and reporting on the execution of general disaster management policies during the post-disaster phase.

Therefore, to perform those duties, the deputy for rehabilitation and reconstruction is equipped with three directorates which encompass:

a. the directorate for planning rehabilitation and reconstruction;
b. the directorate for physical recovery and enhancement; and
c. the directorate for of the social economy and natural resources.

Those three directorates hold authority over disaster recovery, and the regional NDMAs closely follow the same organizational structure as NDMA. Each regional office has a deputy head responsible for rehabilitation and another for reconstruction. The main legal framework governing disaster management in Indonesia is the 2007 Disaster Law.[30] This law regulates disaster relief efforts and oversees the entire disaster management system in the country. It covers various aspects, such as the implementation of the national disaster management system, the duties of national and regional governments, and the roles of the national and regional disaster management agencies.[31]

Chapter VII of the 2007 Disaster Law specifically addresses disaster management, with the third paragraph of the second part focusing on the post-disaster phase. Article 57 states that post-disaster management includes two key components:

a. rehabilitation; and
b. reconstruction.

Rehabilitation is defined as restoring and repairing all aspects of public or community services to a satisfactory level in post-disaster areas, particularly to regain

---

27 Nike Gifitriani, Emelia Kontesa, and Herawan Sauni, "The Constraints of Legal Factors in Controlling Abandoned Land After The Enactment of The Job Creation Law," *Bengkoelen Justice : Jurnal Ilmu Hukum* 12, no. 2 (2022), https://doi.org/10.33369/jbengkoelenjust.v12i2.25159.
28 IFRC, "Disaster Recovery In Indonesia: A Legal and Policy Survey.", *Op.cit*.
29 *Ibid*
30 *Ibid*
31 *Ibid*

government administration and community life.[32] In this context, rehabilitation involves:

a. improvement of the disaster area environment;
b. repair of public facilities and infrastructure;
c. provision of aid for community housing repair;
d. socio psychological recovery;
e. healthcare;
f. reconciliation and conflict resolution;
g. socioeconomic and cultural recovery;
h. security and order recovery;
i. government administration function recovery; and
j. public services function recovery.

Reconstruction is described as rebuilding all facilities, infrastructure, and institutions in post-disaster areas at both governmental and community levels.[33] The primary goal is to promote the recovery of economic, social, and cultural activities, restore law and order, and encourage public participation in all aspects of community life within the affected areas.[34] Reconstruction includes:

a. rebuilding of facilities and infrastructure;
b. rebuilding of communities' social facilities;
c. revival of socio-cultural community life;
d. use of appropriate design with improved and disaster-resistant equipment;
e. participation of social institutions and organizations, businesses, and communities;
f. improvement of social, economic, and cultural conditions;
g. improvement of public service functions; and
h. improvement of essential services in communities.

Hence, in Indonesia, disaster recovery is divided into two main phases: rehabilitation and reconstruction, where these phases differ primarily in their timing.[35] After the immediate disaster response, which provides emergency relief, the government typically initiates an early recovery phase lasting one to three months. During this period, a damage and loss assessment is conducted. Following this, the rehabilitation phase begins, usually lasting three to six months. Finally, the reconstruction phase occurs over six to twenty-four months.

This framework is detailed in Government Regulation Number 21 of 2008 on Disaster Management. The regulation emphasizes that the national and regional governments (in affected areas) are responsible for developing rehabilitation plans. These plans must address factors like building construction standards, social conditions, local customs, culture, and the economycomply with NDMA's guidelines. The regulation also mandates the creation of reconstruction plans, with the primary

---

32 *Ibid*
33 *Ibid*
34 *Ibid*
35 *Ibid*; IFRC, "Disaster Recovery In Indonesia: A Legal and Policy Survey."

responsibility falling on regional governments, except for specific infrastructure, which remains under national government oversight.

The NDMA's Regulations Number 6 of 2017 provides further guidance on post-disaster rehabilitation and reconstruction. These regulations aim to ensure that recovery efforts are well-planned, coordinated, and comprehensive, focusing on building back better and safer. This concept involves making infrastructure more resilient to future hazards during recovery. One key principle of rehabilitation and reconstruction is to enhance safety and disaster risk reduction.

Additionally, Regulation Number 22 of 2008 outlines the provision of grant-based social assistance funds for post-disaster activities. It specifies that both' short-term assistance, such as financial compensation for the loss of a loved one, and long-term support like soft loans (i.e., loans with low or no interest) to help businesses recover. Furthermore, within its practice, this kind of assistance funds consist of:

a. credit for productive businesses; or
b. credit for ownership of capital goods, for disaster victims who have lost their livelihoods.

The 2007 Disaster Law outlines that housing and settlement rehabilitation involves government assistance, which can be provided of funds or materials to help repair damaged homes. The law also specifies that rehabilitating public facilities and infrastructure means restoring essential services related to transportation, economic activities, and the community's socio-cultural life. Reconstruction, on the other hand, involves building new public facilities to meet the affected community's social, cultural, and economic needs, while considering regional and provincial development plans.

Following a disaster, economic, social, cultural, and psychological recovery is interconnected. The 2007 Disaster Law emphasizes that socio-economic and cultural rehabilitation includes to disaster-affected communities to restore their lives to pre-disaster conditions. Additionally, the law acknowledges the significant psychological impact disasters can have on individuals.

These recovery efforts outlined in the Disaster Law were implemented Lampung. The following activities reflect the disaster recovery initiatives implemented through the integrative pentahelix model.

II. Recovery Activities

The NDMA, with assistance from its disaster mitigation program, created Coastal Resilience Tools (CRT) to strengthen the resilience of coastal communities.[36] The CRT follows a four-phase framework aimed at fostering sustainable resilience:

a. risk assessment;
b. identification of solutions;

[36] *Ibid*

c. governance of resilience and its influence on disaster risk reduction (DRR) investments; and
d. effective measurement.

However, only the first two stages have been consistently implemented in practice. When the third and fourth stages are applied, they are often done so in a fragmented manner, without consistent follow-through.

In the case of recovery efforts in Lampung, two stages were carried out: risk assessment and solution identification for social, economic, and natural resources conditions. The selection of these solutions aligns with what Arlikatti[37] and McEntire assert, that numerous interconnected direct and indirect factors—physical, social, institutional, economic, and environmental,[38]—multiple, and ecologicalfacilitate or impede recovery. In this context, disaster recovery in Lampung has been executed across social, financial, and natural resource domains.

II.I. Social Recovery

Social recovery activities were conducted in Kunjir Village, South Lampung. Referring to the results of the rapid assessment, NDMA and the Social Assistance Team identified several key activities as part of social recovery in Kunjir Village: (1) Recovery of the sports sector, (2) recovery of the arts sector, (3) recovery of the religious sector, and (4) recovery of the education sector. These social recovery efforts are based on the principle that vulnerable groups are often the most affected during disasters (National Planning Commission, 2015). This was evident in Kunjir Village, where the tsunami, devastating the social fabric and social capital disrupted many social institutions. Over time, this can lead to prolonged social vulnerability, hindering long-term disaster recovery.[39]

The intervention to restore the social fabric was carried out through the recovery of sports institutions. Sports, a unique form of human activity emphasizing physical movement, can serve as a vehicle for post-disaster trauma recovery for affected communities. Research has shown that sports can significantly impactboth physical and psychological human development, and various studies confirm the psychological and social benefits of engaging in sports.

This initiative aimed to provide training and support to youth groups in Kunjir Village, delivering psychosocial interventions through sports coaching and fostering the development of existing sports groups in the village. In addition to sports, as a Lampung community that values its cultural heritage, arts and culture are deeply ingrained in everyday life. Therefore, the recovery of arts and culture as social capital is essential for post-disaster recovery. The recovery efforts in this area will include

---

37 Arlikatti et al., "Assessing the Impact of the Indian Ocean Tsunami on Households: A Modified Domestic Assets Index Approach."

38 David McEntire, Colleen Gilmore Crocker, and Ekong Peters, "Addressing Vulnerability through an Integrated Approach," *International Journal of Disaster Resilience in the Built Environment*, 2010, https://doi.org/10.1108/17595901011026472.

39 Ben Winser et al., "At Risk: Natural Hazards, People's Vulnerability and Disasters - Piers Blaikie, Terry Cannon, Ian Davis, Ben Wisner - Google Books," *Geoforum* 60, no. 2 (2004).

supporting and fostering local arts and cultural groups within the community. The 2018 South Lampung tsunami left deep psychological trauma among the population. Addressing this requires concerted psychosocial recovery efforts, one of which is optimizing religious activities.

Lastly, recovery efforts in the education sector were implemented by empowering the village library. This initiative focused on providing book donations and offering support for managing the village library. Reading is a positive activity that can be engaged in by all segments of society, particularly young people, such as students. The hope is that through these efforts, literacy levels will increase, and the village library will foster a new social space that can be utilized constructively by the community.

II.II. Economic Recovery

Economic recovery activities took place over two years, beginning with monetary assistance, followed by economic development. The household economy and broader economic development of the community or region are critical to financial security, which is vital for both development work and the pace of disaster recovery. This was evident following China's 2009 Yao'an earthquake, where lower-income households took significantly longer to rebuild.[40] In summary, the influence of economic development on disaster recovery was clearly demonstrated in a study by Cao and Xiao.[41]

The economic recovery assistance in 2021 successfully activated several community business groups in the respective locations of the recovery efforts. For example, in Pekon Kiluan Negeri, fish-based businesses such as "Usaha Lancar" fishball, "Mantap" fish nugget, and "Rasa Sedap" smoked fish were reactivated. Meanwhile, in Pulau Legundi, community business groups such as "Yummy" fishball, "Crunchy" fish nugget, and "Emping Melinjo" flourished.

The activation of these community business groups in the first year was further reinforced through continued economic development support. This development support focused on clarifying the roles of local government, the private sector, and universities in ensuring sustainable economic recovery, particularly in post-disaster areas such as Kiluan Negeri and Pulau Legundi in Lampung.

During the second year of economic recovery assistance, all relevant stakeholders were involved, tailored to the group, sector, and productive economic subsector targeted. The economic recovery assistance was carried out through data collection and intensive coordination using various methods, including Focus Group Discussions (FGDs), interviews, observations, surveys/questionnaires, document

---

40 Ying Wang, Hao Chen, and Juan Li, "Factors Affecting Earthquake Recovery: The Yao'an Earthquake of China," *Natural Hazards* 64, no. 1 (2012), https://doi.org/10.1007/s11069-012-0224-3.

41 Wei Cao and Hao Xiao, "Establishment and Application of Comprehensive Evaluation System for the Ability of Post-Disaster Recovery and Reconstruction," in *Proceedings of International Conference on Information Systems for Crisis Response and Management, ISCRAM 2011*, 2011, https://doi.org/10.1109/ISCRAM.2011.6184140.

studies, and research presentations to gather feedback and suggestions for improvement. Capacity-building efforts for community groups included technical guidance, training, counseling, tutorials, and assistance to facilitate legal recognition of community groups and their products. Business meetings were also held to expand these community groups' network and marketing reach, securing support from local government and other stakeholders for the sustainability of these community businesses.

II.III. Natural Resource Recovery

The December 2018 tsunami along the coast of South Lampung caused severe damage to the coastal areas. Coral reef ecosystems, which are highly sensitive to environmental changes, were particularly affected.[42] Madduppa et al., noted that natural disturbances result in various changes to coral community structures.[43] The tsunami caused significant damage to coral reef ecosystems, as evidenced by the death of coral and other marine biota, which were lifted to the surface and washed ashore by the powerful waves.[44] The tsunami's waves carried sediment and other materials in large quantities from the land, leading to further damage. A decline followed Coral death in the populations of another marine biota.[45] When coral reefs are destroyed, associated marine biota leave the area, disrupting other ecosystems, such as seagrass beds and mangroves, as one coastal ecosystem's loss affects the others. Penta Helix is an evolved version of the Quadruple Helix model, integrating academia, businesses, communities, government, and the media to form a collaborative ecosystem. This approach harnesses creativity and knowledge to develop solutions for managing post-earthquake recovery efforts.[46]

This damage has undoubtedly profoundly impacted the social, economic, and environmental conditions of coastal communities. Coastal populations, who are highly dependent on the resources and condition of the marine environment, are directly affected by the tsunami's destruction. In response, the government, through NDMA, has accelerated recovery and assisted to mitigate the tsunami's impact.

Rehabilitation and reconstruction efforts in natural resources focused on coral reef restoration, planting tsunami-resistant trees, and planting *Casuarina equisetifolia* along the coast to restore coastal ecosystems. Coral reefs play a critical

---

42 Rifki Aldi Ramadhani, Ario Damar, and Hawis Madduppa, "Management on Coral Reef Ecosystem in the Siantan Tengah District, Anambas Islands," *Jurnal Ilmu Dan Teknologi Kelautan Tropis* 7, no. 1 (2015), https://doi.org/10.29244/jitkt.v7i1.9804.

43 Hawis Madduppa et al., "Riset Dan Inovasi Terumbu Karang Dan Proses Pemilihan Teknik Rehabilitasi: Sebuah Usulan Menghadapi Gangguan Alami Dan Antropogenik Kasus Di Kepulauan Seribu," *Risalah Kebijakan Pertanian Dan Lingkungan: Rumusan Kajian Strategis Bidang Pertanian Dan Lingkungan* 3, no. 2 (2017), https://doi.org/10.20957/jkebijakan.v3i2.15513.

44 Clive Wilkinson, David Souter, and Jeremy Goldberg, "Status of Coral Reefs in Tsunami Affected Countries: 2005," *Global Coral Reef Monitoring Network*, 2006.

45 Rikoh Manogar Siringoringo, "Fenomena Tsunami Dan Pengaruhnya Terhadap Terumbu Karang," *Oseana* XXXII, no. 2 (2007): 43–51.

46 Loet Leydesdorff, "The Triple Helix, Quadruple Helix, …, and an N-Tuple of Helices: Explanatory Models for Analyzing the Knowledge-Based Economy?," *Journal of the Knowledge Economy* 3, no. 1 (2012), https://doi.org/10.1007/s13132-011-0049-4.

role as natural barriers, capable of breaking large waves before they reach the shore, thereby reducing the risk of damage from tsunamis and storms. Planting tsunami-resistant trees, such as Casuarina equisetifolia, is a physical barrier that slows down tsunami waves, reducing their speed and destructive power. The strong roots of these trees also help stabilize the soil, prevent erosion, and strengthen the coastline. Other coastal plants, such as pandanus and mangroves, provide similar benefits by protecting the shore from erosion and offering additional protection against disasters.

III. Legal Gap of Disaster Recovery

The disaster recovery efforts conducted by the NDMA can be analyzed from several key points. First, disaster recovery has employed an integrative approach involving multiple stakeholders. In this context, the government, local government, village authorities, communities, businesses, and universities collaborate in recovery activities, each contributing according to their respective capacities. In the specific details of this activities, NDMA and Universities commonly use the guidelines rather than specific legal rules. This reflects the gap between the legal framework and the recovery activities.

Second, the selection of recovery domains has been predominantly managed by NDMA. This is particularly evident in the recovery of natural resources, where NDMA has taken direct control over the specific domains and actions to be implemented. Meanwhile, although guided by a rapid assessment to identify appropriate solutions, social and economic recovery efforts have also been directly overseen by NDMA. This is an instance of bureaucracy-led policies on the recovery process.

Third, these disaster recovery efforts also aim to embed sustainability policies into the agendas of local governments and village authorities. The challenge here lies in ensuring the continuity of programs that have been implemented, especially in terms of securing the necessary budget allocations within the policies of village and regional governments. In this case, the research doesn't see support from local regulations for disaster recovery. Local government shall form local rules in the future, especially regarding the sustainable aspect of disaster recovery.

Conclusion

In conclusion, the analysis of the post-disaster recovery models applied by the National Disaster Management Agency (NDMA) in Pekon Kiluan Negeri, Pulau Legundi Village, and Kunjir Village has revealed a critical shortcoming: despite efforts across the social, economic, and natural resource domains, the recovery models have not been executed in a truly integrative manner. This lack of holistic implementation undermines the potential for achieving long-lasting and meaningful recovery. Proper integrative recovery demands a comprehensive and synchronized legal framework on

the recovery, including the need for local regulation to support the recovery sustainably.

References

Agus Lukman Hakim, Ade Hadiono, Ipah Mulyani, Jumanah, Natta Sanjaya, and Destiana. "Pemulihan Ekonomi Pasca Bencana Untuk Masyarakat Pesisir Di Kabupaten Pandeglang." Jurnal Ilmu Administrasi Negara ASIAN (Asosiasi Ilmuwan Administrasi Negara) 10, no. 1 (2022). https://doi.org/10.47828/jianaasian.v10i1.100.

Aldrich, Daniel P. "The Externalities of Strong Social Capital: Post-Tsunami Recovery in Southeast India." Journal of Civil Society 7, no. 1 (2011). https://doi.org/10.1080/17448689.2011.553441.

Arlikatti, Sudha, Walter Gillis Peacock, Carla S. Prater, Himanshu Grover, and Arul S.Gnana Sekar. "Assessing the Impact of the Indian Ocean Tsunami on Households: A Modified Domestic Assets Index Approach." Disasters 34, no. 3 (2010). https://doi.org/10.1111/j.1467-7717.2010.01166.x.

Barbier, E. B., and Et.al. "Rehabilitating Coastal Ecosystems: A Global Review of Wetlands and Mariculture Impacts and Their Management." Ocean & Coastal Management, 2011.

Becker, S L, and D E Reusser. "Disasters as Opportunities for Social Change: Using the Multi-Level Perspective to Consider the Barriers to Disaster-Related Transitions." International Journal of Disaster Risk Reduction 18 (2016): 75–88. https://doi.org/https://doi.org/10.1016/j.ijdrr.2016.05.005.

Bhattarai, Sailesh, Bruce Maycock, Helman Alfonso, and Alison Reid. "Development of an Integrated Pathways Model of Factors Influencing the Progress of Recovery After a Disaster." Asia-Pacific Journal of Public Health 32, no. 5 (2020). https://doi.org/10.1177/1010539520935386.

Bidisha, Sayema Haque, Tanveer Mahmood, and Md Biplob Hossain. "Assessing Food Poverty, Vulnerability and Food Consumption Inequality in the Context of COVID-19: A Case of Bangladesh." Social Indicators Research 155, no. 1 (2021). https://doi.org/10.1007/s11205-020-02596-1.

Cao, Wei, and Hao Xiao. "Establishment and Application of Comprehensive Evaluation System for the Ability of Post-Disaster Recovery and Reconstruction." In Proceedings of International Conference on Information Systems for Crisis Response and Management, ISCRAM 2011, 2011. https://doi.org/10.1109/ISCRAM.2011.6184140.

Costas, S., O. Ferreira, and G. Martinez. "Why Do We Decide to Live with Risk at the Coast?" Ocean and Coastal Management 118 (2015). https://doi.org/10.1016/j.ocecoaman.2015.05.015.

Dasgupta, Partha, and Ismail Serageldin. Social Capital: A Multifaceted Perspective. The World Bank. Vol. 23, 1999.

Eko, S. "Modal Sosial, Desentralisasi Dan Demokrasi Lokal." Jurnal Analisis CSIS 33,

no. 3 (2011): 1–12.
Erikson, K. T. Everything in Its Path. New York: Simon & Schuster, 1976.
Gifitriani, Nike, Emelia Kontesa, and Herawan Sauni. “The Constraints of Legal Factors in Controlling Abandoned Land After The Enactment of The Job Creation Law.” Bengkoelen Justice : Jurnal Ilmu Hukum 12, no. 2 (2022). https://doi.org/10.33369/jbengkoelenjust.v12i2.25159.
IFRC. “Disaster Recovery In Indonesia: A Legal and Policy Survey,” 2023. https://disasterlaw.ifrc.org/sites/default/files/media/disaster_law/2023-07/Disaster Recovery in Indonesia %28Final%29.pdf.
Ikenberry, G. John, and Francis Fukuyama. “Trust: The Social Virtues and the Creation of Prosperity.” Foreign Affairs 75, no. 2 (1996). https://doi.org/10.2307/20047503.
Kusumasari, B. Manajemen Bencana Dan Kapabilitas Pemerintah Lokal. Yogyakarta: Gava Media, 2014.
Lawang, R M Z. Kapital Sosial Dalam Perspektif Sosiologik: Suatu Pengantar. Jakarta: Fakultas Ilmu Sosial dan Ilmu Politik, Universitas Indonesia (FISIP UI) Press, 2004. https://books.google.co.id/books?id=mGVIMwAACAAJ.
Leydesdorff, Loet. “The Triple Helix, Quadruple Helix, …, and an N-Tuple of Helices: Explanatory Models for Analyzing the Knowledge-Based Economy?” Journal of the Knowledge Economy 3, no. 1 (2012). https://doi.org/10.1007/s13132-011-0049-4.
Liu, Hong Cheng. “Effects of Crisis Leadership in Public Sectors on Satisfaction with Post-Disaster Recovery.” Revista de Cercetare Si Interventie Sociala 47 (2014).
Madduppa, Hawis, Beginer Subhan, Dondy Arafat, and Neviaty Putri Zamani. “Riset Dan Inovasi Terumbu Karang Dan Proses Pemilihan Teknik Rehabilitasi: Sebuah Usulan Menghadapi Gangguan Alami Dan Antropogenik Kasus Di Kepulauan Seribu.” Risalah Kebijakan Pertanian Dan Lingkungan: Rumusan Kajian Strategis Bidang Pertanian Dan Lingkungan 3, no. 2 (2017). https://doi.org/10.20957/jkebijakan.v3i2.15513.
Maly, Elizabeth. “Building Back Better with People Centered Housing Recovery.” International Journal of Disaster Risk Reduction 29 (2018). https://doi.org/10.1016/j.ijdrr.2017.09.005.
McEntire, David, Colleen Gilmore Crocker, and Ekong Peters. “Addressing Vulnerability through an Integrated Approach.” International Journal of Disaster Resilience in the Built Environment, 2010. https://doi.org/10.1108/17595901011026472.
Nakagawa, Yuko, and Rajib Shaw. “Social Capital: A Missing Link to Disaster Recovery.” International Journal of Mass Emergencies & Disasters 22, no. 1 (2004). https://doi.org/10.1177/028072700402200101.
Nejat, Ali, Zhen Cong, and Daan Liang. “Family Structures, Relationships, and Housing Recovery Decisions after Hurricane Sandy.” Buildings 6, no. 2 (2016). https://doi.org/10.3390/buildings6020014.
Nuryanto, Nuryanto, and Haryono Haryono. “Pemberdayaan Masyarakat Nelayan

Pesisir Pantai Utara Jawa Tengah Melalui Koperasi Nelayan Dan E-Commerce." Jurnal Sains Dan Teknologi Maritim XVII, no. 1 (2017). https://doi.org/http://dx.doi.org/10.33556/jstm.v0i1.157.

Olshansky, Robert B, Laurie A Johnson, Jedidiah Horne, and Brendan Nee. "For the Rebuilding of New Orleans." Journal of the American Planning Association 74, no. 3 (2008): 273–87. https://doi.org/10.1080/01944360802140835.

Phillips, Brenda D. Disaster Recovery. Florida: CRC Press, 2015. https://doi.org/https://doi.org/10.1201/b19328.

Putnam, Robert D, Robert Leonardi, and Raffaella Y Nonetti. Making Democracy Work. Princeton, NJ: Princeton University Press, 1993. https://doi.org/10.2307/j.ctt7s8r7.

Ramadhani, Rifki Aldi, Ario Damar, and Hawis Madduppa. "Management on Coral Reef Ecosystem in the Siantan Tengah District, Anambas Islands." Jurnal Ilmu Dan Teknologi Kelautan Tropis 7, no. 1 (2015). https://doi.org/10.29244/jitkt.v7i1.9804.

Sánchez, Angela María Padilla, and Joan Ramon Sanchis Palacio. "The Cause-Effect Relationship between Social and Financial Exclusion/Inclusion. A Theoretical Approach." REVESCO Revista de Estudios Cooperativos 138 (2021). https://doi.org/10.5209/REVE.69168.

Sandoval, Vicente, Martin Voss, Verena Flörchinger, Stephan Lorenz, and Parisa Jafari. "Integrated Disaster Risk Management (IDRM): Elements to Advance Its Study and Assessment." International Journal of Disaster Risk Science 14, no. 3 (2023). https://doi.org/10.1007/s13753-023-00490-1.

"Sendai Framework at a Glance." Accessed October 26, 2024. https://www.preventionweb.net/sendai-framework/sendai-framework-at-a-glance.

Simonović, Slobodan P. Systems Approach to Management of Disasters: Methods and Applications. Systems Approach to Management of Disasters: Methods and Applications, 2010. https://doi.org/10.1002/9780470890363.

Siringoringo, Rikoh Manogar. "Fenomena Tsunami Dan Pengaruhnya Terhadap Terumbu Karang." Oseana XXXII, no. 2 (2007): 43–51.

Sumodiningrat, G. Visi Dan Misi Pembangunan Pertanian Berbasis Pemberdayaan. Yogyakarta: IDEA, 2000.

Wahlström, Margareta. Sendai Framework for Disaster Risk Reduction 2015 - 2030, n.d.

Waly, Nourhan M., Hany M. Ayad, and Dina M. Saadallah. "Assessment of Spatiotemporal Patterns of Social Vulnerability: A Tool to Resilient Urban Development Alexandria, Egypt." Ain Shams Engineering Journal 12, no. 1 (2021). https://doi.org/10.1016/j.asej.2020.07.025.

Wang, Ying, Hao Chen, and Juan Li. "Factors Affecting Earthquake Recovery: The Yao'an Earthquake of China." Natural Hazards 64, no. 1 (2012). https://doi.org/10.1007/s11069-012-0224-3.

Wilkinson, Clive, David Souter, and Jeremy Goldberg. "Status of Coral Reefs in

Tsunami Affected Countries: 2005." Global Coral Reef Monitoring Network, 2006.

Winser, Ben, Piers Blaikie, Terry Cannon, Ian Davis, Robinson Torres, Gerardo Azócar, Jorge Rojas, et al. "At Risk: Natural Hazards, People's Vulnerability and Disasters - Piers Blaikie, Terry Cannon, Ian Davis, Ben Wisner - Google Books." Geoforum 60, no. 2 (2004).

Acknowledgment

The authors would like to express their deepest gratitude to the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia for providing research funding through the Fundamental Research Grant scheme. The authors also sincerely thank the Institute for Research and Community Service of Universitas Lampung for its invaluable support in facilitating and overseeing the implementation of this research grant. Without such financial and institutional support, the successful completion of this study and its contribution to the development of integrative post-disaster recovery models in coastal villages would not have been possible.

Author Contributions

All authors contributed equally to the manuscript's conception, design, data acquisition, analysis, and drafting. All authors approved the final version of the manuscript.

Declaration of Conflicting Statements

The authors declare that there are no conflicts of interest.

Funding Statement

This work was supported by the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia through the Fundamental Research Grant scheme, with additional facilitation from the Institute for Research and Community Service of Universitas Lampung.

Open Data Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Reproducibility Statement

The study design, data collection procedures, and analytical methods are described in sufficient detail to allow replication. Further information can be obtained from the corresponding author upon request.