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Legal Protection and Certainty of Land Ownership in Post-Disaster Recovery: Evidence from Indonesia, Spain, and Oman

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Abstract

This study investigates the legal protection and certainty of land ownership in post-disaster recovery, with a comparative focus on Indonesia, Spain, and Oman. It particularly examines the aftermath of the 2018 earthquake, tsunami, and liquefaction in Central Sulawesi, Indonesia, and contrasts it with recovery efforts in Spain and Oman. Using a descriptive empirical legal approach, the study explores the legal protections for disaster victims, the restoration of land ownership, and challenges in rebuilding. In Indonesia, the 2018 disaster in Petobo Village is analyzed through Governor Regulation No. 10 of 2019, which governs post-disaster rehabilitation and reconstruction. The law stipulates the rights to land restitution and housing reconstruction; however, delays in

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permanent housing construction have hindered the realization of victims' rights. In Spain, the recovery from the 2011 earthquake in Lorca is examined under the Royal Decree 307/2005, which regulates compensation for victims of natural disasters. Despite the law's aim to safeguard land rights and accelerate recovery, significant delays occurred in land restitution and compensation for affected property owners. In Oman, the Land Expropriation Law (Royal Decree No. 6/2008) and Cyclone Gonu Recovery Law provide mechanisms for land distribution and compensation, but challenges arose due to incomplete property registration and inconsistent enforcement, which delayed recovery efforts. By comparing these legal frameworks, the study highlights the differences in land governance and proposes recommendations for strengthening legal protections and ensuring faster, more efficient recovery in post-disaster contexts.

Keywords

Legal Protection, Land Ownership, Post-Disaster Recovery, Legal Certainty.

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Introduction

Natural disasters pose major threats not only to physical infrastructure and human safety but also to legal systems, especially those governing land ownership and property rights. In the aftermath of such disasters, the protection of land rights and the certainty of ownership become crucial for the recovery and rebuilding process.[1] These rights are often compromised, leading to prolonged displacement, legal uncertainty, and social unrest among disaster victims.

One of the most striking examples of such challenges can be seen in Central Sulawesi, Indonesia, which was devastated by a triple disaster on September 28, 2018. A 7.4-magnitude earthquake, followed by a tsunami and massive soil liquefaction, struck areas along the Palu Koro fault line, 26 km north of Donggala Regency and 80 km northwest of Palu City. With a depth of only 10 kilometers, the earthquake caused widespread destruction across Palu City, Sigi Regency, Donggala, and Parigi Moutong.[2]

The consequences of this natural disaster were catastrophic, both in human and material terms. According to the National Disaster Management Agency (BNPB), the total losses and damages in Central Sulawesi reached IDR 18.48 trillion. The liquefaction submerged and destroyed 181.24 hectares in Petobo Village in South Palu District, making it one of the hardest-hit areas. Approximately 744 homes were

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[1] Brown, Oli, and Alec Crawford. *Addressing Land Ownership After Natural Disasters*. Manitoba: International Institute for Sustainable Development, 2006. *See also* Reale, Andreana, and John Handmer. "Land tenure, disasters and vulnerability." *Disasters* 35, no. 1 (2011): 160-182; Mochtar, Fany Rizkia. "Legal Status of Land Rights Affected by Natural Disasters." *Proceeding International Conference on Law, Economy, Social and Sharia (ICLESS)*. Vol. 2. 2024; Pinuji, Sukmo, and Walter Timo De Vries. "Evaluating How Tenure Security in Disaster Management Depends on Land Governance Based on Indonesian Case Study." *BHUMI: Jurnal Agraria dan Pertanahan* 9, no. 1 (2023): 1-30.

[2] Trias, Angelo Paolo L., and Alistair DB Cook. "Future directions in disaster governance: Insights from the 2018 Central Sulawesi Earthquake and Tsunami response." *International Journal of Disaster Risk Reduction* 58 (2021): 102180.

buried, and many residents not only lost their property but also the legal documentation proving their land ownership.[3]

In such post-disaster contexts, the legal certainty of land ownership becomes increasingly complex. The destruction of physical land boundaries, the loss of administrative records, and the displacement or death of rightsholders have created major legal gaps. In Indonesia, land ownership is legally recognized only after registration with the National Land Agency, pursuant to Government Regulation No. 24 of 1997. Yet many plots in Palu, especially in Petobo, were either unregistered or informally documented, complicating the restitution process.[4]

Based on empirical observations and research, four main categories of land issues have emerged after the 2018 disaster: (1) land physically remains but lacks boundary markers; (2) land exists but supporting documents are lost; (3) land remains but the rightsholder is deceased or missing; and (4) land is entirely destroyed or altered, making it unusable or unrecognizable. These scenarios have created severe legal and administrative obstacles for both the state and disaster survivors.[5]

Existing legal frameworks in Indonesia offer partial remedies. For example, Article 147 of the Omnibus Job Creation Law (Law No. 11 of

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[3] Swantoro, Aris, et al. "The Evaluating Relocation Policy Impact on the Sustainable Development Goals (SDGs): A Case Study of Liquefaction Victims in Petobo Village, Central Sulawesi." *Journal of Lifestyle and SDGs Review* 5, no. 5 (2025): e6671-e6671.

[4] Rachman, Rahmia, and Erlan Ardiansyah. "Legal Certainty of Land Rights Affected by Natural Disasters." *Arena Hukum* 17, no. 1 (2024): 112-132; Sulbadana, Sulbadana. "Law Enforcement Based on the Environment: Solution of Land Problems After Tsunami, Liquefaction, and Earthquake in Central Sulawesi." *Diponegoro Law Review* 5, no. 1 (2020): 140-155; Tjitrawati, Aktieva Tri, et al. "The Palu Disaster and Indonesia's Obligation to Ensure the Right of Adequate Housing and Land Rights: Mission Accomplished?." In *The Asian Yearbook of Human Rights and Humanitarian Law*. Leiden: Brill Nijhoff, 2024, pp. 311-351.

[5] Lestari, Nurhilma. "Status Hak Atas Tanah Pasca Bencana Likuifaksi dan Rencana Tata Ruang Wilayah di Kota Palu." *Jurnal Hukum dan Kenotariatan* 5, no. 1 (2021): 160-172; Amrin, Reza Nur, et al. "Status hukum hak atas tanah yang terkena bencana alam." *Tunas Agraria* 5, no. 1 (2022): 65-76; Rahayu, Tiara Dwi, Yani Pujiwati, and Betty Rubiati. "Kepastian Hukum Kepemilikan Hak Atas Tanah Setelah Mengalami Likuifaksi Tanah." *LITRA: Jurnal Hukum Lingkungan, Tata Ruang, dan Agraria* 2, no. 2 (2023): 250-266.

2020) and Government Regulation No. 18 of 2021 attempt to regulate land rights and their termination in extraordinary cases. However, administrative capacity and the absence of specific provisions for land loss due to liquefaction hinder the enforcement of these laws. In cases where land is officially classified as "*destroyed*," the government provides legal protection in the form of *kerohiman* funds, as stipulated in Presidential Regulation No. 52 of 2022.[6]

Academic research has further analyzed these challenges. For instance, Zulfida and Pranoto emphasized that destroyed land—when legally classified as such—results in the termination of ownership rights.[7] Meanwhile, Amirsyah et al. highlighted that disputes over shifted boundaries can be resolved through physical and non-physical evidence presented in court, following Government Regulation No. 24 of 2007 and Ministerial Regulation No. 21 of 2020.[8] Moreover, the study by Limonu argued that the government's decision to reclaim affected land in Petobo for public safety purposes—though unpopular—was legally justifiable. While some residents were dissatisfied with the loss of their land rights, the government provided compensation in the form of permanent housing (*Huntap*), albeit not always equivalent to their original property.[9]

These dynamics underscore the lack of a coherent, disaster-responsive land law in Indonesia. Field observations reveal that lands altered by liquefaction lack a clear legal status. Although ownership rights persist in legal theory, they become ambiguous and contested in practice. This legal vacuum leads to confusion, delays in aid, and secondary displacement, particularly in areas like Petobo Village.

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[6] Rakhmawan, Mokhamad Usman, Sutaryono Sutaryono, and Setiowati Setiowati. "Potensi Pengadaan Tanah Berbasis Kebencanaan di Kota Palu." *Tunas Agraria* 2, no. 3 (2019): 106-123.

[7] Zulfida, Zela Ony, and Edi Pranoto. "Perlindungan Hukum Terhadap Pemilik Hak atas Tanah atas Tanah Yang Musnah." *Thesis,* Semarang: Universitas 17 Agustus 1945 Semarang, 2024.

[8] Amirsyah, Amirsyah, Felicitas Sri Marniati, and Basuki Basuki. "Perlindungan Hukum Bagi Para Pihak Yang Dirugikan dalam Bidang Pertanahan Akibat Peristiwa Bencana Alam Terkait Bergesernya Batas Tanah." *Jurnal Ilmiah Global Education* 4, no. 1 (2023): 1-11.

[9] Limonu, Riski Aldi. "Tinjauan Yuridis Tentang Kepemilikan Tanah Bekas Tempat Bencana Alam Likuefaksi". *Thesis.* Poso: Universitas Sintuwu Maroso, 2022.

International comparative experiences offer helpful hints about these issues. Spain's recovery efforts following the 2011 Lorca earthquake show that while compensation mechanisms exist, bureaucratic delays often hinder timely restitution.[10] Similarly, in Oman, the aftermath of Cyclone Gonu exposed the limitations of the Land Expropriation Law (Royal Decree No. 6/2008), particularly due to incomplete land records and weak enforcement.[11]

Spain's experience with the 2011 earthquake in Lorca, Murcia, is a good example of how to manage land after a disaster. The disaster, which caused 9 fatalities, injured over 300 people, and damaged more than 80% of buildings in the city, exposed substantial gaps in urban resilience and legal mechanisms for land and housing recovery. In response, the Spanish government invoked Royal Decree 307/2005, which regulates subsidies and compensation for individuals affected by emergencies and disasters. This law establishes a legal basis for the recognition of land and housing rights and facilitates financial aid for rebuilding. However, in practice, the implementation was slow due to complex bureaucratic procedures, inconsistent damage assessments, and delays in verifying land ownership. Moreover, many affected properties were either inherited informally or lacked up-to-date cadastral registration, making it difficult for residents to claim compensation. Despite these challenges, Spain's legal framework emphasizes the principle of *legal security* in recovery—ensuring that individuals have access to restitution mechanisms through administrative appeals and judicial review. The Lorca case also prompted reforms in building codes and disaster risk management, integrating land use planning into future risk reduction strategies.[12]

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[10] Santamaría, Gregorio Pascual, Sofía González López, and Lucrecia Alguacil Alguacil. "Análisis de Consecuencias y Actuaciones de Protección Civil en el Terremoto de Lorca (Murcia): Pre-Emergencia, Emergencia y Post-Emergencia/Analysis of consequences and Civil Protection activities in the Lorca earthquake (Murcia): Pre-emergency, Emergency and Post emergency." *Física de la Tierra* 24 (2012): 343.

[11] Mansour, Shawky, et al. "Geospatial modelling of tropical cyclone risk along the northeast coast of Oman: Marine hazard mitigation and management policies." *Marine Policy* 129 (2021): 104544.

[12] *See* López-Comino, José-Ángel, et al. "Rupture directivity of the 2011, Mw 5.2 Lorca earthquake (Spain)." *Geophysical Research Letters* 39, no. 3 (2012); Rodríguez, Mario Octavio Cotilla, and Diego Córdoba Barba. "El terremoto de

Oman's experience with Cyclone Gonu in 2007 provides a contrasting approach rooted in a more centralized and administratively driven legal system. The cyclone caused widespread flooding, destroyed thousands of homes, and resulted in significant displacement, particularly along the coastal areas of Muscat and eastern Oman. To manage post-disaster reconstruction, the Omani government relied on the Land Expropriation Law (Royal Decree No. 6/2008), which authorizes the state to acquire private land for public benefit in return for compensation. Additionally, cyclone-specific decrees were issued to facilitate recovery, including measures for damage assessment, housing reconstruction, and land reallocation. While these laws empowered the government to act swiftly, challenges arose due to the prevalence of unregistered or communally held land, especially in rural and tribal areas. Many affected citizens faced difficulties in proving ownership, as the country's land registration system remains incomplete despite modernization efforts. Furthermore, compensation mechanisms were not always transparent or consistent, leading to dissatisfaction among displaced communities. Unlike Spain, Oman's system lacked formal channels for public participation or legal contestation of compensation decisions, although community leaders were sometimes involved informally in the mediation process.[13]

These international cases reveal a common pattern: delays, legal ambiguities, and limited community participation often characterize post-disaster land governance. However, they also illustrate diverse legal tools and institutional frameworks that may offer lessons for countries like Indonesia. For example, Spain's legal infrastructure emphasizes restitution and community consultation, while Oman's centralized system allows for swift expropriation and compensation, albeit with less transparency.

Lorca-Murcia, España (2011): interpretación morfotectónica." *Revista Geográfica* (2013): 115-131.

[13] *See* Fritz, Hermann M., et al. "Cyclone Gonu storm surge in Oman." *Estuarine, Coastal and Shelf Science* 86, no. 1 (2010): 102-106; Al-Shaqsi, Sultan. "Care or Cry: Three years from Cyclone Gonu. What have we learnt?." *Oman Medical Journal* 25, no. 3 (2010): 162; Al-Maskari, Juma. "How the national forecasting centre in Oman dealt with tropical cyclone Gonu." *Tropical Cyclone Research and Review* 1, no. 1 (2012): 16-22.

Methodologically, this study uses a descriptive-empirical legal approach, analyzing statutory regulations, field data, case law, and policy documents from Indonesia, Spain, and Oman. The objective is to assess how different legal frameworks handle land ownership in post-disaster contexts and what mechanisms they provide to ensure legal protection and land tenure security.

The urgency of this research lies in addressing the legal vacuum affecting civil rights—particularly land ownership—of disaster victims in Petobo Village. Despite several post-disaster interventions, legal and institutional frameworks in Indonesia still lack a comprehensive and enforceable system for handling land ownership in areas altered or destroyed by geological events like liquefaction.

This study adopts a qualitative, empirical, and comparative legal research approach to examine how different legal frameworks handle land ownership and protection in post-disaster recovery. The qualitative aspect allows for an in-depth understanding of how laws are interpreted and implemented in practice, particularly in the context of disaster-related land issues. The empirical component emphasizes real-world evidence drawn from official documents, field reports, and practical experiences of affected communities. Meanwhile, the comparative approach enables a cross-country analysis of legal frameworks and their effectiveness in post-disaster settings, offering helpful information about how diverse legal traditions manage land tenure security during recovery.

This study draws its data from both primary and secondary sources. Primary sources encompass national legislation, regional regulations, government decrees, and official recovery policies from Indonesia, Spain, and Oman. Secondary data include academic literature, research reports, legal analyses, and documentation from NGOs and international organizations. Where available, qualitative data such as interviews, field observations, and testimonies from disaster survivors and legal practitioners are incorporated to highlight the gaps between law and practice in the recovery process.

Three case studies were selected to represent different legal and geographical contexts: Central Sulawesi in Indonesia (affected by the 2018 earthquake, tsunami, and liquefaction), Lorca in Spain (impacted by the 2011 earthquake), and coastal regions of Oman (damaged by Cyclone Gonu in 2007). These cases were chosen for their relevance to

the research focus and for the presence of legal frameworks intended to govern land restitution and compensation. The study examines the execution of these frameworks to discern legal strengths and weaknesses, institutional challenges, and the ramifications for land tenure security in post-disaster recovery initiatives.

A. Legal Protection of Land Rights in Post-Earthquake Disasters and Liquefaction: the Case of Petobo, Sulawesi, Indonesia

Land issues are inherently complex and often require considerable time to resolve. These problems are multifaceted and sensitive, as they intersect with various social, economic, political, and psychological dimensions of life. Several factors, including natural disasters like tsunamis, landslides, floods, and other environmental hazards, exacerbate challenges within the land sector in Indonesia.[14]

Liquefaction is a phenomenon in which saturated granular soil, typically loose to moderately compacted and well-drained, temporarily loses its strength and stiffness, effectively behaving like a liquid. This soil transformation frequently occurs during seismic events. The process of land reconstruction following liquefaction-induced natural disasters presents numerous challenges, particularly concerning land identification and the legal protection of land ownership rights. These difficulties arise primarily due to the destruction of land boundaries and the loss of physical evidence verifying ownership.

In general, rebuilding land after a disaster is a complicated process. A significant challenge lies in the identification and legal safeguarding of ownership status, especially when the physical markers defining land boundaries are damaged or obliterated by the disaster. Such disruptions complicate the mapping and measurement processes, undermining the legal certainty of land tenure in areas affected by liquefaction.[15]

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[14] Aji, Iman Wahyu. "Penyelesaian Sengketa Tanah Akibat Bencana Alam di Kecamatan Bruno, Kabupaten Purworejo." *Amnesti: Jurnal Hukum* 2, no. 2 (2020): 103-113.

[15] *See* Rachman, Rahmia, and Erlan Ardiansyah. "Status of Land Rights Post Liquefaction." *2021 Tadulako's International Conference on Social Sciences (TICoSS 2021)*. Atlantis Press, 2022; Antoni, Antoni, and Binsar Jon Vic.

In providing legal protection to victims of natural disasters, the government must implement policies that ensure the rights of affected individuals are safeguarded in accordance with their inherent human dignity. One important step in this direction is to give victims who have lost their homes permanent housing. This form of assistance represents a concrete implementation of government policy aimed at managing and overcoming the challenges of post-disaster rehabilitation and reconstruction. The allocation of aid is determined based on the extent of damage to the victims' residences, and this support is commonly referred to as stimulant assistance.

The amount of assistance granted to victims is stipulated in the Regulation of the Mayor of Palu, Central Sulawesi, No. 7 of 2022, which serves as the third amendment to Mayor's Regulation No. 35 of 2019. This regulation (hereinafter *Perwalkot No. 7 of 2022*) provides technical guidelines for the rehabilitation and reconstruction of housing following natural disasters, including earthquakes, tsunamis, and liquefaction (Phase II). According to Chapter II, Section 2.2, Letter b, the policy specifies the following aid amounts: IDR 50,000,000 for severely damaged houses, IDR 25,000,000 for moderately damaged houses, and IDR 10,000,000 for lightly damaged houses.[16]

Several considerations guided the construction of permanent housing in Petobo Village. Primarily, many residents affected by the earthquake and liquefaction disaster were unwilling to relocate to other areas. Furthermore, disaster survivors had stayed in temporary housing (*Huntara*), provided by the government during the initial disaster response, for over five years—far beyond the initially promised two-year period. Based on these factors and with the approval of the Regional Government, the National Land Agency of Palu City coordinated land acquisition efforts for the development of permanent housing (*Huntap*) in Petobo Village.[17]

"Reconstructing Ownership and Legal Certainty of Land Experiencing Liquefaction to Protect Community Rights." *Devotion: Journal of Research and Community Service* 6, no. 6 (2025): 520-534.

[16] *See* Riansyah, Fikri, and Hadi Prabowo. "Strategi Percepatan Rehabilitasi dan Rekonstruksi Dampak Bencana Likuefaksi Oleh Pemerintah Kota Palu Provinsi Sulawesi Tengah". *Thesis.* Bandung: IPDN, 2025.

[17] Pradoto, R. G. K., et al. "Palu housing reconstruction process: Reviewing and learning after the 2018 earthquake." *IOP Conference Series: Earth and Environmental Science*. Vol. 1065. No. 1. IOP Publishing, 2022; Sadli, Sartika.

TABLE 1. The number of victims who have not received permanent housing in Petobo Village Until 2023

No	Victims Who Have Not Received Permanent Housing	Total
1	Based on the submission of files received by Petobo Village	845 hp
2	Based on the completeness of the file	650 kg
3	Pass Verification	555 kW

Source: Secondary Data (March 28, 2023)

The data above shows that out of 845 families who registered, only 555 families completed the permanent residence registration process after passing the file verification, indicating that 290 families have not yet registered for permanent housing this year in Petobo Village. Based on this data, the researcher assumes that post-disaster victims face obstacles in obtaining legal protection due to the challenges many victims encounter in meeting the requirements for permanent housing.

Obstacles such as the loss of proof of ownership of the property, such as the certificate of ownership (SHM) and SKPT that were lost at the time of the disaster, or due to the victim who could not prove that they owned the house/land before the disaster. The settlement of land ownership rights can actually be completed, among other things, by guaranteeing certainty and effective legal protection by the government and related institutions for land ownership rights.[18] Another fact is that many victims registered to receive housing but used the same family card; besides that, some victims who had registered suddenly left Petobo to live with their families.

Furthermore, many studies emphasized that the legal status of the destroyed land was examined in relation to Ministerial Regulation No.

"Implementasi Kebijakan Penanganan Penyintas Pasca Bencana Alam Likuifaksi 2018 di Kota Palu (Kasus Korban Likuifaksi Kelurahan Petobo)". *Thesis.* Palu: Universitas Tadulako, 2025.

[18] Kuswanto, Heru, and Arief Dwi Atmoko. "Perlindungan Hukum terhadap Hak Atas Tanah Bersertifikat." *TSL: The Spirit of Law* 6, no. 1 (2019): 30-47.

17 of 2021 from the Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) of the Republic of Indonesia. The research utilized the flooding in the northern region of Pekalongan Regency as a case study. The regulation in question, particularly Article 2, outlines procedures for the determination of land classified as "*destroyed*." According to this provision, both management rights and/or land rights are revoked when land is declared destroyed.[19]

The regulation defines "*destroyed land*" as land that meets specific criteria, including: (a) the land has undergone a physical transformation due to natural events; (b) it can no longer be identified based on existing boundaries or documentation; and (c) it can no longer be used, occupied, or utilized for its original or intended purpose. These conditions are intended to provide a legal framework for managing land loss in disaster-prone areas and to clarify the legal implications for landowners whose property has been irreparably damaged.

This study is relevant in the context of post-disaster recovery, particularly in areas where natural hazards such as floods, earthquakes, or liquefaction permanently alter the physical landscape. It points out that there must be a coherent legal approach that balances the removal of legal rights over unusable land with the provision of fair and timely restitution or compensation mechanisms for affected landholders.

From the criteria above, land that has undergone liquefaction in Petobo village, South Palu District, is not included in the category of destroyed land. So, there is no need for reconstruction and/or reclamation. What the government must do is to record and verify the land based on existing data, whether it is archival, digital data, etc. But it preserves the land rights of the previous owner.

The people in the affected areas (Petobo Village, South Palu District, Palu City, Central Sulawesi Province) are currently waiting for the comfort of permanent housing construction (*Huntap*). Although it

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[19] Anugrah, Dikha, et al. "Regulation of physical data on land destroyed by natural disasters." *UNIFIKASI: Jurnal Ilmu Hukum* 10, no. 2 (2023): 124-135; Sari, Embun, et al. "Land procurement for public interest against destroyed land: natural events and legal certainty." *Civil Engineering Journal* 8, no. 6 (2022): 1167-1177; Permana, Tri Cahya Indra, Sri Wahyu Handayani, and Kamilah Wati bt Mohd. "Granting Priority Rights and Compensation to Owners of Destroyed Land." *Jurnal Dinamika Hukum* 23, no. 3 (2023): 450-466.

seems slow, the government is carrying out its responsibility to protect the rights of victims, and the protection has been implemented, although it has not been maximized. Up until now, the government has been collecting data and identifying the disaster-affected victims who have yet to receive permanent housing. Legal protection for victims' right to obtain permanent housing is established in the law, with the expectation that its implementation will truly provide justice.

According to Maria S.W. Sumardjono, as cited in Bagus Rahmanda, the occurrence of a natural disaster does not automatically extinguish existing land rights. She asserts that if an individual holds a legitimate legal relationship with a parcel of land, such rights remain protected under the law, despite physical damage to the land or the loss of visible boundaries. Furthermore, Sumardjono emphasizes the importance of land registration records held by regional land offices. If these documents—particularly the *warkah* (archival land deed files)—are still intact and accessible, they can serve as vital legal evidence in restoring or confirming land ownership for disaster victims. From this perspective, the existence of such documentation greatly streamlines the legal recovery process and reinforces the ongoing acknowledgment of property rights, even following catastrophic natural occurrences.[20]

If the local BPN Regional Office is destroyed and the land certificate is lost/destroyed, it is necessary to remap the land in question. Additionally, the Village Head can provide evidence to support those seeking recognition of their land rights. In addition to the victim, the heirs of the deceased disaster victim can also request ownership rights to their land located in the area of the former natural disaster.[21] The reconstruction of the boundary of the land parcel is basically the process of redetermining the location of the land parcel boundary involves redetermining the location of the boundary points that have been lost for various reasons, followed by recalculating the coordinates of these

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[20] *See* Rahmanda, Bagus. "Perlindungan hukum bagi pengusaha pemilik tanah akibat musnahnya tanah oleh bencana alam dan kaitannya dengan pihak ketiga." *Gema Keadilan* 6, no. 1 (2019): 63-74.

[21] Rahmanda.

boundary points. To find the location of the boundary points of the land parcel in the field, the following methods are used:[22]

1) Information from land owners, heirs, or community leaders in the area where the land parcels are located provide information through the community-based land registration program.
2) Using the assistance of land certificates that have been issued by BPN (if they still exist).
3) Using the help of satellite imagery combined with geometric data owned by the Directorate of the United Nations and BPHTB.

All three methods can be used individually, although they should be combined to get more and more reliable results. After the location of the land parcel point has been found and determined, the next stage is the determination of the coordinates of the parcel boundary points. Considering the terrain conditions after the disaster and the need for future reconstruction, it is better to determine the coordinates of the boundary points of the land parcel directly using the differential GPS positioning method or indirectly using the GPS combination method.

If the land is destroyed and cannot be used, the right to the land will be removed. The holder of the land rights will be given priority to determine whether to carry out reconstruction or reclamation of the object of the right after the disaster. Based on this regulation, the municipal and central regional governments should not necessarily relocate the subject of rights and designate the object of rights as green open space without considering the fate of the land rights that have been attached to it.

The results of the interview on March 30, 2023, together with Mr. Fahrul, the Head of the Land Acquisition and Development Section of BPN Palu City, stated that:

> *Guided by Ministerial Regulation ATR/BPN No. 17 of 2021 concerning the procedures for determining destroyed land, a*

[22] Rosmita, Rosmita, Fitriani Fitriani, and Nasaruddin Nasaruddin. "Sengketa Hak Kepemilikan terhadap Tanah yang Bergeser Pasca Bencana dalam Tinjauan Hukum Islam." *BUSTANUL FUQAHA: Jurnal Bidang Hukum Islam* 5, no. 2 (2024): 405-428.

> *team was established to carry out the relevant assessment activities. According to this regulation, land may be classified as destroyed if it can no longer be identified or recognized. In practice, such destruction is typically the result of severe environmental phenomena, particularly coastal abrasion or land erosion, where the land has physically disappeared or undergone irreversible transformation. The regulation thus provides a legal basis for formally recognizing the loss of land that no longer has visible form or presence.*[23]

This reconstruction is considered important because the reconstructed land can be used as a reference for determining the boundaries of other land plots. Nevertheless, reconstruction can be carried out as long as conditions on the ground allow. If such reconstruction is not possible, the boundary of the land plot is re-measured based on the physical conditions in the field and with the knowledge of the landowner and neighbors next to it. The remeasurement was carried out in the context of updating or improving the spatial data of the registered land plot.[24]

Boundary reconstruction means returning/relaying boundary stakes on land parcels that are lost or relocated to their original position based on available documents or other valid evidence. In accordance with the PMNA 3/1997/Juknis 3/1997, boundary reconstruction is a measurement activity that is carried out second or several times on a plot of land by referring to the first land registration data (BPN 1998). Some land plot owners have begun to choose to reconstruct the boundary considering that there is no certainty about the implementation of residential relocation to a safer place. Boundary reconstruction will uphold the rights of registered and active land plots. This reconstruction

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[23] The results of the researchers interview with Mr. Fahrul, Head of Land Acquisition and Development of BPN Palu City, dated March 30, 2023.

[24] Lestari, Febyana Ayu. "Analisis Perubahan Bidang Tanah Terdaftar Akibat Gempa Bumi dan Likuifaksi". *Thesis.* Palu: Universitas Tadulako, 2023.

is considered important because the reconstructed land can be used as a reference for determining the boundaries of other land plots.[25]

Legal protection must be based provisions and legal rules that function to provide justice and serve as a means to realize welfare for all people.[26] A Certificate of Ownership as proof of legal ownership gives authority for the holder to carry out legal acts related to the land, whether it is used as a residence, for agriculture, as a plantation, or as business land to meet the needs of life.[27] According to article 32 of Government Regulation Number 24 of 1997 concerning land registration, land certificates that have been issued for 5 years are a strong means of proof. A certificate serves as valid proof of rights, providing strong evidence of both physical and juridical data, as long as this data aligns with the information in the survey letter and the relevant land book.[28]

B. Community Efforts to Reclaim Civil Rights (Land Rights) Following Land Liquidation in Petobo Village

In seeking legal protection and certainty for the civil rights of post-disaster victims, several things that need to be considered are related to the role of the government in facilitating this and related to Governor's Regulation No. 10 of 2019, concerning the Post-Disaster Rehabilitation and Reconstruction plan which is a benchmark for the effectiveness of a regulation determined by the legal factors themselves, whether this regulation has run as expected in its formation or not. According to the theory of legal effectiveness proposed by Soerjono Soekanto, the

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[25] Yustinov, Raras Laila, and Fitika Andraini. "Tinjauan Hukum Pendaftaran Tanah Secara Sistematis melalui Ajudikasi Berdasarkan PP No. 24 Tahun 1997." *Dinamika Hukum* 20, no. 2 (2019): 36-47.

[26] Febrianti, Ayu. "Perlindungan Hukum Terhadap Klien yang Minuta Aktanya Musnah Terkena Bencana Alam di Kota Palu". *Thesis.* Yogyakarta: Universitas Islam Indonesia, 2019.

[27] Khasanah, Dian Dewi, and Alfons Alfons. "Analisis Yuridis Akibat dari Musnahnya Obyek Jaminan yang Dilekati Hak Tanggungan Karena Bencana Alam." *Widya Bhumi* 1, no. 2 (2021): 149-159.

[28] Amrin, Reza Nur, et al. "Status Hukum Hak Atas Tanah Yang Terkena Bencana Alam." *Tunas Agraria* 5, no. 1 (2022): 65-76.

effectiveness of a rule is influenced by the enforcement of the law, the availability of facilities that support law enforcement, and, importantly, the role of how the law is enforced, then the facilities that support law enforcement, and lastly, of course, it is influenced by the community and its culture.[29]

The theory of legal effectiveness proposed by Soerjono Soekanto is relevant to the findings of researchers in the field, specifically regarding the community of disaster victims who are seeking their rights under Governor Regulation No. 10 of 2019; thus, these victims are currently awaiting the implementation of the government's rehabilitation and reconstruction program for permanent housing distribution.

The government carried out a coordinated initiative to inventory the damage to victims' houses after the earthquake and liquefaction disaster in Petobo Village. According to an interview conducted by the author on May 7, 2023, with Mr. Alfian, the Head of Petobo Village, the responsibility for conducting the inventory lies with the Regional Government, which formed a cross-sector Inventory Team. This team operates in coordination with the National Disaster Management Agency (BNPB).

The process involves conducting field surveys to assess the extent of damage to residents' houses. The team sorts the damage into three groups: heavily damaged, moderately damaged, and lightly damaged. They write down the name and address of the homeowner next to each group. Following the completion of this survey, the Regent or Mayor issues an official decree (*Surat Keputusan*/SK) listing the affected individuals and the corresponding level of damage to their homes.

This decree subsequently serves as a supporting document for the submission of the Housing Waiting Fund (*Dana Tunggu Hunian*/DTH) and the Home Stimulant Fund to BNPB. These funds are intended to provide temporary and reconstruction support for victims, highlighting the central role of administrative coordination in post-disaster housing recovery efforts.[30]

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[29] Soekanto, Soerjono. *Faktor-Faktor yang Mempengaruhi Penegakan Hukum.* Jakarta: PT Raja Grafindo Persada. Jakarta, 2008.

[30] *See* Hakim, Fikri Ilmi. "Implementasi Program Pemenuhan Hunian Tetap Bagi Korban Bencana Alam Gempa Bumi, Tsunami dan Likuifaksi di Wilayah Kota Palu

Effective post-disaster management leads to the successful achievement of recovery goals, the development of local capacities, and enhanced community participation in mitigating long-term impacts.[31] However, its implementation often encounters significant challenges. One major obstacle is the process of proving land ownership rights. Although, juridically, individuals who have registered their land with the National Land Agency (BPN) possess clear legal proof of ownership, disasters can complicate the administrative processes needed to verify these rights in the aftermath.

Regarding the legal status of land rights for victims affected by liquefaction, those impacted retain the right to initiate efforts to restore the boundaries of their displaced land parcels through reconstruction programs facilitated by the Palu City Regional government.[32] Additionally, the government provides permanent housing relocation to victims who have lost their homes due to liquefaction. However, Mr. Bakri, a disaster victim, expressed uncertainty and passivity concerning these efforts during an interview conducted on May 7, 2023. When asked about the actions taken to secure shelter, he stated, *"So far, I have not taken any action; I am waiting for notification to submit the necessary documents. Once asked to complete the data, I immediately delivered it to the Village Office."*

When asked about the status of land located within the designated red zone, Mr. Bakri remarked, *"Regarding that, I have not pursued any claims. It depends on the government's decisions. I am resigned, but if the government intends to take over our land, compensation must be provided. Even if I do not receive permanent housing, I will return to my land despite any government prohibitions."*[33]

Provinsi Sulawesi Tengah". *Thesis.* Bandung: Institut Pemerintahan Dalam Negeri, 2022.

[31] Ngulube, Nombulelo Kitsepile, Hirokazu Tatano, and Subhajyoti Samaddar. "Toward participatory participation: A community perspective on effective engagement in post-disaster recovery and reconstruction." *Community Development* 55, no. 6 (2024): 895-915.

[32] Tjitrawati, Tri, et al. "The Palu Disaster and Indonesia's Obligation to Ensure the Right of Adequate Housing and Land Rights: Mission Accomplished?."

[33] Interview with Mr. Bakri, as the victim, May 7, 2023

These issues arise within the context of the legal framework established by Presidential Regulation No. 17 of 2018 on Disaster Management Implementation. Article 1, paragraph (1) defines *Certain Circumstances* as situations where the disaster emergency status has not been declared, has ended, or has not been extended, yet actions are still necessary to reduce disaster risks and their broader impacts. This regulatory provision points out the need for structured intervention even beyond formal emergency periods, highlighting the complexities faced by disaster victims in securing their rights and rebuilding their lives.[34]

The authors observe that, following the earthquake and liquefaction disaster in Petobo Village, individual efforts by victims to assert their rights have been minimal. Instead, collective actions have been organized within communities based on their place of residence, primarily focused on disseminating information and mobilizing victims to collectively advocate for their rights, particularly regarding access to permanent housing and land ownership. This limited individual initiative may be attributed to the perception that the government has provided sufficient legal protection and certainty, as outlined in Governor's Regulation No. 10 of 2019 on Post-Disaster Rehabilitation and Reconstruction. Furthermore, the Palu City Government had publicly announced a phased approach to permanent housing construction, leading many victims to adopt a wait-and-see stance despite prolonged delays. Victims continue to trust that the government will eventually uphold their legal rights, even if fulfillment takes years.[35]

Compounding the situation, the land used by the government for temporary housing to shelter thousands of displaced residents has been subject to an expired lease agreement. The original loan-and-use contract with the landowner was limited to two years and was not extended after

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[34] *See* Ariyaningsih, et al. "Disaster Law in Indonesia." In *Disaster Law: Implications to Governance and Implementation*. Singapore: Springer Nature Singapore, 2025, pp. 183-205.

[35] Maisa, Maisa, and Haerani Husaniy. "Dispute Resolution of Destroyed Mortgage Guarantee (Case Study of Petobo Village, South Palu District, Palu City)." *Omnibus Law Journal* 1, no. 1 (2021): 9-13; Maisa, Maisa, Muliadi Muliadi, Windiahsari Windiahsari. "The Legality of Land Ownership Right that Changes in Position and Size (Case Study of Natural Liquefaction Disaster in Palu City)". *Journal of Indonesian Legal Studies* 9, no. 1 (2024): 457-480.

its expiration three years ago. Consequently, the landowner issued a formal eviction notice to the Mayor of Palu, demanding the vacating of the land. This eviction has forced many victims into precarious living situations—relying on relatives for shelter or, in some cases, residing in inadequate conditions such as cattle sheds. The lack of secure temporary housing has exacerbated the vulnerabilities of the displaced population, leaving many in a state of limbo while awaiting the promised permanent housing.

Despite the ongoing construction of permanent housing, victims still lack sufficient legal certainty and protection. The government needs to work harder to make sure that only the people who are supposed to get housing—those whose land was damaged by the earthquake and liquefaction disaster—get it. This means collecting data accurately and keeping an eye on the housing distribution process. Without such measures, the promise of recovery risks remaining unfulfilled for many victims still struggling to rebuild their lives.

C. Compensation for Land and Property in Post-Disaster in Spain: Case of the 2011 Lorca Earthquake

The 2011 earthquake in Lorca, located in the Murcia region of Spain, stands out as a significant natural disaster despite its moderate magnitude of 5.1. What made the earthquake particularly destructive was its shallow depth and proximity to the urban center, which caused extensive damage to buildings, infrastructure, and homes, displacing thousands of residents. The sudden nature of the disaster caught the local authorities and communities off guard, creating an urgent need for coordinated emergency response and recovery efforts. The earthquake exposed vulnerabilities in urban planning and disaster preparedness, pressing the Spanish government and regional authorities to rapidly mobilize resources for relief and reconstruction.

A legal framework that facilitates compensation and recovery governs Spain's response to natural disasters like the Lorca earthquake. Central to this framework is Royal Decree 307/2005, which outlines the procedures for compensating victims of natural disasters. This decree sets

forth criteria for eligibility, establishes mechanisms for assessing damages, and delineates the responsibilities of governmental bodies involved in recovery efforts. Its objective is to provide legal clarity and protection for victims, enabling them to receive compensation promptly and equitably. The decree shows that Spain is committed to a structured and legally sound way of dealing with disasters, with the goal of balancing the needs of victims with the need for administrative efficiency.[36]

However, despite the existence of this legal framework, the practical implementation in Lorca revealed significant challenges, particularly concerning compensation for land and property damage. While the law stipulates that victims should be compensated, many property owners encountered difficulties in substantiating the extent of the damage and navigating the often complex bureaucratic procedures required to claim compensation. Variability in property types, inconsistent ownership documentation, and complexities in asset valuation further complicated the process. These factors led to inconsistencies in compensation outcomes, with some victims receiving insufficient restitution to fully cover reconstruction costs. Consequently, financial insecurity persisted among many affected households, hindering their ability to recover fully.[37]

One of the most critical impediments to efficient recovery in Lorca was the delay in executing compensation and reconstruction programs. Despite the clear legal provisions, administrative bottlenecks, slow processing times, and procedural complexity prolonged the delivery of assistance to victims. These delays not only impeded the rebuilding process but also prolonged the period of displacement and uncertainty for thousands of residents. The disconnect between the legal framework and its practical application underscored systemic inefficiencies in

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[36] Santamaría, Gregorio Pascual, Sofía González López, and Lucrecia Alguacil Alguacil. "Análisis de Consecuencias y Actuaciones de Protección Civil en el Terremoto de Lorca (Murcia): Pre-Emergencia, Emergencia y Post-Emergencia/Analysis of consequences and Civil Protection activities in the Lorca earthquake (Murcia): Pre-emergency, Emergency and Post emergency." *Física de la Tierra* 24 (2012): 343.

[37] Wlodarczyk, Anna, et al. "Communal coping and posttraumatic growth in a context of natural disasters in Spain, Chile, and Colombia." *Cross-Cultural Research* 50, no. 4 (2016): 325-355.

disaster governance. It highlighted the pressing need to streamline administrative procedures to facilitate quicker relief and recovery, thereby reducing the socio-economic hardships experienced by disaster victims.

Legal certainty regarding the ownership of damaged properties emerged as another significant issue affecting recovery efforts. Spain's property registration system is generally comprehensive; however, problems arose when discrepancies in records or outdated documentation hampered the verification of ownership claims. Some victims struggled to provide sufficient legal proof of ownership, particularly in cases where informal property arrangements existed or where official paperwork was incomplete. This uncertainty delayed compensation disbursement and introduced disputes, undermining the equitable distribution of aid. Ensuring accurate and up-to-date property registration is therefore crucial to enhancing legal certainty and facilitating efficient disaster recovery processes.

The combined effect of compensation challenges, administrative delays, and ownership verification problems substantially impacted the speed and quality of Lorca's post-earthquake recovery. Many victims remained unable to rebuild their homes promptly due to financial constraints and bureaucratic hurdles. This prolonged state of limbo not only affected physical reconstruction but also exerted psychological strain on affected individuals and communities. The slow recovery process undermined community resilience, highlighting vulnerabilities in Spain's disaster response and recovery frameworks. It became evident that legal frameworks alone are insufficient without effective implementation and community-centered approaches to recovery.

Institutional responses to the Lorca earthquake involved coordination among various governmental agencies at regional and national levels. However, the multiplicity of actors and overlapping responsibilities sometimes resulted in confusion and inefficiency. While Royal Decree 307/2005 provided the necessary legal basis, it did not fully address the challenges related to institutional capacity and inter-agency coordination. This deficiency resulted in fragmented efforts and delayed action, leading to clearer mandates, improved communication channels, and integrated recovery planning among involved institutions.

Strengthening institutional frameworks is thus essential to ensure timely and effective disaster management.[38]

Beyond institutional issues, the social dynamics of recovery in Lorca demonstrated the importance of community participation. Informal networks played a vital role in disseminating information and assisting victims in navigating complex bureaucratic processes. Nonetheless, disparities in access to legal advice and administrative support meant that marginalized groups, including low-income households and renters, faced disproportionate challenges in securing compensation and rebuilding assistance. This unequal access exacerbated existing social vulnerabilities, indicating the importance of inclusive recovery policies that prioritize equity and provide targeted support for the most disadvantaged populations.

The Lorca earthquake experience offers critical lessons for disaster law and policy. It illustrates that while a comprehensive legal framework is necessary, it must be complemented by effective implementation mechanisms to translate legal rights into tangible outcomes.[39] Delays in compensation and reconstruction highlight the importance of streamlining administrative procedures and building institutional capacity. Moreover, accurate property registration and legal clarity are indispensable to ensuring fairness in post-disaster compensation. Policymakers must address these gaps to foster resilience and equity in disaster recovery.

Recommendations to improve disaster recovery based on the Lorca case include enhancing digital record-keeping and data management to facilitate rapid verification of ownership and damage

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[38] *See* López, Sofía González. "Secuencia sísmica de Lorca: análisis de consecuencias y actuaciones de emergencia y post-emergencia." *Alberca: Revista de La Asociación de Amigos Del Museo Arqueológico de Lorca* 10 (2012): 9-37; Solares, José Manuel Martínez, et al. "El terremoto de Lorca de 11 de mayo de 2011 y la sismicidad de la región/The 11 May 2011 Lorca earthquake and the seismicity of the region." *Física de la Tierra* 24 (2012): 17.

[39] Rojo, Marc Bertran, Elise Beck, and Céline Lutoff. "The street as an area of human exposure in an earthquake aftermath: the case of Lorca, Spain, 2011." *Natural Hazards and Earth System Sciences* 17, no. 4 (2017): 581-594; Moreno, Sandra Dema, Rosario González Arias, and Rocío Pérez-Gañán. "Women and children first? An analysis of gender roles in the rescue of people following the 2011 Lorca earthquake." *International Journal of Disaster Risk Reduction* 73 (2022): 102902.

assessments. Simplifying compensation claims processes and establishing transparent, accountable mechanisms can mitigate delays. Strengthening institutional coordination through dedicated recovery units and clarifying roles can improve efficiency. Additionally, expanding access to legal aid and outreach programs can empower victims, especially vulnerable groups, to effectively exercise their rights. All of these steps would make post-disaster recovery faster, fairer, and more effective.

When viewed comparatively, the Spanish experience echoes challenges faced globally in balancing legal certainty with the urgency of recovery. Issues such as documentation difficulties, compensation inadequacy, and administrative bottlenecks are common across jurisdictions. Spain's legal framework, however, offers a robust foundation that, with improved execution, can serve as a model for other countries. Cross-national learning is crucial for refining legal and institutional approaches to post-disaster land and property recovery.

In addition, the Lorca earthquake case underscores the complex relationship between legal frameworks and the practical realities of disaster recovery. Although Royal Decree 307/2005 establishes a solid legal foundation for compensation and rights protection, implementation challenges and systemic delays have hindered full recovery.[40] Ensuring legal certainty, bolstering institutional capacity, and fostering inclusive community participation are vital for improving outcomes for disaster victims. The lessons from Lorca contribute valuable insights to the broader field of disaster law and policy, with implications for Spain and beyond.

D. Land Rights Protection Post Disaster in Oman: Case of Cyclone Gonu in 2007

The impact of Cyclone Gonu in 2007 marked one of the most devastating natural disasters in Oman's recent history. The cyclone

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[40] *See* Spanish Government. *Real Decreto 307/2005, de 18 de marzo, por el que se regulan las subvenciones en atención a determinadas necesidades derivadas de situaciones de emergencia o de naturaleza catastrófica, y se establece el procedimiento para su concesión* (Royal Degree 3007/2005). Online at https://www.boe.es/eli/es/rd/2005/03/18/307

caused extensive damage across several coastal and interior regions, resulting in widespread destruction of homes, infrastructure, and agricultural lands. The sudden and severe nature of the disaster overwhelmed local communities and government agencies alike, necessitating immediate humanitarian response and long-term recovery efforts. The cyclone's impact highlighted vulnerabilities in disaster preparedness and exposed critical gaps in land and property governance systems, which in turn complicated recovery and reconstruction processes.

Oman's legal framework for land ownership and disaster recovery centers around Royal Decree No. 6/2008 on Land Expropriation and specific legislation enacted for Cyclone Gonu recovery efforts. These laws give the government the power to handle land redistribution, compensation, and rebuilding after disasters. The Royal Decree sets out procedures for the expropriation of land for public purposes, including disaster recovery, and defines the rights and obligations of affected landowners. In parallel, laws related to Cyclone Gonu recovery sought to establish mechanisms for rapid relief and rehabilitation, emphasizing the government's role in facilitating land and housing solutions for displaced populations. Despite these legal instruments, challenges in implementation limited their effectiveness on the ground.[41]

One of the foremost issues in Oman's post-Gonu recovery was the incomplete registration of property ownership. The cyclone left many land parcels without formal documentation or with outdated or unclear ownership details recorded. This absence of comprehensive property records posed significant difficulties in identifying rightful owners and processing compensation claims. The fragmented and incomplete cadastral information slowed down efforts to redistribute land and hindered victims from asserting their property rights effectively. This gap in property registration not only delayed recovery but also created potential conflicts and legal disputes over land tenure, undermining the stability necessary for reconstruction.[42]

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[41] Was repealed by Royal Decree 71/2023, *see* Oman. *Royal Decree 71/2023 Issuing the Law on the Expropriation for Public Benefit*. Online at https://decree.om/2023/rd20230071/

[42] *See* Al-Badi, Ali H., et al. "IT disaster recovery: Oman and Cyclone Gonu lessons learned." *Information Management & Computer Security* 17, no. 2 (2009): 114-

The mechanisms established for land distribution and compensation following Cyclone Gonu also faced significant practical challenges. Although the legal framework empowered the government to allocate land and provide compensation to victims, the actual execution of these policies was marred by inefficiencies and inconsistencies. The processes for damage assessment, compensation valuation, and land allocation were often slow and lacked transparency, leading to delays and dissatisfaction among affected communities. Furthermore, the criteria for eligibility and compensation amounts were not always clearly communicated or uniformly applied, exacerbating perceptions of unfairness. These issues diminished trust in governmental recovery efforts and hampered the timely restoration of livelihoods.[43]

Weak enforcement and inconsistent implementation of disaster recovery laws further complicated Oman's post-Gonu rehabilitation. While the legal provisions existed on paper, the enforcement mechanisms were insufficient to ensure compliance and accountability among implementing agencies. Limited administrative capacity and bureaucratic inertia delayed the processing of claims and delivery of benefits. In some cases, political or social influences interfered with fair enforcement, resulting in uneven access to compensation and land redistribution. The lack of robust oversight and monitoring mechanisms weakened the overall effectiveness of legal protections intended to assist victims and rebuild affected areas.

Social and administrative obstacles played a crucial role in shaping the outcomes of recovery efforts in Oman. Traditional social structures and community dynamics affected land ownership and access to resources, which sometimes went against the law. Additionally, the administrative framework lacked the flexibility and responsiveness needed to address the complex realities faced by disaster victims. Limited

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126; Aguirre-Ayerbe, Ignacio, et al. "From tsunami risk assessment to disaster risk reduction–the case of Oman." *Natural Hazards and Earth System Sciences* 18, no. 8 (2018): 2241-2260.

43 Al Maamari, Raya Hamed Hilal. "Social work practice in the aftermath of natural disasters: A qualitative inquiry in the Sultanate of Oman". *PhD Thesis*. Nottingham: University of Nottingham, 2023; Manji, Al, and Suad Saud Bashir. "Planning for resilience to extreme weather events in Oman, 2000-2015". *PhD Thesis.* Leeds: University of Leeds, 2018.

public awareness of legal rights and procedures further disadvantaged vulnerable groups, such as women, low-income families, and informal settlers, who struggled to navigate the bureaucratic landscape. These social and administrative barriers compounded the difficulties in achieving equitable and efficient disaster recovery.

The cumulative impact of these challenges was a protracted and uneven recovery process in the aftermath of Cyclone Gonu. Many victims remained in temporary shelters or inadequate housing for extended periods, reflecting the delays and inefficiencies in land and housing restitution. The uncertainties around property rights and compensation undermined confidence in recovery programs and slowed the return of displaced populations to their communities. The case of Oman points out the critical value of integrating comprehensive land registration systems, clear legal frameworks, and effective enforcement mechanisms to support resilient post-disaster recovery.

Institutional coordination during the recovery process revealed significant gaps, as multiple agencies with overlapping mandates struggled to deliver coherent and timely support. The lack of a centralized recovery authority contributed to fragmented interventions and inconsistent application of laws. Enhancing institutional capacity, clarifying roles, and improving inter-agency communication emerged as critical needs to strengthen governance and accelerate recovery. These institutional lessons resonate beyond Oman, highlighting universal challenges in disaster management systems in developing and transitional contexts.

The experience of Oman after Cyclone Gonu shows how important it is to have clear property rights as a key part of effective disaster recovery. Legal frameworks cannot fully protect victims or help with rebuilding if there is no clear and easy-to-find proof of land ownership. Furthermore, the case illustrates that legal provisions must be accompanied by strong administrative capabilities and social inclusivity to ensure that all affected populations can access their rights. Addressing these intertwined legal, institutional, and social dimensions is essential for building resilience against future disasters.

Recommendations arising from the Omani case include prioritizing the modernization and digitization of land registration systems to ensure accuracy and accessibility. Strengthening enforcement

mechanisms and streamlining compensation procedures can mitigate delays and improve transparency. Creating legal aid and outreach programs that include everyone would give vulnerable groups the tools they need to stand up for their rights and take part in recovery in a meaningful way. Institutional reforms that focus on improving coordination and building capacity would make disaster governance frameworks even stronger. Collectively, these measures would improve the speed, fairness, and effectiveness of recovery interventions.

When compared internationally, Oman's post-Gonu experience reflects common challenges seen in disaster-affected countries, such as gaps in property documentation, weak enforcement, and administrative bottlenecks. However, Oman's legal framework, particularly Royal Decree No. 6/2008, provides a structured basis for recovery efforts that, if better implemented, could facilitate more effective rehabilitation. The lessons learned reinforce the need for integrated approaches combining legal reforms, institutional strengthening, and community engagement to enhance post-disaster recovery outcomes.

Therefore, the aftermath of Cyclone Gonu reveals the complexities of applying legal frameworks in post-disaster contexts, especially where property registration is incomplete and institutional capacity is limited. Although Oman has established legal instruments intended to support disaster victims, practical challenges in enforcement, documentation, and administration have constrained recovery progress. To achieve equitable and efficient reconstruction, it is imperative to enhance legal certainty, build robust institutional systems, and address social barriers. The case of Oman contributes valuable insights for disaster law and policy, emphasizing the broad scope of post-disaster recovery challenges.

Conclusion

This comparative study of legal protection and land ownership certainty in post-disaster recovery across Indonesia, Spain, and Oman reveals critical insights into the complexities and challenges of land governance in disaster-affected contexts. In each case, despite the presence of legal frameworks designed to safeguard victims' land rights and facilitate reconstruction, practical obstacles have significantly

impeded the effective realization of these rights. Indonesia's experience following the 2018 earthquake and liquefaction in Petobo Village highlights how regulatory provisions, such as Governor Regulation No. 10 of 2019, provide a foundation for land restitution and housing reconstruction, yet persistent delays in the delivery of permanent housing undermine the protection of victims' rights. Similarly, Spain's response to the 2011 Lorca earthquake demonstrates that even with comprehensive legal mechanisms like Royal Decree 307/2005, bureaucratic inefficiencies and delays in compensation disrupt timely recovery and contribute to legal uncertainties for affected property owners.

In Oman, the problems are made worse by incomplete land registration systems and poor enforcement of recovery laws after Cyclone Gonu, even with the legal tools provided by Royal Decree No. 6/2008 and specific laws for recovery after the cyclone. These limitations underscore how the lack of comprehensive property documentation and administrative coordination can hinder equitable compensation and land redistribution efforts. The comparative analysis reveals that beyond the existence of legal frameworks, the efficacy of post-disaster recovery is heavily contingent on transparent enforcement, robust institutional capacity, and inclusive procedures that address the social and administrative realities on the ground.

The findings of this study emphasize the urgent need for governments in disaster-prone regions to strengthen legal protections and ensure clearer, more reliable proof of land ownership prior to disasters. Additionally, timely implementation and consistent enforcement of recovery laws are essential to guarantee victims' rights and accelerate rehabilitation. Enhancing land governance through improved property registration, streamlined compensation mechanisms, and greater community participation can reduce uncertainty and foster more resilient post-disaster recovery. Ultimately, this research contributes to the broader discourse on disaster law and policy by highlighting how integrated legal, administrative, and social approaches are vital for achieving sustainable recovery and protecting vulnerable populations' rights in the aftermath of natural disasters.

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