

Update on 2020 REPORT

2023

'Responding to Natural Disasters & Emergencies:

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Message by Tan Pei Ing, Secretary General, April 2023

Natural disasters and emergencies have been affecting our communities in increasing frequency and devastating ways, and it has become essential to develop guidelines that architects and urban planners can follow to ensure the safety and well-being of citizens in the aftermath of these events.

The 'Responding to Natural Disasters & Emergencies: Proposed Inclusive Guidelines' for Architecture and Urban Planning by the UIA Architecture for All Work Programme is an exceptional publication that offers a comprehensive analysis of the challenges encountered in the wake of natural disasters. The guidelines and case studies presented in the publication aim to provide practical solutions to the complex issues presented by these events and promote a more proactive approach to disaster response and recovery in the field of architecture and urban planning. The publication highlights the crucial role that architects can play in responding to natural disasters and emergencies and rebuilding more inclusive communities.

This updated edition includes additional case studies that showcase the relevance of these guidelines in various contexts. It provides valuable insights into reconstruction efforts following natural disasters, the crucial role of emergency architects, the impact of disasters on the accessibility of buildings for disabled persons, and the challenges and opportunities in designing affordable housing in post-disaster recovery. The inclusive guidelines proposed in the publication prioritize accessibility, sustainability, and community engagement, providing a comprehensive framework that can be tailored to specific disaster scenarios.

With the publication of this updated edition, the UIA Architecture for All Work Programme reinforces its dedication and commitment to promoting the adoption of inclusive design principles and empowering architects to

play a crucial role in disaster response and recovery efforts worldwide. This publication serves as an exceptional and informative resource for architects, policymakers, and anyone interested in understanding the importance of inclusive design in post-disaster reconstruction and recovery.

I would like to congratulate all the parties involved in this effort. This updated publication exemplifies how the UIA Working Bodies, in this instance, the UIA Architecture for All work programme can make significant contributions to provide comprehensive knowledge on inclusive pre and post disaster management and also on Architects' roles to address them.

Message by Allen Kong , Co-Director , Architecture for All Work Program May 2023

I would like to congratulate all the authors involved in this effort both for the publication and the engagement in their communities . The UIA Architecture for All work programme can make significant contributions to provide comprehensive knowledge on inclusive pre and post disaster management and also on Architects' roles to address them.

More and more we are realising that the occurrence of disasters and other emergencies are circumstances in waiting. We do have a greater understanding of occurrence of natural events which with preplanning can mitigate the impacts and severity of an event.

Sadly, however there are many times where even though anticipated, the built environment does not have sufficient resistance to the circumstances. But when we do build back, we can build back better.

The articles by **Dr Arina Hayati** et al.

'Inclusion within Urgent Decisions: affordable housing design for post-disaster in Indonesia' examines the circumstance of Aceh after the Tsunami of 2004 and discusses the effectiveness of the recovery.

Natural events such as typhoons are predicted to increase in number and severity because of climate change.

The paper by **Ar. Erico G. Abordo** **'What Went Wrong. When Typhoon Odette Tore Through the Philippines: A Case Study'** by candidly examines the circumstance and adds, "Women and persons with disabilities should publicly lead and promote gender-equitable and universally accessible approaches during the response and reconstruction phases.

Ar Samer Helmy Kasem reflects on the 2023 Turkey – Syria Earthquake on the affordability and accessibility of buildings in the region.

Ar, Dr Joseph Kwan introduces the Emergency Architects (AEA) group of ARCASIA and describes their charter.

Senior Research Fellow Jodie Bailie et al University of Sydney have produced real statistical evidence of the issues relating to people with Disabilities in the aftermath of floods referencing the floods in Lismore Northern New South Wales Australia.

Climate change will rewrite what we have come to describe as environmental disasters. Environments will be more extreme and existing buildings services struggle to cope. Around the world the question is being asked should design for crisis be made mandatory. There is no doubt if it were possible, the choice is simple, however the question of retrofit remains.

1. Inclusive Design Guidelines for Architecture and Urban Planning when responding to Natural Disasters and emergencies

ARCASIA Emergency Architects (AEA)

Ar Dr Joseph KWAN

Director, ARCASIA Emergency Architects (AEA)

Director, Region IV, UIA WP *Architecture for All*

1.1 Abstract

Over past decades, the number of natural disasters has increased tremendously. Each month a new disaster occurs somewhere in the world causing huge damage to the infrastructure and also to the economy.

Emergency architects working with governments and international NGOs craft new shelters for the homeless affected by hurricanes, earthquake, tsunamis, armed conflicts, floods, chemical explosions, and other catastrophes. Architects, planners, and engineers have used their professional expertise (knowledge of risk prevention and of building) to provide sustainable and appropriate assistance to the populations affected by technological (chemical factory explosion), human (civil) and natural disasters (tsunami, earthquake)

ARCASIA emergency architects are professional experts who offer their services for areas that are affected by natural disasters or armed conflicts. Many non-profit, private and government organizations collaborated with architecture firms to help in redevelopment of the affected areas.

The main objectives of ARCASIA Emergency Architects are:

- to support and develop architects' humanitarian engagement in Asia Pacific, thus, to contribute to the development of architecture.

- to train architects with skills to help populations affected by natural, technological, or human disasters.
- to preserve and promote architectural, historical, and cultural world heritage.

The main function of AEA includes emergency architecture planning and project management services for disaster reconstruction and redevelopment.

2. Impact Of 2023 Turkey-Syria Earthquake on The Affordability in Accessibility of Buildings for Disability People After The Disaster in Syrian Areas

SAMER HELMY KASEM, Architect, Managing Director, Diwan of Architecture and Patrimony, Egypt/KSA

2.1 Abstract

On February 6, a magnitude 7.8 earthquake struck southern Turkey, near the northern border of Syria. This quake was followed nearly nine hours later by a magnitude 7.5 earthquake located about 59 miles (95 kilometers) to the southwest.

According to ACAPS, new earthquakes are among the worst scenarios for the region because they can affect human needs and the ability to meet them. Damaged buildings are at risk of collapsing, and survivors may continue to experience constant fear as they begin to deal with ongoing trauma.

The current complex humanitarian emergency in Syria is among the largest in the world and the earthquake will only exacerbate the situation and its vulnerabilities. One of the obstacles to quickly delivering aid in Syria is that the government does not control the entire northwest, the area hardest hit by the quake.

Apartment blocks, recently built to accommodate those forcibly displaced from Syrian government-controlled areas into opposition-controlled northwestern Syria during the nearly 12-year war, have been destroyed. It also destroyed old residential neighborhoods in Salqin and Hareem in rural Idlib, as well as Atarib and Jandriz in Aleppo.

The old buildings in Syria were built without taking into account the occurrence of natural disasters, as they were not confirmed to meet international standards.

Thousands of displaced Syrians continue to suffer as a result of living in refugee camps that do not meet natural human needs, as well as a lack of efforts to rebuild affected areas.

Corresponding Author

SAMER HELMY KASEM, Architect, Managing Director, Diwan of
Architecture and Patrimony, Egypt/KSA

3. When Typhoon Odette Tore Through the Philippines: A Case Study

Ar. Erico G. Abordo

Co-Founder, Architects for Accessibility (Philippines)

Professorial Lecturer, Polytechnic University of the Philippines

3.1 Abstract

Devastation is a way of life in the Philippines. Every year, the country gets hit by at least 20 typhoons. Ultimately, one of those annual typhoons would sweep out the provinces and carry loss, destruction, and heartache. Typhoon Odette hit the small islands of Dinagat and Siargao at the southern portion of the Philippines and flattened the area when it brought with it hurricane winds, heavy rain, and death to the villagers.

Faced with this recurring dilemma, a group of stakeholders had a sit-down with expert panellists, and will try not to provide a solution, but go to notions of identifying the main problems with the island: its design, geography, housing and disaster response, especially for Persons with Disabilities. Using the Harvard Case Study Method, the panellists and the audience will attempt to define the problems that must be answered first, delineate the imposing thesis: What did we do wrong?

INTRODUCTION

The UIA has invited Architects for Accessibility, an affiliate and subgroup of the United Architects of the Philippines – Q.C. Central Chapter, to present during the last conference in 2022 in Spain. The presentation was entitled, “Rebuilding Homes from Typhoon Odette: A Post Disaster Round Table Discussion,” and was a part of the series of case studies presented as a parallel event for The UIA International Madrid Forum on “Affordable Housing Activation (AHA).” This was presented online in the Philippines on April 2022, with stakeholders from the islands of Dinagat and Siargao,

including panelists of disaster experts, architects, government officials, to name a few.

On that fateful day of December 2021, a month of Christmas and holidays, Typhoon Odette hit the small islands of Dinagat and Siargao at the southern portion of the Philippines, and flattened the area when it brought with it hurricane winds, heavy rain, and death to the villagers. It was not the usual devastation that the nation expected: the typhoon not only demolished shoreline dwellings and establishments, but was also accompanied by landslides from the higher grounds, eliminating any form of shelter from the monster of a storm. It was destruction incarnate.

This paper will attempt to answer the impending question: what went wrong? Which decisions, events, and policies, led to the devastation that swept over the islands and affected the lives of many? Moreover, did covid affect such decisions, and where does the safety and future of Persons with Disabilities lie in such environments?

TYPHOONS AND THE SAFETY OF PERSONS WITH DISABILITIES (PWD)

Dinagat Islands is one of many disaster-prone areas in the Philippines and this was made more apparent when Typhoon Odette (Typhoon Rai, internationally) devastated the locality last December 2021. This happened in the middle of the covid pandemic.

While there are efforts to rebuild, the question remains - will Dinagat Islands survive the next calamity, or is it doomed to a viscous cycle of devastation and temporary rebuilding? How can architecture contribute to the solution? What else are necessary to complement our architectural solutions? What does it take to build a truly resilient community?

GEOGRAPHY AND HISTORY

On that fateful day of December 16, 2021, Typhoon Odette hit the Philippine Islands. First came the winds that tore roofs off houses. Then came the waves that pulled the houses to the sea. Next came the floods from the sea and that swept what remained of the houses. Landslides cascaded down the hills and upturned whatever was left. Then came silence.

To better understand what happened, click on the footage: <https://youtu.be/4v3cWpYoA7k>.¹

Why are the Dinagat Islands & its nearby provinces such as Samar and Leyte in the Visayas and Siargao Island of Surigao del Norte in Mindanao prone to natural disasters? The reason is their geographic location & their physical / natural environment.² (Figure 1)

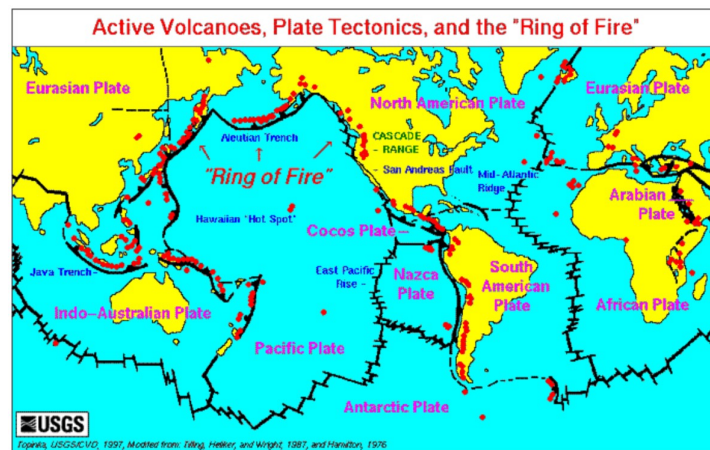


Figure 1. Active Volcanoes, Plate Tectonics, and the “Ring of Fire”

The Philippines, where Dinagat Islands belongs to, is located around the Pacific Ring of Fire on the west where earthquake and volcanic activities frequently occurs. Same also where Typhoon Rai or also known by its local name Odette originated and gained enough energy to bring strong winds and heavy rainfall which devastated the said island province.³

The tectonic setting of the Philippines is surrounded by the following plates, namely the Eurasian-Sunda Plate on the Northwest, Palawan Block on the West, and the Philippine Sea Plate, subducting towards west, which was delineated by the Philippine Trench.⁴ (Figure 2)

¹ From YouTube.

² From the presentation of Luigi Gamboa, Geologist of the Department of Public Works and Highways.

³ Ibid.

⁴ Ibid.

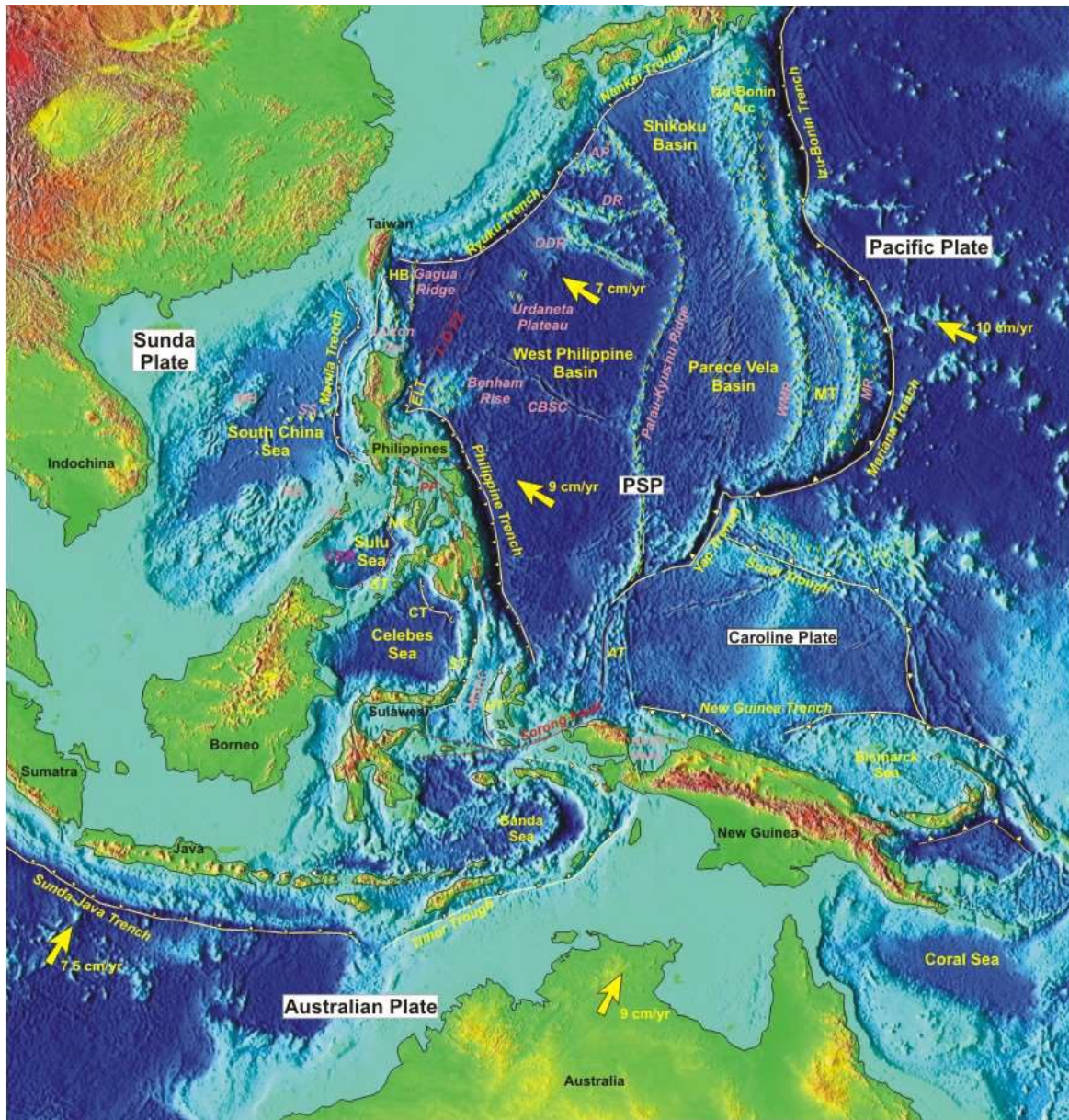


Figure 2. Plates around Philippine

The Dinagat Islands located on the north of Mainland Mindanao is almost near the Philippine Trench ... where strong earthquakes frequently occur, and west of the Philippine Sea where Typhoon Odette intensified its amount of rainfall and wind energy. Another earthquake generator from the western side of the island province is a segment of the Philippine Fault System, traversing the Surigao Strait (as shown in the assessment generated by HazardHunterPH, a website launched by DOST-PHIVOLCS in coordination with DENR-MGB for their rain-induced landslide and flood susceptibility maps and DOST-PAGASA for their storm surge and severe

wind hazard assessment). It is approximately 28.4 km from the town proper of San Jose, the provincial capital of Dinagat Islands.

The Dinagat Islands on the left is mostly composed of Dinagat Ophiolite, which is made up of ultramafic rocks highlighted in purple. These rocks when subjected to prolonged weathering will turn into a laterite, which is a major source of aluminum and nickel. That is why there are many large-scale mining companies operating in the said island where the nickel found in the laterite ore can only be extracted by open-pit mining method.⁵

On the other hand, Siargao Island is mostly composed of Siargao Limestone..., which is also present in some coastal areas of Dinagat Islands. According to the Lexicon of Philippine Stratigraphy of 2008 by Rolando E. Pena, the said limestone frequently contains masses of broken corals, shells and casts of small gastropods. When limestone is subjected to prolonged exposure to groundwater, caves can be formed underneath the surface due to dissolution and eventually a sinkhole on the surface if further exposed to surface water such as massive amount of rainfall. These limestone features are termed as Karst.

These features were observed and mapped on March 2015 as part of their reconnaissance survey looking for ideal site to install an early warning system for deep-seated landslides and slope failures, which will affect a community exposed to it. According to the locals in the area, the presence of cracks and vertical displacements on the elevated terrain known as scarps...were formed due to a landslide in 2004 caused by a week of prolonged rainfall. A localized scarp...was also observed in the nearby San Carlos Elementary School, which is coeval in the 2004 landslide event.⁶

Another manifestation of Karst landforms are the presence of circular and oval shaped depressions, which may lead to formations of sinkholes. These photos were also taken... in the said project on October 2019

⁵ Ibid.

⁶ Ibid.

within the vicinity of the said school after the community was selected for the installation of an early warning device for landslides and deep seated slope-failures.⁷ (Figure 3)



Figure 3. Formations of Sinkholes

THE DISCOURSE

Place yourself in the role of the protagonist, or the decision-maker. Through discussing the situation, the panellists must identify the issues or challenges facing the protagonist. They must be able to analyse the situation: examine the root causes; then, consider possible courses of action. If possible, the panellists tried to arrive at a set of recommendations and a plan of action. To emphasize, the main priority of the forum was to come up with the definition of the problem: what went wrong in this situation?

Key words that were important to consider during the discussion were the following:

Disaster prevention, especially for PWDs
Alternative housing solutions

A unique disaster response for the location of the specified islands

⁷ Ibid.

In addition, it was emphasized to the panellists during the discussion that the forum might not produce the intricate solutions that they would like individually to carry out, but rather to focus on asking the right questions first to answer in such situations. It was also explained to the panellists to use the Harvard Case Study Method to answer guiding questions such as:

- Who is the protagonist?
- What are their objectives (implicit or explicit)?
- What decisions must they make?
- What problems, opportunities, and risks does the protagonist face?
- What alternative courses of action are open to me (personally)?
- What criteria should I use to judge the alternative?
- What actions should I take?
- How should I convince others that my approach is best?

THE RESULT

A round-table discussion with experts and stakeholders was held last April 2022 to ascertain, not the solution to this dilemma, but its main problem or problems and hindrances. The discourse ended with an outline of challenges and opportunities as shown in the following table:

DINAGAT ISLANDS POST-DISASTER EFFORTS	
CHALLENGES	OPPORTUNITIES
Limited budget and lack of political will	Collaborate with Private Entities, change scope
Distance and availability of resources	Look for local materials
Land forms	Integration of accessibility features in housing as a standard building back better consideration
Mobilization: exemption or reduction of transportation cost of the materials for the certain project	Technological advancement especially with materials and construction methodologies
Permanency	Sweat equity
Limited space to accommodate accessibility features	
More prevention rather than reactive efforts	↑

LIMITED BUDGET AND LACK OF POLITICAL WILL

Representatives from the government agencies such as the National Housing Authority (NHA) were asked if they would be able to produce a design that would withstand intense weather phenomena. They merely said that the housing design and standards were already established, and that making another design would entail costliness to the end users and stakeholders. Their design for standard row houses has been erected in selected parts of the islands of Dinagat and Siargao, through a socialized housing program by the government. The design for these row houses was questioned regarding their strength to withstand hurricane winds. An NGO of Emergency Architects has added that the resilience of the residents will surpass this disaster, but have not proposed a typhoon-resistant design that would help the recovering residents.

On the other hand, a private company, Cix Cigma Design, showed that they have a proposed design that has strong wind resistance capacity (see following picture). Their design was adopted in Cebu (another area affected by the typhoon, but not as devastated), but was not used for the redevelopment of Siargao and Dinagat Islands.⁸

The scope of government policies and projects must change to include partnerships with private companies that have expansive studies on typhoon-resistant structures. However, the current government relies heavily on existing public agencies with limited budgets for research and studies on such endeavors. (Figure 4)



Figure 4. Example of partnerships with private companies

⁸ From the presentation of Ar. Carlo Marudo, Cix Cigma Design.

MOBILITY, DISTANCE AND AVAILABILITY OF RESOURCES

were struggling. An air survey by the Coast When the devastation ended, survivors of the onslaught were left in the dark, literally. Help that should have come from the central government took longer than expected: prioritized affected areas were Cebu, Bohol and Leyte, being more urbanized and frequented by tourists. Siargao and Dinagat Islands, with loss of electrical power and mobile networks, was not able to communicate with the outside world. It took more than a week before the rest of the country knew that Siargao and Dinagat Guard alerted the government of the utter devastation in these areas.

News coverage regarding the impacts of Odette was limited in the days after the typhoon struck, a fact partly attributed to the shutdown of the [regional news stations of media network ABS-CBN](#), which had earlier been [denied a renewal of its congressional franchise](#). With internet service knocked out and mobile phone networks brought down in the wake of the typhoon, news from the typhoon-hit areas was very limited in the critical first days after the disaster. The [Dinagat and Siargao group of] islands were "levelled to the ground." 95 percent of houses were estimated to have lost their roofs, and emergency shelters were destroyed.⁹

While help arrived, it was made more difficult as rations can only be brought into the islands via helicopter. Streets were blocked by fallen trees and sharp roofs unhinged by winds, while ports and beaches were impassable due to debris carried by the waves.

Some panellists during the round table discussion proposed using fallen trees be used in some of the reconstruction of the facilities, in part to get rid of the organic debris around the islands.

LAND FORMS AND ACCESSIBILITY FEATURES

The local government of both islands must evaluate its current disaster plan, if there is any in place. The islands' topography and location is around the Pacific Ring of Fire, which makes them open to all sorts of compounded disasters.

⁹ Wikipedia: Typhoon Odette.

According to one of the panellists, Ar. Cipriano of Architects for Accessibility, the SENDAI Framework for Disaster Risk Reduction is ideal to use in such a situation. Instead of allowing such incidents to happen again, the framework has steps to mitigate sudden and slow-onset disasters, caused by natural or manmade hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors.¹⁰

The Dinagat and Siargao islands must integrate a Priority 4 Level of action of the SENDAI Framework:

Priority 4 - Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction. In this priority level, “Women and persons with disabilities should publicly lead and promote gender-equitable and universally accessible approaches during the response and reconstruction phases.”¹¹

Ar. Cipriano emphasizes that the vulnerable population of “women and persons with disabilities” must become an active voice in this crisis response, to become prioritized in the redevelopment of their communities. The local governments do not even have a census of the number of Persons with Disabilities in their islands, let alone have pertinent programs for them. The Accessibility Law of the Philippines is misrepresented in these areas, with inadequate ramps and accessible comfort rooms even in the tourist areas. The representation of PWDs in particular must be apparent especially in their physical needs, as ramps and accessible slopes would help in the rescuing of, not just PWDs, but everyone including senior citizens and injured people during the next calamity. Even the proposed redevelopment of these islands does not have accessibility features, especially the row houses, as they were designed with no ramps or accessible toilets. Won’t it be easier to pull out injured people from their houses if there are installed ramps or gentle slopes in the areas of residence?

Readiness is key.

¹⁰ SENDAI Framework for Disaster Risk Reduction 2015-2030.

¹¹ Ibid.

CONCLUSION: PREVENTION RATHER THAN REACTION

Readiness is key.

Instead of having to relive the consequences of the next disaster, the local government of Dinagat and Siargao islands must be ready the next time a future disaster hits. Due to its location and inherent characteristics, both islands are due for an inevitable disaster in the upcoming years.

The round table discussion was able to ask important issues of readiness and vulnerability. However, the most definitive question conveyed was: are we ready for the next one? Nature is beautiful in the islands, but it also turn cruel by bringing devastation and death to its human settlers. Will there be a “better design” to protect their residents, let alone save their roofs from flying off their homes? Some claim that the design is already available, but will there be incoming partnerships between the public and private sectors to actively push for a stronger political will to do the absolute right decision for technological advancement and protection of their citizens?

Are we ready for the next one?

3.2 Appendix 1. The SENDAI Framework for Disaster Risk Reduction (2015-2030)

www.undrr.org/implementing-sendai-framework/what-sendai-framework

The Sendai Framework focuses on the adoption of measures which address the three dimensions of disaster risk (exposure to hazards, vulnerability and capacity, and hazard’s characteristics) in order to prevent the creation of new risk, reduce existing risk and increase resilience.

- Priority 1 - Understanding disaster risk

Disaster risk management needs to be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment.

- Priority 2 - Strengthening disaster risk governance to manage disaster risk

Disaster risk governance at the national, regional and global levels is vital to the management of disaster risk reduction in all sectors and ensuring the coherence of national and local frameworks of laws, regulations and public policies that, by defining roles and responsibilities, guide, encourage and incentivize the public and private sectors to take action and address disaster risk.

- Priority 3 - Investing in disaster risk reduction for resilience

Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment. These can be drivers of innovation, growth and job creation. Such measures are cost-effective and instrumental to save lives, prevent and reduce losses and ensure effective recovery and rehabilitation.

- Priority 4 - Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction

Experience indicates that disaster preparedness needs to be strengthened for more effective response and ensure capacities are in place for effective recovery. Disasters have also demonstrated that the recovery, rehabilitation and reconstruction phase, needs to be prepared ahead of the disaster, in an opportunity to “Build Back Better” through integrating disaster risk-reduction measures. Women and **persons with disabilities** should publicly lead and promote gender-equitable and universally accessible approaches during the response and reconstruction phases.

4. Case Study: Inclusion within Urgent Decisions: Affordable housing design for post-disaster in Indonesia

Inclusion within Urgent Decisions: affordable housing design for post-disaster in Indonesia

Arina Hayati^{1,a}, Wahyu Setyawan^{1,b}, Teddy Aria Permana^{2,c}, Sarah Cahyadini¹, Kirami Bararatin¹, Erik Ramadhan², Andarita Rolalisasi², Tisa Angelia²

¹Department of Architecture. Institut Teknologi Sepuluh Nopember (ITS). Indonesia

²Indonesian Institute of Architects (IAI) for East Java Province

Corresponding authors: arina_h@arch.its.ac.id^a, wahyu_s@arch.its.ac.id^b, bangtedjo@gmail.com^c

ABSTRACT

In 2004, the Department of Architecture Institut Teknologi Sepuluh Nopember (ITS) contributed a housing design proposal and implementation of building construction for Tsunami Aceh. Eighteen years after the program's performance, the change and continuity of housing design concepts and buildings are still discussed and reviewed from the sustainability perspective. The concept was developed based on a community participation approach and adopted the basic housing standard code (ADB House Design Standard). The Indonesian Institute of Architects (IAI) for East Java contributed a housing design proposal for the building recovery process when the Lumajang district of East Java suffered from the Semeru Mountain Eruption at the end of 2021. The IAI proposed the housing design concept of a 'Healing Home', which has the quality of affordable and sufficient floor area, spatial requirement and specification, safety and efficiency on building

materials, and structure. This paper discusses the two cases by examining the mitigation process and implementation—the last discussion questions how both projects consider the inclusion aspects based on community and stakeholders' involvement.

INTRODUCTION

Indonesia is a country with thousands of islands located in the three active tectonic plates (the Eurasian Plate, the Pacific Plate, and the Indo-Australian Plate). Indonesia has been prone to natural disasters for decades, including land floods, tsunamis, earthquakes, and mountain eruptions. Every year, cities in Indonesia exposes to many types of natural disasters that cause the death of hundreds to millions of people and destroy houses and infrastructures. The estimated 129 volcanoes in Indonesia are active and monitored by The Centre for Volcanology and Geological Hazard Mitigation. It is also estimated that more than 5 million people live in the 'danger zone', which requires prompt attention from National Government. After the earthquake and tsunami hit Aceh in 2004 with the highest dead toll, the government issued Presidential Regulation Number 83 of 2005 concerning the National Coordinating Agency for Disaster Management (*Bakornas PB*). This agency has a coordinating function which is supported by daily implementers as disaster management implementing programs. Then, the Indonesian government continues to develop the legalization, institutions, and budgeting in response to the disaster management system. After issuing Law Number 24 of 2007 concerning Disaster Management, the government issued Presidential Regulation Number 8 of 2008 concerning the National Disaster Management Agency (BNPB). The agency coordinates the implementation of disaster management activities in a planned, integrated, and comprehensive manner.

Indonesia is a country traversed by the Pacific Ring of Fire, leading to numerous natural disasters, both in the past and future. According to (Yanuarto, 2021), Semeru Mountain is one of the volcano mountains in East Java Province, with consistent eruptions before the 19th century.

The volcanic activities have been well recorded since 1942 by *Pusat Vulkanologi dan Mitigasi Bencana Geologi* (PVMBG) / Centre for Volcanology and Geological Hazard Mitigation. It was recorded almost every year from 1945 until 2008; the Semeru mountain showed volcanic eruption activities and produced hot clouds of avalanches up to 10 km. The disaster has damaged rice fields, bridges, roads, buildings, and housing. On December 4th, 2021, Lumajang was hit by hot clouds of avalanches from Semeru mountains, and several areas were destroyed and lost. The event resulted in many casualties, and many others were seriously injured. It was recorded by BNPB that approx. 9.977 people were displaced, and the refugees are scattered in 148 evacuation points in Lumajang Regency. In addition, relocation action was prioritized to give home more than 2,900 families of victims of the Mount Semeru eruption (Detikcom, 2021). Because of this, the Institute of Indonesian Architects for East Java acted as Disaster Response Assistant and designed the temporary housing, namely the 'HUNTARA' (Permana & Hidayat, 2022).

Addressing the interchange of The Sendai Framework for Disaster Risk Reduction 2015-2030 and the 2030 Agenda of Sustainable Development Goals, the frameworks urge countries to involve people with disability in active and meaningful participation in supporting Disaster Risk Reduction (DRR) by promoting "leave no one and no place behind for its vision for livable, accessible, inclusive, and sustainable communities. Therefore, the government issued a Regulation of the Ministry of the Republic of Indonesia, Act No. 42 of the Year 2020, about Accessibility to settlements, public services, and disaster protection for persons with disabilities (PP, 2020). Embedding promotion for this effort, on June 18th, 2022, the Department of Architecture, Institut Teknologi Sepuluh Nopember collaborated with UIA Architecture for All (AfA) Work Programme Region IV and IAI (Ikatan Arsitek Indonesia/Indonesian Institute of Architects) for East Java Province organized a side event of Affordable Housing Activation (AHA). This event shares the best practices of housing design from post-disaster in two regions of Aceh Province and Lumajang District. This paper narrates the stories of how the academician and architect

practitioners involved in working with stakeholders to make the urgent decisions of rebuilding from housing to settlements and infrastructures after natural disasters. Two cases have described the approach and methods of design solutions from the preparation phase until the rebuilding phase. The paper also examines how far the two humanity projects applied the inclusion perspective in the reconstruction process.

CASE 1: INCLUSIVE PROCESS ON REHABILITATION AND RECONSTRUCTION POST DISASTER IN ACEH

In late December 2004, the biggest earthquake hit Sumatra Island and triggered an immense tsunami with 20 meters of wave stroking Aceh, and Nias, destroying and displacing houses, settlements, and infrastructures. There was no precedence memory of the scope and scale of the earthquake and tsunami disaster in Aceh and Nias that everybody was caught by surprised, scattered, lost, and devastating for everybody. Unlike a typical earthquake, the event with 20 meters wave of tsunami wiped the land with its trees, houses, public buildings, and infrastructures within hours. The local government and main infrastructures were paralysed, and in many places were no signs of the original settlement; the public records and the holders of the 'community memory' were also lost. Further, many of the members of the community were swept far from their original homes and ended up surviving in temporary shelters either in camps or with friends. This situation required a specific approach and solution for disaster response and recovery management.

The Project: Turning Ground Zero back to Normal.

Under the Earthquake and Tsunami Emergency Support Project (ETESP) of ADB 2005-2009, a grant from the Asian Tsunami Fund was given to meet Indonesia's disaster management, rehabilitation, and reconstruction requirements (Blunt & Silas, 2010). As the damage caused by the tsunami and earthquake was widespread, this multisector project included five groupings of initiatives: (i) livelihood restoration, (ii) provision of social

services, (iii) community infrastructure, (iv) physical infrastructure, and (v) fiduciary governance.

The community infrastructure included a housing sector component of these five initiatives. This component was generally referred to as the Housing Rehabilitation and Reconstruction Program or, more commonly, “the housing program” (Silas & Setyawan, 2010). The housing program provided funding for replacing housing units destroyed by the disaster and rehabilitating units deemed reparable. Housing was the ETESP’s most critical component during the initial phase of project implementation since, without permanent shelter, it was nearly impossible to rebuild the livelihoods of beneficiaries. The project aims to provide new or rehabilitated housing for homeowners or renters (including squatters) and to enable people to re-establish their lives in the initial community. In addition, the project provided economic recovery and security by constructing a new healthy sanitary and sustainable living.

The strategies and principles: Solution Based on Community Participation

The strategy focused on the communities' prominent role, namely the bottom-up approach. The project reinforced the social institutions supported by themselves through cooperation and participation. All stages used a community-based approach (Figures 1 and 2). The community decided on all agreements and solutions. The communities played active roles during all phases, from planning and designing the village plan and housing design.

The strategy was integrated into any development process that involved the community and local government for participatory mechanism projects from planning, cooperation, and implementation actions. This strategy showed the public trust between communities, local governments, donors, and NGOs.



Figure 1. Initial meeting with survivors to re-establishing community.



Figure 2. One of serial meetings with community to rebuild the damaged village.

The projects were developed based on the following principles (Silas & Setyawan, 2010):

- a. The approach was people-centred, community-based, and participative and ensured a central role by civil society.
- b. Supporting housing rehabilitation and reconstruction and significant intervention in rebuilding lives that integrated with other sector strategies, for example: linking housing with a water supply and sanitation, opening the employment creation and human resource development that promoted the local economy and business.
- c. Ensuring cooperation between the central government and sectoral departments, the different levels of local government, and non-government organisations to consolidate with the communities.
- d. Utilising in a coordinated way as far as possible with other complementary programs.

Beneficiary Eligibility

The objective of the Project was to re-establish basic shelter facilities for each household whose house was destroyed or damaged by an earthquake/tsunami and ensure the community re-established their lives back to normal (Steinberg, 2010). Those eligible to receive assistance in rehabilitating houses under ETESP were homeowners and home renters or squatters. For homeowners, the principle was only one person per household was entitled to this provision. The only exception was the case of a polygamous homeowner with wives residing before the tsunami in

his other properties. In such a case, a house reconstruction grant was provided to the wives for each house destroyed by the earthquake/tsunami. Granted verification was based on the family card '*kartu keluarga*' held by each household, and the House Repair Grant was given to one household written on the card. For the home renters, the community suggested that renters were granted free house rent for the first year and secured the housing tenure for 15 years with a letter of statement from the landowner. The Informal Settlers and House Owner without Titles were granted constructed houses on land with entitled documents. However, this may only be used to build a standard 36 m² on government plots. Women, were fully entitled to rehabilitation/reconstruction provisions, including widows who were the recipient of the grant for a house owned by their husbands. Orphans of a deceased couple were shared as co-recipients of the grant for the house owned by their parents. All attention was exercised to ensure that widows and children inherited the land their husbands or parents owned if they showed the legal inheritance status. If the status were not legally approved, widows and children would be entitled to receive rehabilitation/reconstruction premises for the home renters.

The Village Planning and Land Availability

The village plan was based on the objective of rebuilding the village to be better and more livable (Figures 3 and 4). The decision on the village plan was made and agreed upon by the community through a series of meetings between community leaders and community members. The village plan in schematic drawings included housing plots and housing development, supported by a drainage system, water supply, domestic solid waste disposal, flood protection system, and road system that would make the area safer in case of another tsunami.



Figure 3. Lamdingin Village Plan

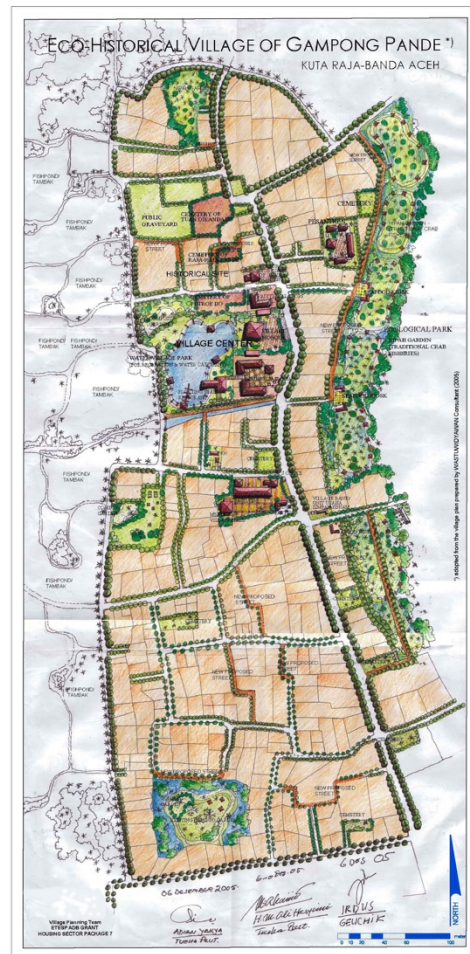


Figure 4. Gampong Pande Village Plan

Housing Design

The ADB house design consisted of two basic principles, required by ADB terms of the General Agreement and the basics of an Acehnese House. The standard house size was 36 m² with additional areas for a toilet, a rear terrace for the cooking area for female activities and a front terrace for a male member meeting the guest. The house itself consisted of four modules of 9 m², where one was enclosed as a bedroom. The enclosed module also functioned to absorb the lateral force that occurred if the earthquake occurred again. The ceiling height of a minimum of 3 metres and ample openings in the walls made the living space comfortable. Other variations were possibly proposed to meet particular local requirements, such as limited plot size or unique local architectural design.

The detailed site layout showed the housing plots with the boundaries of individual plots that represented the present ownership and the proposed ownership. The current and future owners of the land must be identified and sign that they agree to the changes made. Further, the community must decide and sign their acceptance for the used plan within the budget allocated.

The structure is also based on the traditional Acehnese house with a rigid reinforced concrete frame and on-footing foundation. The floor is also a reinforced plate at least 30 cm above the high tide level to ensure free from flooding, and most of the houses are within the catchments area of the sea. The use of building materials is conditioned to the acceptance of the intended inhabitants, availability, and environmental aspects. The wood materials were used as limited minimum as possible.

The house design was easily adaptable for functions such as village offices, schools, clinics, and meeting halls such as the '*Bale Inong*', a place for women's activities. The house was built in Gampong Pande with support from people in Montpellier, France. The meeting hall, 'the Meuligoe,' was designed based on the same principles as the houses, ensuring earthquake resistance and adaptability to environmental and climatic conditions.

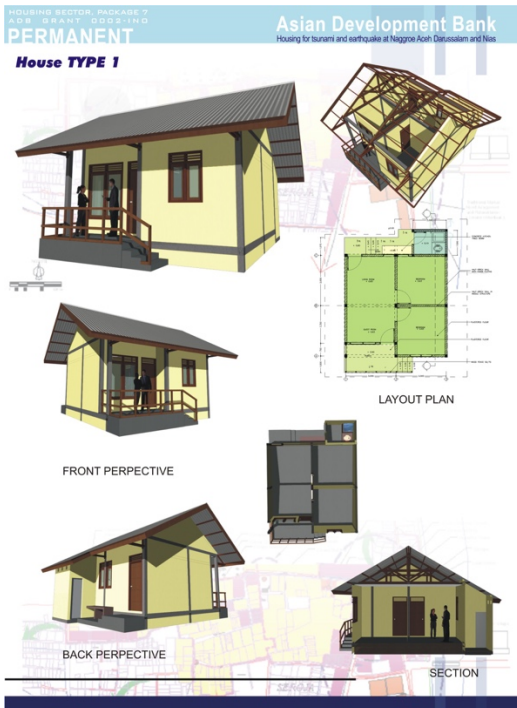


Figure 5. Generic design of house

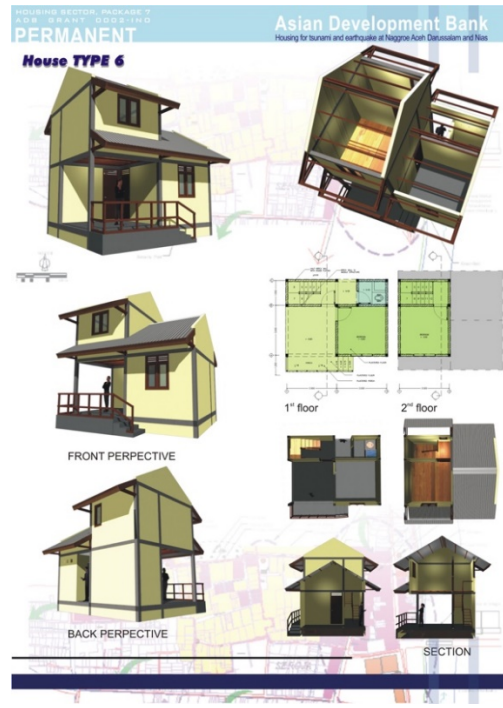


Figure 6. Modification of housing design according to limited plot



Figure 7. Result of generic design of house



Figure 8. Result of modification of housing design according to limited plot

Two Plus Stage Strategy

Before the tsunami event in 2004, the general approach to building houses in the context of disaster response only used a two-stage approach (emergency and permanent phase). However, it is apparent to those working in the housing sector that only some of the program's objectives based on a two-stage approach sat easily together. The difficulties of implementing a strategy that demands fairness and accuracy yet assume speed to meet people's real needs are difficult to

reconcile when the two-stage approach moves directly from emergency housing (tents and barracks) to the permanent house. Understandably, the disaster victims should not stay long periods in these temporary shelters, yet the planning process and verifying their rights and their qualifications for assistance were time-consuming. Therefore, an alternative transitional or third stage must be added (Figure 9).



Figure 9. The Two Plus Stage Strategy inserting transitional/temporary phase.

CASE 2: WORKING AND COLLABORATING BETWEEN STAKEHOLDERS FOR VOLCANIC ERUPTION LUMAJANG REGION

According to statistical data released by the Indonesian National Disaster Management Agency (BNPB), over the last five years (2018-2022), 110 volcanic eruptions and earthquakes throughout Indonesia, resulting in the loss of many lives. In early December 2021, the Lumajang region of the East Java province was exposed to the Mount Semeru eruption. According to Yanuarto (2021), by December 21st, 2021, more than 50 people were recorded to have lost their lives, mostly from exposure to hot clouds (pyroclastic flow).

The number of displaced residents reached 10,395 people, who were accommodated in 410 evacuation points (Muhari, 2021). Many refugees were concentrated in three districts:

- Pasirian had 17 points with 1,746 people.
- Candipuro had 21 points with 4,645 people.
- Pronojiwo had 8 points with 1,077 people.

In addition to Lumajang Regency, evacuees were also found in other districts. Malang Regency hosted 9 points with 341 people, Blitar had one point with three people, Jember had 3 points with 13 people, and Probolinggo had 1 point with 11 people. The Command Post continuously updated the data on evacuees in response to the impact of the Semeru eruption.

Two locations were selected to relocate residents affected by the eruption: Sumbermujur Village in Candipuro District and Oro-Oro Ombo Village in Pronojiwo District. These relocation sites received approval from the Ministry of Environment and Forestry through Decree Number 1256/MENLHK/SETJEN/PLA.2/12/2021. The designated area for relocation spans 90.98 hectares (Lumajang, 2021).

The Project: Mitigating Urgent situation with stakeholders' collaboration.

In this project, the stakeholders and the local government issued an official and binding decision letter as a reference regulation for parties involved in relocating residents affected by the Semeru eruption disaster. The letter contains directions and instructions for activities in the relocation area. In the initial preparation stage, the IAI (Indonesian Institute of Architects) Work Unit coordinated and communicated intensively with the Semeru eruption disaster task force (Lumajang Regency Government, Military Resort Command, Housing and Settlements Service, Public Works Service), as well as communicating with non-governmental organizations which would later act as donors and shelter builder (Figure 10). The relocation area that has been determined through the Decree of the Lumajang Regent was in Sumbermujur Village, Candipuro District - Lumajang Regency, East Java (Lumajang, 2021).



Figure 10. The initial assessment process with the Lumajang Regent and stakeholders on the relocation area of Sumbermujur.

The Stages of Mitigation Activities

In this program, IAI for East Java Province applied seven stages of mitigation activities, as follows.

1. Disaster Response Assistant

The stage took place during the first two weeks after natural disasters. The IAI for East Java Province teams (The Work Unit of Professional Services Agency) provide emergency assistance on-site by collecting data on affected residents, houses, buildings, or damaged infrastructure (light, moderate, severe condition).

2. Collaboration Activities

Once the data were collected, IAI East Java and IAI regional Malang formed a special Working Unit, which became central in handling further collaboration activities and was the host for other regional IAI organizations who wished to join the efforts.



Figure 11. Early meetings of IAI East Java as a form of collaboration with other agencies

3. Intensive discussion with Experts

Given the size and breadth of the scope of activities to be carried out, the IAI Work Unit will partner with several non-governmental organizations whose activities are in the disaster area. By joining several organizations outside IAI, a lot of input and comparative data are obtained, which can later be used in the next activity stage.

4. Volunteer Involvement

The Work Unit also recruit volunteers from IAI partners' university students. For this activity, students can apply the MBKM (Freedom to Learn Program) learning system in which all field activities, especially in disaster management, can be converted into credit units, in which the credit transfer mechanism is regulated by respective universities (Rolisasi, 2022).



Figure 12. Briefings for student volunteer to be stationed in Sumbermujur

5. Stakeholder Collaboration

In this stage, the activity concept, phases and timeline were finalized with the local government of Lumajang Regency under the Housing and Settlement Office. IAI Working Unit partners with the local regency as facilitator and advisor for the planning and design of the relocation activities. Several Universities are involved in this collaboration process.



Figure 13. Meetings of stakeholder collaboration –Government of Lumajang Regency

6. Detailed Activities

This stage includes all the planning and finalization of activities. Several important experiences for disaster response in other places, such as Lombok-West Nusa Tenggara and Palu-Central Sulawesi, also underline the emergence of special applications in the resulting design. The following diagram shows the different aspects incorporated into the planning and finalization of housing design (Figure 14).



Figure 14. Aspects of consideration for housing design

7. Design of *Huntara* (temporary house): The Healing Home

The last step in the process results in designing a temporary house to be built by donors and NGOs. The basic concept for the temporary house is core housing so that homeowners can develop permanent housing at a later stage. The goal is to produce a practical, affordable, targeted, and contextual design (Permana & Hidayat, 2022). Material selection for the structure is based on timely consideration, as it must simultaneously be quick and appropriate. Such as the use of materials that are readily available around the location:

- Sand from the eruption to make bricks for walls.
- Sengon wood as a building frame.

- Rock left from the eruption explosion for building foundations.

The project also uses workers from residents who lost their livelihoods due to the disaster and design a land site that still accommodates and provides existing facilities as in their original area. The temporary housing is also reusing the broken roof tiles and concrete bricks as materials for the fences. In addition to a more sustainable approach, this could also form a new memory for victims in the new environment (healing environment).



Figure 15. Design of temporary housing, based on the concept of core housing. Source: (Permana & Hidayat, 2022)

Relocation Elaboration

The permanent relocation of the Semeru disaster is the first of its kind in Lumajang and East Java. In its implementation, the relocation process requires a lot of careful and measurable inputs and disaster precedents. Within the limited timeline and urgent needs, many variables should be handled with care, including:

1. Determining the relocation area

The initial challenge in determining the relocation area was the availability of land close to the refugees' place of origin. The maximum radius from their origin is no more than 10 kilometres so that refugees do not feel "alienated". Two alternatives with different landscape characteristics are identified. After going through technical considerations, the location of Sumbermujur-Candirejo was chosen, an area of 81 hectares with an average slope of 5-10 degrees.

2. Relocation Concept of Residents Affected by the APG Disaster

Based on the discussion of the Work unit, including NGO specialists, a '*Bedol Desa*' system was chosen. The system includes moving all residents with their social and institutional structure. Thus, the process makes adapting to the new location easier. This process is made possible as the community has a relatively strong social capital, the cooperation (*gotong-royong*) to build and develop the new location jointly. In other words, the bottom-up process of community-based relocation enhances the success rate of the relocation process, as the community has a strong sense of belonging.

3. Planning by experts

IAI and its work units helped and assessed the new location with all the knowledge and expertise from professional Architects, NGOs, and academia. The planning for permanent relocation is set to 2 years timeline with the concept of relocation in point 2 above. The first six months (Transition Phase) are for the regional masterplan, enumeration/plotting of houses, shelter construction, infrastructure and public facilities. The following 18 months (Rehab Recon Phase) are for constructing permanent housing and completing public

facilities. Therefore, the residents would be able to settle properly within two years (although it may not necessarily be 100% the same as before). It is also part of participating in the preparedness stage for residents in the disaster mitigation process mandated by BNPB.

4. Policy at the local level

The tight timeline ultimately made the local government adopt a top-down approach in some of the processes, including selecting relocation areas and building houses and infrastructure. Direct instructions from the Vice President of the Republic of Indonesia when he first attended the relocation site, was to shorten the relocation process to around six months so that residents who had experienced post-disaster hardships and difficulties could immediately return to normal life. To accelerate the process of relocation, the public construction company was also involved in building permanent housing and Infrastructure construction which could then be completed in 7 months. The direct consequence was that the initial design concept and process of the "*Bedol Desa*" could not be fully implemented. However, with the compromise of the parties and reconditioning assisted by the IAI Work Unit, the design and relocation process in the village of Sumbermujur - Candipuro can still run smoothly and according to the timeline desired by stakeholders. In addition, many new parties were involved in the development phase through invitations or donations, so the construction process was aided in terms of funding and human resources.



Figure 16. Housing and social facilities in relocation area

CONCLUSION: SOCIAL INCLUSION IN URGENT SOLUTIONS

Based on the discussion of the two cases above, the aspects of inclusion were partially integrated during the mitigation process and decisions. Generally, housing designs implement the minimum standard and requirements adopted from local and international standards (ADB House Design Standard and Regulation of the Ministry of Republic of Indonesia, Act No. 42 the Year 2020 about Accessibility to settlements, public services, and disaster protection for persons with disabilities). For the case in Aceh, the solution adopted the bottom-up approach, which used the principle of the ADB ETESP assistance that no one should be exempted from being assisted for whatever reasons based on community participation, including gender, children, and vulnerable people. It is important to note that in the customary land right in Aceh, most land is controlled by the female member of the family. For example, in the process of mitigation design, a gender specialist was included in the team. Although the specialist was involved in the later stage, still very effective as the first batch development was still in its early progress. The Gender Specialist did the following responsibilities:

- Promote and ensure that female village members were selected and prepared to be served with housing reconstruction and rehabilitation. They had equal opportunity and the right to voice their needs, aspirations, priorities, and other specific ideas.
- Ensure that the designs and plans for housing reconstruction, rehabilitation, and community facilities have considered gender-sensitive needs.
- Prepare the women member of the village with a Gender Action Plan (GAP) that ensures the same right, responsibilities, and opportunities to be part of rebuilding the village and the respective community.

Of this decision, the housing is still used, occupied and sustained by the Aceh communities with further development and adjustment based on current needs and situations (Setyawan, Setijanti, & Hayati, 2022).

Meanwhile, in the Lumajang case, the social inclusion aspect was partially considered in the beginning phase, and the decisions were dominantly determined by the government (local and national levels). Practitioners and NGOs played and worked as field assistants (programme facilitators) while communicating closely with the communities/victims. Therefore, the working process was based on equal collaboration with a top-down approach, yet all decisions considered the community requirements and hopes. This approach was selected and implemented because the situation urged an emergent solution and decision. Although the top-down approach was adopted, the decision input was generated through discussion between local government and practitioners, academics, and NGOs. After that, the decision leads to determining Actions and Solutions, including site selection, building design, the duration and process of building implementation and construction, and the relocation process (Figure 17) (Afandy, 2022).

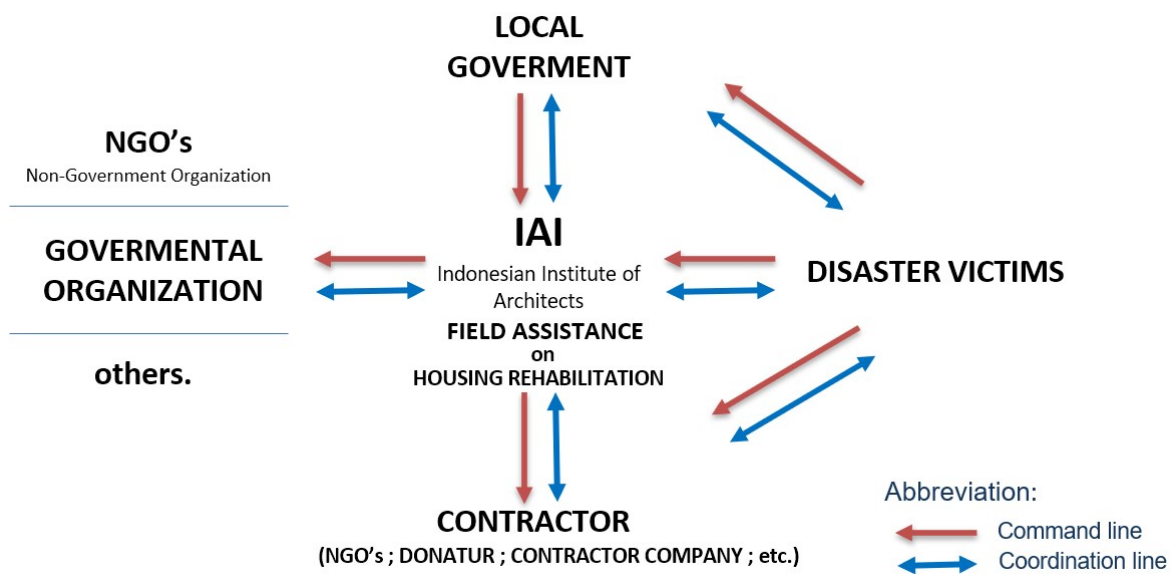


Figure 17. Collaboration methods used for urgent decision making in eruption disaster case. Source: (Afandy, 2022)

In conclusion, two cases of disaster mitigation show that the mitigation measures the problems and solutions based on the type of disaster and mitigation and scope of destruction leading to design solutions (Table 1).

Table 1. Aspects of Disaster and Social Inclusion

Aspects	Aceh	Lumajang
Type of Disaster	Earthquake & Tsunami	Eruption & hot clouds (pyroclastic flow) Flash floods followed by cold lava and heavy rains.
Scope of Destruction (Environmental impact)	Nature, buildings, infrastructure, housing, and land were mainly washed/cleared (city scale). Physically intact without plot relocation.	The environment was structural damage and plot displacement (housing, infrastructure & building, plantations and paddy fields, and sand mind), and the houses was fully relocated to a new place. Plot relocation with the new physical environment.
Social impact	Strong social and historical bonding to the current place	Socially in tack but losing the bonding of place, the properties and livelihood.
Mitigation type and approach	Collaboration with Bottom-up approach (the society fully controlled input and decision) - other stakeholders acted as facilitators and supporting agents.	Collaboration with top-down approach. Community involvement was only as providing input of problems, but partially involved in the first phase of the mitigation process. IAI for East Java acted as field assistance for one year until the rehabilitation and reconstruction period was complete (the team was a part of the TFL (field facilitator team) division of the Housing and Settlement Area Office of Lumajang district.
Stakeholders type and the role	<ul style="list-style-type: none"> • Community (Active agent, Decision makers, and Beneficiary) • Local Government (Supporting, Facilitators, Decision makers) • National Government (Policy makers, Facilitators and Supporters) • National and International Agencies (Mediators/Field assistants/Facilitators) • Donors (Supporters funding) 	<ul style="list-style-type: none"> • Community (Beneficiary and partially involved in early phase) • Local Government (Policy & Decision makers) • National Government (Policy makers, Facilitators, and Supporters) • National Agency (Mediators/Field assistants/Facilitators) • Donors (Supporters funding)
Inclusion Aspects and Building Code	Vulnerable communities include (Women and orphans) and	Vulnerable communities with partial involvement in the early stage

Used	renters with no land tenure. The building design was based on Building Code (Earthquake resistant), and all decisions were socially constructed (proposed and agreed upon by the community).	The building design is adjusted to the Building Code and Core housing principles. IAI for East Java contributed to designing a new building code for the Lumajang case assisted by IAI for Yogyakarta City, ARKOM and IAI Malang district. ITB and UIN Malang prepared the Master Plan.
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5. Case Study Northern Rivers Floods NSW Australia

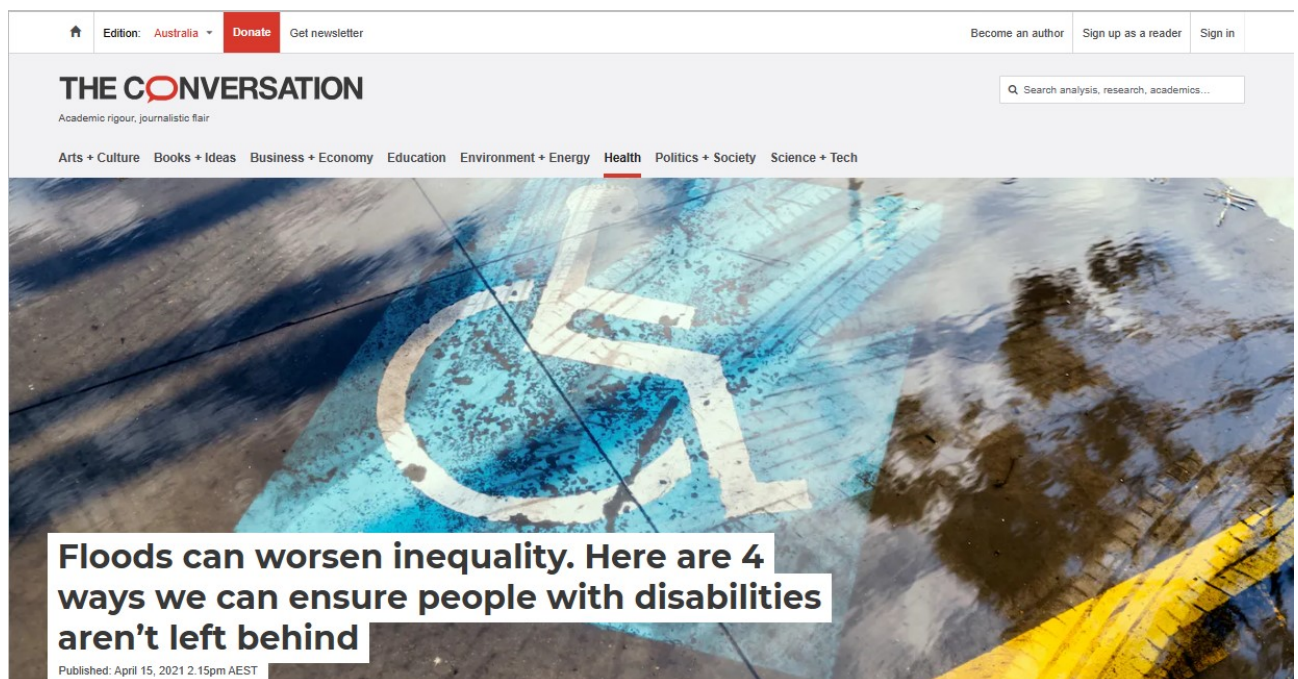
5.1 Floods Can worsen inequality. Here are 4 ways we can ensure people with disabilities aren't left behind.

Jodie Bailie | Senior Research Fellow

Centre for Disability Research and Policy | University Centre for Rural Health

Faculty of Medicine and Health, University of Sydney

[Floods can worsen inequality. Here are 4 ways we can ensure people with disabilities aren't left behind \(theconversation.com\)](https://theconversation.com/floods-can-worsen-inequality-here-are-4-ways-we-can-ensure-people-with-disabilities-arent-left-behind)



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