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ASEAN Risk Monitor and Disaster Management Review

4TH Edition

Rendering 2023 Disastergram:

Is ASEAN going to the right path for Sustainable Resilience?

P-ISSN 2807-2421

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Disclaimer:

This publication has been produced with the financial assistance of the European Union. The contents of articles in this publication are the sole responsibilities of the respective authors and can in no way be taken to reflect the views of the AHA Centre or the European Union.

Suggested citation for ARMOR:

AHA Centre. (2024). ASEAN Risk Monitor and Disaster Management Review (ARMOR) 4th Edition. Jakarta: ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre). Retrieved from https://ahacentre.org/publication/armor/

Suggested citation for a article in ARMOR:

Author(s) name(s). (2024). Article title. In the AHA Centre, ASEAN Risk Monitor and Disaster Management Review (ARMOR) 4th Edition. Jakarta: ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre). Retrieved from https://ahacentre.org/publication/armor/

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Acknowledgement

The AHA Centre would like to acknowledge the following for their contribution to the fourth edition of ARMOR:

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The AHA Centre is grateful for the funding support of the European Union (EU) through the Integrated Programme in Enhancing the Capacity of the AHA Centre and ASEAN Emergency Response Mechanisms (EU-SAHA) Project.

Table of Content

ARMOR ASEAN Risk Monitor and Disaster Management Review 4th Edition

Aa List of Acronyms and Abbreviations

A

AA	Anticipatory Action
AADMER	ASEAN Agreement on Disaster Management and Emergency Response Work Programme
ACDM	ASEAN Committee on Disaster Management
ACPF	ACDM-CSO Partnership Framework
ACSC	ASEAN Civil Society Conference
ADINET	ASEAN Disaster Information Network
AHP	Analytic Hierarchy Process
AICHR	ASEAN Intergovernmental Commission on Human Rights
AJDRP	ASEAN Joint Disaster Response Plan
AMS	ASEAN Member States
APG	AADMER Partnership Group
ARDEX	ASEAN Regional Disaster Emergency Response Simulation Exercise
ASCC	ASEAN Socio-Cultural Community
ASEAN	Association of Southeast Asian Nations
ASEAN-ERAT	ASEAN Emergency Response and Assessment Team
ASEAN-ISIS	ASEAN Institute of Strategic and International Studies
ASSI	ASEAN Safe School Initiative
ASP	Adaptive Social Protection

B

BNPB	Badan Nasional Penanggulangan Bencana/ Indonesia National Disaster Management Authority

C

CBDRM	Community-Based Disaster Risk Management
CBDRR	Community-Based Disaster Risk Reduction
CCA	Climate Change Adaptation
CLIMADA	CLImate ADAptation
CSO	Civil Society Organisation

D

DaLA	Damage and Loss Assessment
DDPM	Department of Disaster Prevention and Mitigation of Thailand
DH	Destroyed Housing
DMTIs	Disaster Management Training Institutes
DRI	Drought Risk Index
DRF	Disaster Risk Financing
DRM	Disaster Risk Management
DROMIC	Philippines Disaster Response Operations Monitoring and Information Centre
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction and Management
DRSP	Guidelines on Disaster Responsive Social Protection
DSWD	Department of Social Welfare and Development of the Philippines

E

EC	Evacuation Centres
E-SIMBA	Sistem Informasi Monitoring dan Evaluasi Pembangunan/ Indonesia Development Monitoring and Evaluation Information System
EU	European Union

F

FAO	Food and Agriculture Organisation of the United Nations
FBEA	Forecast-based Early Actions

G

GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GIS	Geographic Information System
GISTDA	Geo-Informatics and Space Technology Development Agency
GRAF	Global Risk Assessment Framework

I

IDMC	Internal Displacement Monitoring Centre
IDPs	Internally Displaced Persons
IFRC	International Federation of Red Cross and Red Crescent Societies
INFORM	Index for Risk Management
IS	Informal Settlement
IT	Information Technology

J

JRC	Joint Research Centre

M

Mat Peci	Komunitas Masyarakat Peduli Ciliwung - a community group focusing on the environmental issues in the area of Ciliwung River in Jakarta, Indonesia

N

NbS	Nature-based Solution
NDRRMC	The Philippines National Disaster Risk Reduction and Management Council
NGO	Non-Governmental Organisations

P

PDC	Pacific Disaster Center
PDNA	Post-Disaster Needs Assessments
PFM	Public Finance Management

R

RACER	Regional Alliance for Collective Emergency Response
RCA	Rakhine Coastal Region Conservation Association in Myanmar
RISE	Revitalising Informal Settlements and their Environments Programme
RVA	ASEAN Risk and Vulnerability Assessment

S

SASOP	Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations
SDGs	Sustainable Development Goals
SFDRR	Sendai Framework for Disaster Risk Reduction
SP	Social Protection
SPDDM	Strategic Policy Dialogue on Disaster Management
SPI	Standardised Precipitation Index
SRSP	Shock-Responsive Social Protection
SSP	Shared Socioeconomic Pathway

T

TOR	Terms of Reference
TWG	Technical Working Group

U

UN	United Nations
UNDP	United Nations Development Programme

V

VDDMA	Viet Nam Disaster and Dyke Management Authority

W

WFP	World Food Programme

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Introduction

With the effects of climate change becoming more tangible, Southeast Asia, given its geography, continues to present itself as the region most prone to disasters caused by natural hazards. But beyond the relentless droughts, earthquakes, floods, typhoons, and tsunamis, the nature of disasters is evolving to the extent of new threats, such as the recent COVID-19 pandemic. These disasters continue to plague humanity while also growing in their ability to threaten both urban and rural populations, which will put Southeast Asia's ability to withstand these challenges and make such resilience sustainable to the test.

In alignment with the ASEAN Vision 2025 on Disaster Management, ASEAN endeavours to enhance its capacity to respond effectively to disasters and demonstrate global leadership in disaster management by 2025. The AHA Centre, in its mission to support ASEAN's goals in disaster response and management, introduces the 4th edition of the ASEAN Risk Monitor and Disaster Management Review (ARMOR), titled: "Rendering 2023 Disastergram*: Is ASEAN Going to the Right Path for Sustainable Resilience?"

The 4th edition of ARMOR, through the contributors in this edition, will underline the importance of strengthening sustainable disaster resilience in Southeast Asia and offer suggestions and improvements that can be made to existing approaches and initiatives. The contributions offer multi-faceted insights that encompass culture, education, the use of data and technology, and government policies to highlight the steps needed to achieve sustainable disaster resilience in the region.

Building Sustainable Resilience: Navigating Systemic Risks, Enhancing Resilience elaborates on the concept of sustainable resilience, which was introduced by the President of Indonesia, and aims to address complex issues and strengthen climate and disaster resilience while aligning with global agendas.

ASEAN Disaster Risk Sustainable Resilience: Incorporating Sustainable Development Goals into ASEAN Riskscape assesses the latest disaster risk of the ASEAN region and incorporates the Sustainable Development Goals (SDGs) as components to build resilience. The assessment seeks to understand the impact of sustainable development efforts on the ASEAN riskscape.

The Disaster-Threat Passivity Phenomenon: A Concept Analysis investigates human passivity and indifference towards the threat of disasters. In particular, it investigates the reasons for human passivity and offers cross-dimensional solutions to address it.

Toward Better Information for Climate Resilience in Southeast Asian Informal Settlements recognises the exacerbated threats and risks disasters have to informal settlements in Southeast Asia and studies how the use of nature-based solutions may benefit these communities. The article also explores how technology can be utilised to evaluate and support nature-based solutions through the use of low-cost environmental sensors, IT tools for citizen spaces, and satellite remote sensing.

* 'Disastergram' derives from the word 'Disaster' and 'Diagram' which provide a holistic illustration of disaster setting in the ASEAN region including the level of risk, disaster management efforts, and disaster management-related research, innovation, and latest technology.

The 4th edition of ARMOR will underline the importance of strengthening sustainable disaster resilience in Southeast Asia

Enhancing Sustainable Disaster Management Solutions on Displacement in Southeast Asia Using Data-Driven Approaches compiles varying forms of data to assess the impact disasters have on displacement across different Southeast Asian nations. By collecting and analysing data, the article also identifies targeted factors and areas that Southeast Asian nations must take into consideration in mitigating disaster-induced displacement.

Catalysing Adaptive Social Protection for Sustainable Resilience in Southeast Asia: Gaps, Stakeholders, and Policy Mechanisms draws attention to lapses in ASEAN Member States' approaches to adaptive social protection. It highlights the importance of involving multisector stakeholders, accompanied by all-encompassing socioeconomic data, in the design and planning of programmes catered to enhancing social protection, disaster risk reduction, and climate change adaptation strategies. It also recommends adopting disaster-risk financing to encourage greater protection from and resilience towards disasters, as well as facilitate human adaptability.

Unveiling the ASEAN-Civil Society Partnership: Navigating Disaster Resilience through Collaboration

identifies the areas in which ASEAN and its Member States have collaborated with civil society organisations, specifically in relation to disaster risk reduction and management. The article underlines how these partnerships have contributed to improvements in the region's disaster resilience but also offers recommendations for greater ASEAN-civil society interactions.

Community-Based Disaster Risk Reduction in Rakhine State, Myanmar, examines the benefits of community-based disaster risk reduction (CBDRR) strategies in improving disaster preparedness and response and enhancing sustainable disaster resilience. Noting the challenges faced in Rakhine State, it encourages greater involvement of ASEAN, international organisations, and local stakeholders in CBDRR.

Anticipatory Action for Disaster Management and Sustainable Resilience: Lessons from ASEAN Countries reinforces the need for anticipatory action as a key mechanism of disaster risk reduction and management. It reflects on the actions disaster management stakeholders in Southeast Asia can take to advance the anticipatory action agenda in order to consolidate and build on the region's disaster resilience.

Policy Research for Policy Proposal for the People: Drought Modelling for Post-Disaster Needs Assessment in Thailand endeavours to construct a drought assessment model tailored for application within the context of post-disaster needs assessments (PDNA). The Thai National Research Council supported this research as a pilot project in four northeastern provinces: Nakhon Ratchasima, Chaiyaphum, Buriram, and Surin. The study's core concept involves the development of a drought model that harnesses satellite imagery and indices in conjunction with in-depth interviews to extract socioeconomic factors, thereby enhancing the quality of outcomes for policymaking.

Articles

ARMOR
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#1

Building Sustainable Resilience:

Navigating Systemic Risks, Enhancing Resilience

Authors:
Raditya Jati, Oktavi Andaresta, Prasetio Wijaksono, Theophilus Yanuarto, and Fitriatun Hidayati

#1

Building Sustainable Resilience: Navigating Systemic Risks, Enhancing Resilience

Author: Raditya Jati, Oktavi Andaresta, Prasetio Wijaksono, Theophilus Yanuarto, and Fitriatun Hidayati

Abstract:

The concept of sustainable resilience, introduced by the President of Indonesia, aims to address complex issues and strengthen climate and disaster resilience while aligning with global agendas. It emphasises the importance of understanding systemic risks and adopting an integrated approach to risk management that considers economic, environmental, and social factors. Long-term thinking, diversification, collaboration, and adaptability are crucial elements for enhancing resilience. The United Nations Sustainable Development Goals (SDGs) provide a framework for building sustainable resilience, while nature-based approaches and community engagement play vital roles in achieving sustainability at the local level.

Investing in sustainable resilience is highlighted as a key aspect of building a secure and adaptive future. It involves allocating resources to critical infrastructure, climate change adaptation measures, ecosystem restoration, research and development, capacity building, and fostering public-private partnerships. There are actionable recommendations to enhance sustainable resilience, including strengthening risk assessment and planning, integrating climate adaptation, promoting nature-based solutions and circular economy practices, enhancing social equity and inclusion, investing in education and capacity building, fostering collaboration and partnerships, leveraging technology and innovation, mainstreaming resilience in policies and regulations, and establishing monitoring, evaluation, and learning mechanisms.

By implementing these actions, societies can effectively navigate systemic risks and enhance overall resilience, leading to a more sustainable and secure future. Building sustainable resilience is an ongoing process that requires continuous learning, adaptation, and collective action to address present and future challenges while safeguarding the well-being of current and future generations.

Keywords: sustainable resilience, sustainable development goals, climate change adaptation

Resilience for Sustainability: understanding the concept for implementation

The term "sustainable resilience" may be relatively new, but the ideas behind it are deeply rooted in academic discourse. Far from being a novel concept competing with current global agendas, it represents an evolutionary step, building upon decades of research and existing international commitments. At its core, sustainable resilience recognises the crucial link between long-term well-being and the ability to adapt and recover from disruptions. This echoes the Brundtland Commission's definition of sustainable development, established in the 1980s, which stressed meeting the needs of the present without compromising the future. This inherently implies adaptability and resilience in the face of change. The field of ecological resilience, dating back to the mid-20th century, has long explored how ecosystems bounce back from disturbances. It emphasises the importance of building flexible and diverse systems that can withstand shocks and stresses. Similarly, social-ecological systems frameworks, emerging in the 1990s, highlight the interconnectedness of social and ecological systems, emphasising the need for joint management for long-term sustainability.

5 KEY ELEMENTS that serve as the main pillars of Sustainable Resilience, putting people at the centre

Figure 1.1. Five Key Elements that Serve as the Main Pillars of Sustainable Resilience

Sustainable resilience represents a convergence of these established principles. It emphasises the need for systems — be they environmental, social, or economic — to be both sustainable and resilient in the face of complex challenges. This is not a competition with existing agendas but rather a valuable framework for navigating the complex realities of the 21st century. In the policy context, the concept was delivered by the Government of Indonesia at the opening of the 2022 7th Session of the Global Platform for Disaster Risk Reduction in Bali, Indonesia.

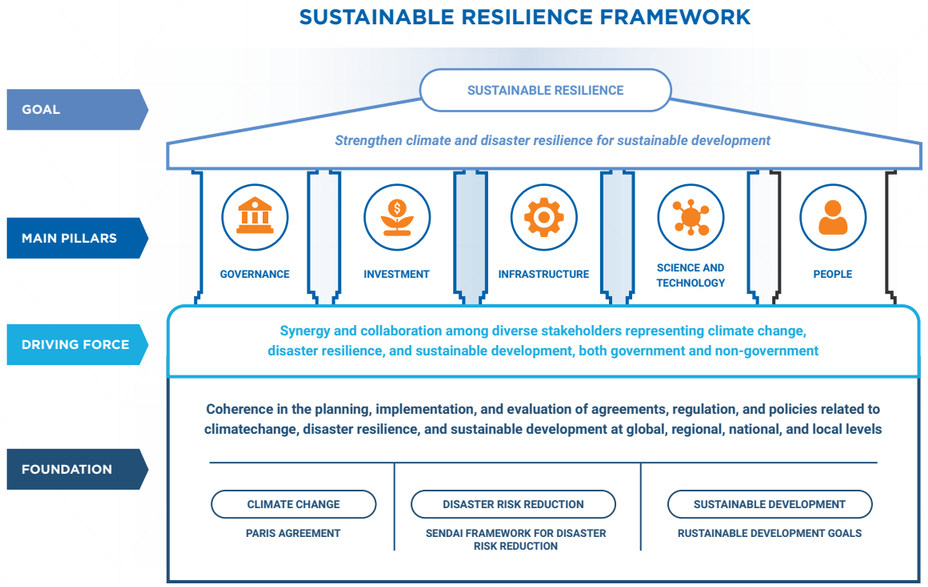

Figure 1.2. Sustainable Resilience Framework

The ultimate aim of these proposals is to increase coherence in responding to the systemic risks and challenges that were laid out in the Global Assessment Report on Disaster Risk Reduction 2022. The report explored how structures are evolving to better address systemic risks, called on policymakers to measure what we value, designed systems to factor in how human minds make decisions about risks, and reconfigured governance and financial systems to work across silos while maintaining close consultation with the affected people. In terms of governance reconfiguration, one of the proposed actions by the Global Assessment Report on Disaster Risk Reduction 2022 is to embrace a new "risk language" that cuts across multiple disciplines, thus enhancing multiscale risk management.

On behalf of the Government of Indonesia during the 7th Session of the Global Platform for Disaster Risk Reduction in 2022, President Joko Widodo believed that sustainable resilience could be achieved by strengthening the anticipatory-, responsive-, and adaptive-disaster-preparedness culture and institutions in which every country should invest in science, technology, and innovation, including ensuring access to finance and technology. Sustainable resilience was also achievable by building disaster- and climate change–resilient infrastructure and sharing commitments to implement global agreements at the national and local levels. This was in line with Presidential Decree Number 87/2020 on the Indonesia Disaster Management Master Plan 2020 – 2044, which showed the government's commitment to creating a long-term sustainable resilience planning programme over 25 years (President of the Republic of Indonesia, 2020).

In an academic setting, there is a perspective that resilience is the main goal, and sustainability is a factor that contributes to resilience (Marchese et al., 2018). In this perspective, according to Marchese et al. (2018), when sustainability is less affected during disruptions, it will result in a system that is better able to adapt, respond, and restore social, environmental, and economic functions before and after the disturbance. If we increase the scope, sustainable resilience has recently emerged as a concept and assessment framework that allows for the evaluation of baseline and subsequent changes in both sustainability capital and vulnerability over time. It also evaluates the interactions resulting from the implementation of (or failure to implement) management strategies intended to improve system resilience. Sustainable resilience also represents a system that seeks to reduce damage and loss over time by strategically monitoring and managing both vulnerability and sustainability to achieve desired performance outcomes (Gillespie-Marthaler et al., 2019a, 2019b).

Interestingly, the outcome of the first Global Forum for Sustainable Resilience, held in March 2023, concluded that sustainable resilience should be approached as an overarching umbrella for a collaborative effort to build resilience and achieve sustainable development (Global Forum for Sustainable Resilience, 2023). Sustainable resilience is roughly translated as the outcome of our ability to effectively address complex, fundamental, and systemic issues while also aligning key initiatives to strengthen climate and disaster resilience for sustainable development. Therefore, one of the most important steps in achieving sustainable resilience is to look for ways to align and streamline the principles, targets, and key initiatives. It is also important to address duplication and dissonance in the implementation of the Paris Agreement on climate change, the Sendai Framework for Disaster Risk Reduction (SFDRR), and the Sustainable Development Goals (SDGs) as internationally developed instruments designed to underpin development planning at the national, subnational, and local levels. This concept can also help harmonise the implementation and achievement of the targets and priorities for action of the SFDRR, greater ambition in the nationally determined contributions of the Paris Agreement, and full achievement of the SDGs.

Sustainable Resilience for Sustainable Development

Sustainable resilience is a crucial element for achieving sustainable development. It involves developing the capacity to withstand and recover from shocks and stresses while simultaneously advancing social, economic, and environmental sustainability. Sustainable resilience proposes a holistic approach that considers the interdependence of sociocultural, economic, and environmental dimensions. By integrating resilience and sustainability, efforts can be directed towards simultaneously addressing social equity, economic prosperity, and environmental protection. Sustainable resilience emphasises long-term thinking and planning. It goes beyond short-term fixes and focuses on building systems that can adapt, transform, and thrive in the face of future challenges. This long-term perspective aligns with the principles of sustainable development, which emphasise meeting the needs of the present without compromising the ability of future generations to meet their own needs. Both sustainable resilience and sustainable development require collaboration amongst multiple stakeholders. Governments, businesses, civil society organisations, and communities need to work together to identify common goals, leverage collective resources, and implement coordinated actions. Collaboration facilitates the sharing of knowledge, expertise, and resources, leading to more effective and sustainable outcomes.

Sustainable resilience recognises the importance of inclusivity and equity in development processes. It aims to ensure that the benefits and costs of resilience-building efforts are shared equitably amongst all segments of society. By addressing social vulnerabilities and ensuring access to essential services, sustainable resilience contributes to reducing inequalities and promoting inclusive development. Sustainable resilience acknowledges the critical role of ecosystems in supporting human well-being and sustainable development. Protecting and restoring ecosystems, conserving biodiversity, and adopting nature-based solutions contribute to both resilience and sustainability. Ecosystem services, such as water purification, climate regulation, and natural hazard mitigation, are essential for supporting human livelihoods and maintaining the health of the planet. At the same time, the manner in which those services are provided has the potential of increasing or reducing the risks for future generations.

Sustainable resilience and sustainable development share a common approach in integrated risk management. This involves identifying and assessing multiple risks, understanding their interconnections, implementing strategies that address multiple challenges simultaneously, and continuously evaluating those strategies for improvement and adaptation to the changing contexts. By integrating risk management more centrally into development planning, resilience can be enhanced while attempting to achieve sustainable development objectives. Achieving sustainable resilience for sustainable development requires adaptive, risk-informed, and risk-responsive governance and policy frameworks. They should always promote innovation, enable learning from experience, and facilitate the implementation of effective evidence-based strategies to build resilience and achieve SDGs.

By combining the principles of sustainable development with this concept of resilience, societies, especially communities at the smallest level, can foster a more inclusive, equitable, and sustainable future. Sustainable resilience offers a streamlined pathway for addressing present and future challenges while safeguarding the well-being of both the current and future generations. Beyond mere survival, Indonesia's approach to disaster risk management emphasises community-based disaster risk management (CBDRM). For example, this empowers communities to manage water resources, thus fostering social cohesion, economic development, and resilience. As part of the ecosystem-based disaster risk reduction, CBDRM recognises the interdependence between healthy ecosystems and community vulnerability. Water resource management through watershed-based policies encourages multi-level governance, showcased by initiatives like Yayasan Tukad Bindu, Komunitas Masyarakat Peduli Ciliwung (Mat Peci),[1] and Merti Code. These initiatives demonstrate the power of grassroots ingenuity, combining environmental protection with economic empowerment and cultural preservation. Indonesia's 25-year disaster management master plan, robust regulatory framework, and integration of local wisdom lay the foundation for sustainable resilience. By scaling up CBDRM through innovations like rainwater harvesting and strengthening inclusivity, Indonesia offers a pioneering model for ecosystem-based disaster risk reduction, aligning with SDGs, SFDRR, and climate change adaptation. This journey paves the way for a future where communities and ecosystems thrive in harmony, ensuring water security for generations to come.

Therefore, as the world faces complex challenges, building sustainable resilience requires a journey not a destination. This journey demands a shift in our perspective from quick fixes to long-term vision, from fragmented responses to integrated solutions, and from a nationwide focus to one that is people centred.

First, we must understand the landscape: identify and grasp the intricate web of systemic risks, like climate change and its attendant tipping points (Niranjan, 2023), as well as pandemics that have the potential to cripple entire systems. This awareness isn't enough; we need an integrated approach that recognises the interplay between economic, environmental, and sociocultural factors. Just as a virus exploits weaknesses in our immune system, vulnerabilities in one area can magnify risks in others. Therefore, the journey will demand more than just knowledge.

We need long-term thinking: anticipating future trends and potential shocks, not just reacting to the present. Scenario planning, modelling, futures thinking, and foresight become crucial tools for navigating an uncertain future. The path to resilience also demands diversification and redundancy, avoiding overreliance on single solutions. Imagine a country that only has a power grid that depends on a single fuel source — a single storm could plunge it into darkness. By diversifying energy sources and building redundancy, we create backup systems that ensure resilience in the face of disruptions. This journey is rarely solitary. Collaboration and knowledge sharing are critical weapons. Governments, businesses, communities, academia, and individuals must be encouraged to share expertise, best practices, and resources to build collective resilience. Imagine a global early warning system for pandemics built through knowledge sharing across borders. The SDGs provide a compass on this journey. By aligning our efforts with their interconnected goals — from poverty eradication to climate action — we work towards a future where resilience and sustainability intertwine. Finally, remember that resilience is not a static state but a continuous process. Adaptability and flexibility are key characteristics. We must embrace innovation, learn from past experiences, and constantly adapt to changing circumstances. Think of a mangrove forest: its flexible roots swaying with the tide yet remaining firmly rooted.

[1] Mat Peci is a community group focusing on the environmental issues in the Ciliwung River area of Jakarta, Indonesia.

Prioritising local investment in resilience

Building resilience to support sustainability is most effective when approached at the local level. Local communities possess valuable knowledge and understanding of their unique social, economic, and environmental contexts. By focusing on local resilience, sustainable development efforts can be tailored to address specific challenges and leverage local resources and expertise. Local communities can contribute insights that are crucial for identifying locally relevant solutions and implementing effective strategies. Local resilience promotes community engagement and empowers individuals to actively participate in decision-making processes. By involving local stakeholders, such as community members, civil society organisations, and local businesses, in resilience-building efforts, a sense of ownership and collective responsibility is fostered. This engagement leads to greater acceptance, cooperation, and sustainable outcomes. Local resilience recognises communities' familiarity with their surrounding risk and their proximity to natural resources, ecosystems, and infrastructure. By integrating local resources and assets into resilience-building strategies, communities can enhance their ability to withstand shocks while striving for sustainability. This includes utilising local renewable energy sources, promoting sustainable agriculture practices, and incorporating nature-based solutions that capitalise on the surrounding ecosystem services.

Local resilience embraces bottom-up approaches that empower communities to shape their own sustainable development pathways. It acknowledges that local actors have an in-depth understanding of their needs, priorities, and aspirations. By encouraging local decision-making and fostering local initiatives, sustainable solutions can be tailored to the specific needs and aspirations of the community, leading to more effective and sustainable outcomes. Local resilience efforts often promote the formation of collaborative networks and partnerships amongst various local stakeholders. These networks enable the sharing of knowledge, resources, and best practices, facilitating collective action for sustainability. Local collaborations can span across administrative boundaries and sectors, engaging government agencies, educational institutions, businesses, community groups, and non-profit organisations to promote integrated approaches to resilience and sustainable development. Local resilience enhances the communities' adaptive capacity and enables them to respond and recover from shocks and stresses in a sustainable manner. By building local capacity for adaptive management, problem-solving, and innovation, communities can better navigate uncertainties and adapt to changing circumstances. This adaptability fosters a culture of continuous learning and improvement, leading to long-term sustainable development outcomes. Local resilience efforts contribute to the development of social capital within communities. Social capital refers to the networks, relationships, trust, and, most importantly, shared knowledge amongst community members. Strong social capital strengthens collective action, cooperation, and resilience. Through community engagement, local resilience initiatives foster social cohesion, collaboration, and a sense of shared responsibility, which enable the communities to better address challenges to sustainability. Local resilience is a critical component of sustainable development, as it acknowledges the unique characteristics, resources, and challenges of specific communities. By empowering local stakeholders and integrating their culture and knowledge, engaging in collaborative networks, and leveraging local resources, sustainable development can be achieved in a manner that is contextually relevant, inclusive, and environmentally sustainable.

Building resilience to support sustainability is most effective when approached at the local level. Local communities possess valuable knowledge and understanding of their unique social, economic, and environmental contexts.

Case Studies

To better understand the aims of sustainable resilience and the messages they carry, there are three examples of sustainable resilience initiatives in Indonesia's disaster management context:

1 Rehabilitating mangroves: In 2020, the Indonesian government launched the national mangrove rehabilitation programme, which recognised the critical role of mangroves for livelihoods, resilience, and climate. This presidential priority aimed to rehabilitate 600,000 hectares of degraded mangroves by 2024. The programme was implemented by several ministries under the coordination of the Coordinating Ministry for Maritime and Investment Affairs, the Ministry of Environment and Forestry, the Ministry of Marine Affairs and Fisheries, and the Peatland and Mangrove Restoration Agency. It also involved the private sector and community organisations. The national mangrove rehabilitation programme is supported by several development agencies, including the World Bank, through the Mangroves for Coastal Resilience programme.

2 Early warning systems and community preparedness: Indonesia has invested in building early warning systems for various types of disasters, including earthquakes, tsunamis, and volcanic eruptions. These systems provide timely alerts to communities at risk, enabling them to evacuate or take appropriate actions. Moreover, Indonesia has promoted community-based disaster risk reduction programmes. For instance, the programme trains local residents to identify risks, develop evacuation plans, and build emergency shelters. These efforts empower communities to take an active role in disaster preparedness, reducing their vulnerability sustainably.

3 Disaster-resilient infrastructure and sustainable urban planning: In rapidly growing urban areas like Jakarta, Indonesia, the focus is on resilient infrastructure and sustainable urban planning. This includes constructing buildings and critical infrastructure that can withstand earthquakes and floods. The government also works on improving urban drainage systems to mitigate flood risks. Sustainable urban planning incorporates green spaces and natural flood management solutions, like retention ponds, biopore infiltration holes, and green roofs, to reduce the impact of heavy rainfall. These measures not only enhance disaster resilience but also contribute to long-term environmental sustainability.

These examples illustrate Indonesia's commitment to integrating sustainability into its disaster management strategies, ensuring that they not only protect lives and property during disasters but also contribute positively to the environment and communities in the long run. Indonesia aims to move beyond mere reactive disaster management by weaving sustainability into its strategies. This ensures not only immediate protection but also long-term well-being for lives, environments, and communities. Recognising the crucial role of community empowerment, Indonesia actively engages and empowers local communities through training, risk assessments, and developing their own disaster plans. This fosters ownership and responsibility, making them resilient partners. Embracing an ecosystem-based approach, Indonesia attempts to leverage natural buffers, like mangroves and forests. Restoration and preservation efforts enhance resilience, promote biodiversity, and recognise the link between ecological health and preparedness. Multi-sectoral collaboration is needed amongst government agencies, non-governmental organisations, academia, and the private sector to collaborate, pooling resources, expertise, and innovative solutions. This strengthens disaster preparedness and response, as seen with private sector involvement in infrastructure and technology companies contributing to early warning systems. This multipronged approach illustrates Indonesia's commitment to building a future where resilience surpasses mere survival, embracing sustainability and collaboration for long-term well-being.

Way Forward for Sustainable Resilience

The journey towards policy, programmes, and lived experiences that centralise sustainable resilience requires a paradigm shift. It demands seeing the planet as a system, understanding interdependencies, and acting with a long-term vision. By integrating these principles into our actions, we can navigate the complexities of the world, build a more resilient future, and create a world where we not just survive but thrive. To move forward and enhance sustainable resilience, we must take several key actions:

1 Mainstream resilience in policies and regulations: Integrate resilience considerations into policy frameworks, regulations, and development plans from the national to subnational level. Ensure that resilience becomes a central consideration in sectors, such as urban planning, infrastructure development, energy, agriculture, and disaster risk reduction. Create incentives and regulatory frameworks that promote sustainable practices and discourage activities that undermine resilience.

2 Strengthen risk assessment and planning: Conduct comprehensive risk assessments to identify and understand systemic risks, vulnerabilities, and interdependencies. This includes analysing social, economic, and environmental risks and their potential impacts, along with strengthening anticipatory and participatory action. Develop robust resilience plans that integrate risk reduction, preparedness, response, and recovery strategies.

3 Integrate climate change adaptation: Recognise the critical importance of climate change mitigation and adaptation in building sustainable resilience. Incorporate climate resilience considerations into infrastructure development, urban planning, agriculture, and natural resource management. Foster the use of climate data, modelling, and scenario planning to inform decision-making processes.

4 Promote nature-based solutions: Embrace nature-based solutions that utilise ecosystem services to enhance resilience. Protect and restore natural habitats, including forests, wetlands, and coastal areas, which provide natural buffers against hazards, support biodiversity, and mitigate climate change impacts. Integrate nature-based solutions into urban design, infrastructure development, and land-use planning.

5 Encourage circular economy practices: Transition towards a circular economy, which focuses on reducing waste, recycling resources, and promoting sustainable production and consumption patterns. By minimising resource depletion, enhancing resource efficiency, and promoting sustainable business models, the circular economy contributes to long-term resilience and environmental sustainability.

6 Enhance social equity and inclusion: Ensure that resilience-building efforts prioritise social equity and inclusion. Address social vulnerabilities and inequalities by providing equal access to essential services, promoting inclusive decision-making processes, and involving marginalised groups in resilience planning and implementation. Consider the needs and perspectives of all stakeholders to foster a sense of ownership and shared responsibility.

7 Invest in education and capacity building: Promote education and capacity-building initiatives that enhance resilience at all levels. This includes raising awareness about systemic risks, providing training in risk management and adaptive practices, and integrating sustainability and resilience into educational curricula. Empower individuals, communities, and organisations with the knowledge and skills necessary to adapt and thrive in a changing world.

8 Foster collaboration and partnerships: Foster collaboration and partnerships amongst governments, businesses, civil society organisations, communities, and academia. Establish multi-stakeholder platforms that facilitate knowledge sharing, resource mobilisation, and coordinated action. Encourage public-private partnerships to leverage expertise, innovation, and financial resources for sustainable resilience initiatives.

9 Leverage technology and innovation: Embrace technological advancements and innovation to enhance resilience. Explore using digital technologies, such as data analytics, artificial intelligence, and remote sensing, for early warning systems, risk assessments, and decision support. Foster innovation ecosystems that promote sustainable technologies, products, and services.

10 Implement monitoring, evaluation, and learning: Establish monitoring and evaluation mechanisms to assess the effectiveness of resilience-building initiatives. Learn from past experiences, evaluate outcomes, and continuously improve approaches based on lessons learnt. Foster a culture of adaptive management and continuous learning to enhance resilience over time.

By implementing these actions, sustainable resilience can be advanced, contributing to the achievement of SDGs and ensuring a more secure, equitable, and sustainable future for all.

Investment for Sustainable Resilience

Along with the key actions previously listed, investment in sustainable resilience is crucial for building a more secure, adaptive, and sustainable future. The following are recommendations to ensure that our efforts are eventually self-supporting and long-lasting.

- Allocate resources to enhance the resilience of critical infrastructure systems, such as transportation networks, energy grids, water and sanitation systems, and communication networks. This includes retrofitting existing infrastructure to withstand climate-related hazards, integrating nature-based solutions, adopting smart technologies for monitoring and response, and investing in climate change adaptation measures that build resilience to its adverse impacts. This can include developing climate-resilient agriculture practices, implementing coastal protection measures, promoting sustainable water management strategies and renewable energy sources, and supporting community-based adaptation initiatives.
- Direct investment towards the ecosystem restorations' and conservation projects' needs to be further enhanced. Protecting and restoring ecosystems, such as forests, wetlands, and coral reefs, can provide numerous benefits, including natural disaster risk reduction, carbon sequestration, biodiversity conservation, and better water resource management.
- Support research and development efforts focused on sustainable resilience solutions.
- Invest in technological innovations, data analytics, modelling, and forecasting tools that improve risk assessment, early warning systems, and decision-making processes.
- Encourage interdisciplinary research collaborations to advance knowledge and develop new approaches for sustainable resilience.
- Allocate funds to enhance awareness raising, capacity building and education programs related to sustainable resilience. This includes training programs for government officials, community leaders, and professionals in risk management, climate adaptation, and sustainable development practices.
- Promote educational initiatives that integrate resilience and sustainability into school curricula and vocational training programs.
- Foster public-private partnerships to mobilize resources, expertise, and innovation for sustainable resilience.
- Encourage collaboration between communities, government agencies, businesses, non-profit organizations, and research institutions to leverage financial, technical, and operational capabilities. Public-private partnerships can facilitate the development and implementation of large-scale resilience projects and initiatives.
- Promote the development of innovative insurance and risk financing mechanisms that support sustainable resilience. This can include creating insurance products specifically designed to cover climate-related risks and natural disasters.
- Encourage the use of risk transfer schemes such as catastrophe bonds and resilience bonds to provide financial support for resilience projects and recovery efforts.
- Invest in community-based resilience initiatives that empower local communities to build their capacity to withstand and recover from shocks.
- Support grassroots organizations, community-led projects, and social enterprises that focus on resilience-building activities at the local level. This can include funding for community training, participatory planning processes, and small-scale infrastructure projects.
- Foster international cooperation and financial support for sustainable resilience efforts, particularly in vulnerable and developing regions.

- Provide funding and technical assistance to support capacity building, knowledge sharing, and implementation of resilience projects in countries facing significant climate and development challenges.
- Encourage the integration of sustainability criteria into investment decisions and financial mechanisms.
- Promote green bonds, sustainable investment funds, and impact investment strategies which prioritize investments in projects and businesses and contribute to sustainable resilience. By strategically directing investment towards sustainable resilience, we can build a more resilient and sustainable future that safeguards communities, economies, and the environment in the face of growing challenges and uncertainties.

Acknowledgments

The authors have benefited from wise and intensive discussion with DFAT and SIAP SIAGA team, with few of them include Said Faisal, Oliver Lacey-Hall, KPH Notonegoro, and Valentinus Irawan. The authors are grateful for their contributions and inputs for this paper.

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Articles

ARMOR
ASEAN Risk Monitor and Disaster Management Review
4TH Edition
#2

ASEAN Disaster Risk Sustainable Resilience:

Incorporating Sustainable Development Goals into ASEAN Riskscape

Authors:
Sadhu Janottama, Joseph Green, Lawrence Anthony Dimailig, Erin Hughey, Mohammad Fadli, and Jasmine Alviar

#2

ASEAN Disaster Risk Sustainable Resilience: Incorporating Sustainable Development Goals into ASEAN Riskscape

Author: Sadhu Janottama, Joseph Green, Lawrence Anthony Dimailig, Erin Hughey, Mohammad Fadli, Jasmine Alviar

Abstract:

Indonesia presented concepts of sustainable resilience to increase resilience in the face of disaster risks at the 7th Global Platform for Disaster Risk Reduction 2023. This presentation was followed by the Association of Southeast Asian Nations (ASEAN) Leaders Declaration on Sustainable Resilience (ASEAN, 2023), which aims to promote sustainable resilience as an enabling framework to enhance collaboration in strengthening climate and disaster resilience for sustainable development. This article assesses the latest disaster risk of the ASEAN region and incorporates the Sustainable Development Goals (SDGs) as components to build resilience. This assessment seeks to understand the impact of sustainable development efforts on the ASEAN riskscape. This year, the ASEAN Risk Index for Situational Knowledge (ASEAN RISK) shows that Myanmar, the Philippines, and Indonesia are the ASEAN Member States (AMS) most at risk of disasters. Compared to the 1st edition of the ASEAN Risk Monitor and Disaster Management Review (ARMOR), there is generally decreased resilience in the ASEAN region. However, compared to the 3rd edition of ARMOR, there is a general improvement in the resilience of the ASEAN region. By incorporating SDGs into the ASEAN risk assessment, there is an average reduction in risk scores of 9% across all AMS. By taking a closer look at each resilience component, each AMS highlighted its strong points on the SDGs for their resilience components. This article recommends that ASEAN explore how sustainable resilience can be shared amongst AMS to enhance regional resilience further.

Keywords: ASEAN RISK, disaster, resilience, sustainable development

Introduction

Background

In light of the escalating impact of natural hazards, the Association of Southeast Asian Nations (ASEAN) region remains particularly vulnerable to disasters. According to the ASEAN Disasters Information Network (ADINet), 2023 witnessed an average of three daily disasters within the ASEAN region. These events affected approximately 61,000 individuals, displacing 5,000 people on a daily basis ("ADINet," 2024). Tragically, there were an average of two deaths, one missing person, and three injuries each day during the same period. Comparing these figures to the disaster averages from 2012[1] to 2022, it becomes evident that disaster occurrences surged significantly in 2023, reaching 2.4 times the 2012–2022 average rate. This heightened frequency underscores the urgent need for proactive measures within the ASEAN community to enhance disaster resilience.

During the inauguration of the 7th Global Platform for Disaster Risk Reduction 2023, Indonesia delivered concepts of sustainable resilience in facing disaster risks to increase resilience (Office of Assistant to Deputy Cabinet Secretary for State Documents & Translation, 2022). This includes emphasizing the importance of strengthening culture and institutions, investment in science, technology, and innovation, ensuring access to funding and technology transfer, building disaster-resilient and climate-resilient infrastructure, and shared commitment to implement local, national, and global agreements. ASEAN leaders also adopted this concept on 5 September 2023 with the ASEAN Leaders Declaration on Sustainable Resilience (ASEAN, 2023). Through these declarations, ASEAN promotes sustainable resilience as an enabling framework to enhance collaboration in strengthening climate and disaster resilience for sustainable development by aligning critical initiatives related to the implementation of the Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals (SDGs), and the Paris Agreement at national and local levels.

Understanding the current ASEAN risk scope will highlight several components of resilience within the context of sustainability, which is essential for ASEAN. This understanding may also highlight how much ASEAN has increased its resiliency within the context of sustainability. This article explores and assesses the current ASEAN disaster riskscape and seeks to understand the impact of resilience components with sustainable development efforts on the ASEAN riskscape. Further, this article also examines the sustainable resilience component of ASEAN Member States (AMS) to reduce disaster risk in ASEAN.

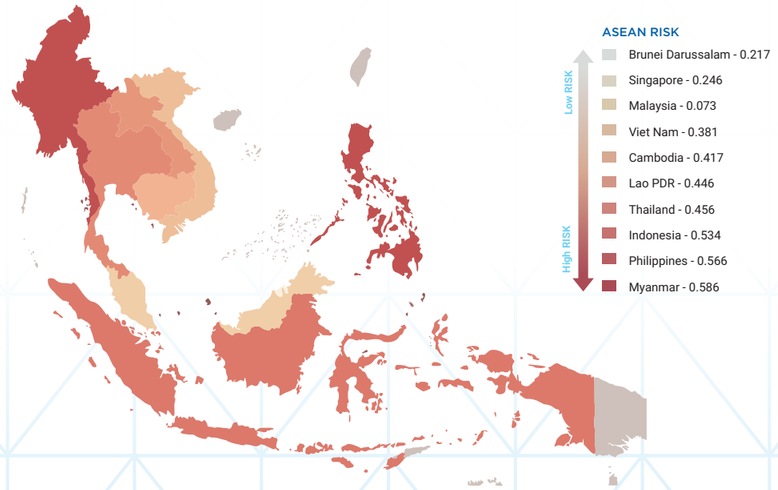


Figure 2.1 An ASEAN Risk Index for Situational Knowledge (ASEAN RISK) heat map showing the degrees of risk throughout the region.

[1] ADINet started record disasters from July 2012.

ASEAN Risk

ASEAN RISK builds on two of the leading disaster risk assessments: the Joint Research Centre's Index for Risk Management (INFORM) and the Pacific Disaster Center's (PDC) ASEAN Risk and Vulnerability Assessment (RVA). These indices are leveraged to create a composite measure of "multi-hazard exposure," "vulnerability," "coping capacity," and "resilience." Both INFORM and PDC approach indicator aggregation, scaling, and ranking similarly — the differences are primarily based on indicator selection.

To provide a simplified, single measure for situational awareness and use by decision-makers within the ASEAN region, the "vulnerability" and "capacity" components were averaged into a single measure. The INFORM vulnerability index is averaged with the PDC vulnerability index to produce a composite ASEAN Risk Monitor and Disaster Management Review (ARMOR) vulnerability index. INFORM's "lack of a coping capacity" index is first subtracted from one to re-orient the scores to a "coping capacity" measure and then averaged with RVA's coping capacity index to produce a composite ARMOR managing capacity index.

A resilience index is calculated using the geometric mean (representing "1-vulnerability" multiplied by "coping capacity"). This provides an aggregate measure of AMS' resilience to shocks and systemic stressors. "Resilience" considers the socioeconomic and population-based measures associated with "vulnerability" and the systemic tools and shortcomings available to AMS to prepare for, respond to, and recover from shocks. This aggregate measure provides a relative ranking of the AMS' abilities to cope with hazards and exposures.

Hazards and exposures are assessed using PDC's All-Hazards Impact Model (AIM) 3.0 model. AIM's base population and infrastructure data are at a 30-metre resolution. Hazard zones (for earthquakes, wildfires, landslides, tropical cyclone winds, flood tsunamis, and volcanos) are input into the model. The base population and infrastructure data intersecting the hazard zones are aggregated and min-max scaled. Next, hazard raw (total) and relative (% of the total) indicators are generated for population, replacement building cost, vulnerable population, schools, and hospitals within the hazard zones. The values are min-max scaled to generate values from 0 to 1, where 0 is the lowest exposure, and 1 is the highest. Each class's raw and relative exposure values (population, etc.) are averaged to produce composite hazard-specific exposure values. These values are then averaged to produce an overall "hazard exposure" value.

This methodology envisions risk as a composite of "hazard exposure," "vulnerability," and 1-"coping capacity" (or coping-capacity deficit). This methodology is roughly equivalent to 1-"resilience," as calculated above. Thus, the equation can be normalised as:

$$\text{Risk} = \text{Hazard Exposure}^{1/2} \times (1\text{-Resilience})^{1/2}$$

Equation 2.1 *Risk is calculated as the square root of "hazard exposure" times square root of 1 minus "resilience"*

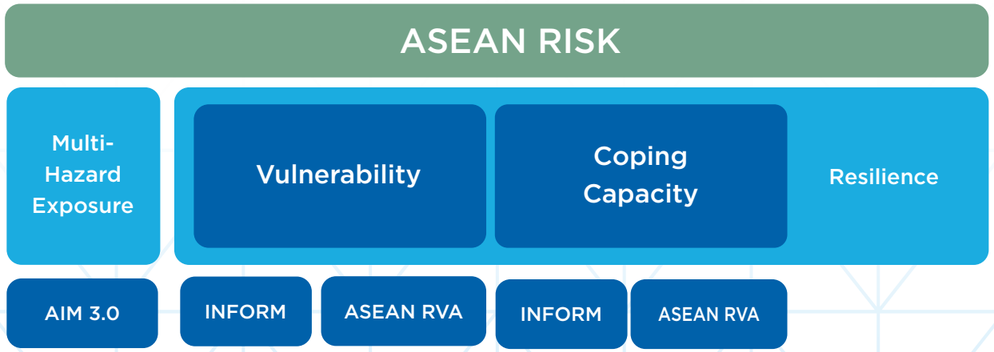


Figure 2.2. ASEAN RISK follows a model-of-models approach, whereby disaster risk components in INFORM and ASEAN RVA are applied to produce a composite risk index for each AMS (Source: Dimailig et al., 2022).

ASEAN RISK, Resilience, and Sustainability

ASEAN RISK (Dimailig et al., 2020; Pang & Dimailig, 2019) considers natural hazard risk, and last year's analysis (Dimailig et al., 2022) considered the additive burden of COVID-19 to each AMS risk profile. The focus of this year's analysis was assessing sustainable resilience. This assessment seeks to understand the impact of sustainable development efforts on the ASEAN riskscape. The resilience indicators used in each of the previous years significantly overlap with the 17 SDGs. Because there is significant overlap between the 17 SDGs and disaster resilience outcomes, using the SDG Progress score provides a metric that accounts for SDG progress and current indicators of resilience, demonstrating the sustainability of efforts that overlap both the SDG and Disaster Risk Reduction.

The progress of each AMS towards achieving all 17 SDGs was considered during the SDG Progress. The SDG Progress score was normalised for the ASEAN region, and the SDG normalised score was combined with the "resilience" measure from the ASEAN assessment (done by multiplying the "resilience" index score by 1 + the normalised SDG score). This calculation provides an assessment of "resilience" while additionally giving credit to the AMS for their relative progress in achieving the 17 SDGs. The SDG-adjusted "resilience" score can then be combined with "hazard exposure" to show the impact of SDG Progress on disaster risk scores. The outcome measure provides a current understanding of the ASEAN riskscape as well as a measure of sustainability in reducing disaster risk.

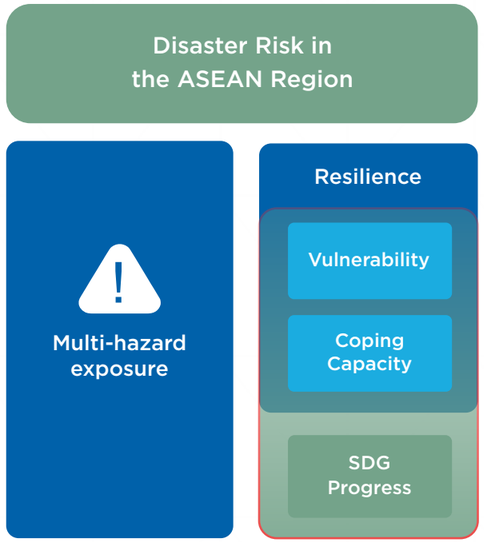


Figure 2.3. SDG Progress is aggregated with the *"Resilience"* component, which consists of *"Vulnerability"* and *"Coping Capacity"*, and then re-calculated with the other components of ASEAN RISK (*"Multi-hazard exposure"*) to arrive at a measure of adjusted Disaster Risk of each AMS with SDG Progress.

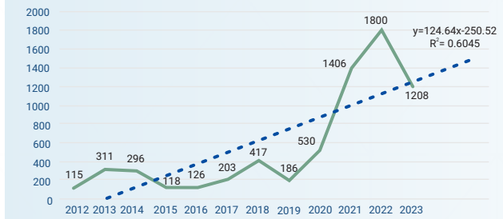
Figure 2.4. Detail of *"resilience"* component assessed (*"Vulnerability"* and *"Coping Capacity"*) in this article compared to 17 SDGs.

The authors conducted interviews and discussions with representatives from AMS to incorporate the perspectives of actors from national disaster management organisations (NDMOs). These interviews aimed to gather insights into their understanding of sustainable resilience and provide information to help them assess progress towards SDGs. Specifically, the focus was on efforts to reduce "vulnerability" and enhance "coping capacity." Six NDMOs contributed valuable information to this article, including Cambodia's National Committee on Disaster Management, Indonesia's Badan Nasional Penanggulangan Bencana, Lao PDR's NDMO, Thailand's Department of Disaster Prevention and Mitigation, and the Viet Nam Disaster and Dyke Management Authority.

Result and Discussions

ASEAN RISK

Annual Disaster Occurrences in the ASEAN Region as of 2023



Disaster in the ASEAN Region per Hazard Category as of 2023

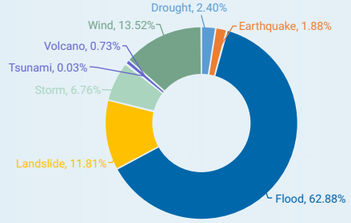


Figure 2.5. Annual disaster occurrences (left) and distribution of disaster events per hazard category (right) in the ASEAN Region until December 2023 shows that there is a general increasing trend from 2012 until 2023, and hydrometeorological disasters are the most disasters that occurred in the ASEAN Region (Source: "ADINet,"2024).

Between 2012 and 2023, the ASEAN Disaster Information Network documented over 6.7K disaster events across the ten AMS. These events have significantly impacted more than 235 million individuals, displacing over 26 million people and resulting in 118K casualties (including fatalities, missing persons, and injuries). The economic toll stands at over USD 19 billion in damages. Figure 2.5 illustrates a general upward trend in disaster occurrences within the ASEAN region. However, there was a temporary decline in 2023 due to the onset of El Niño. Notably, hydrometeorological disasters (floods, storms, landslides, winds, and drought) dominate the region's disaster landscape, emphasising the critical role of weather and climate conditions in shaping ASEAN's risk to disasters.

Hazard	Percent of the ASEAN Population Exposed	Percent of Exposed that are considered Vulnerable	Population Exposed	Built Environment Exposure Replacement Cost (USD)
Flood	23	13	146,245,744	7,631,504,208,000
Landslide	3	12	16,504,715	331,833,423,800
Tsunami	1	16	5,184,092	86,681,397,400
Earthquake	57	17	359,126,250	2,907,266,094,100
Tropical Cyclone Wind	49	16	310,300,381	3,189,321,060,100
Volcano	38	14	237,734,911	2,000,466,041,400
Wildfire	21	14	134,478,967	1,759,751,570,900

Table 2.1. Summary of the ASEAN region's population and economic exposure to natural hazards shows that earthquakes, tropical cyclones, winds, and volcanoes pose the highest threat to the ASEAN population. Meanwhile, floods are the region's most frequent disaster with the highest threat to capital exposure (built environment exposure).(Source: PDC, 2023).

Exposure to natural hazards continues to be the predominant factor driving disaster risk within the ASEAN region. Amongst the natural hazards assessed, identical to the previous ARMOR edition (Dimailig et al., 2020; Dimailig et al., 2022; Pang & Dimailig, 2019), earthquakes (affecting 57% of the population, approximately 359 million people) and tropical cyclones (affecting 49% of the population, around 310 million people) pose the most significant threats. From 2012 to 2023, tropical cyclone–related disasters affected over 100 million individuals, while earthquakes impacted nearly 20 million. Regarding casualties, tropical cyclones (along with associated disasters) and earthquakes stand out as the top two events resulting in the highest loss of life in ASEAN. On the other hand, when considering built environment exposure, floods incur the highest costs, exceeding USD 7 billion. Tropical cyclones follow closely, accounting for over USD 3 billion, while earthquakes contribute approximately USD 2.9 billion to the overall economic impact.

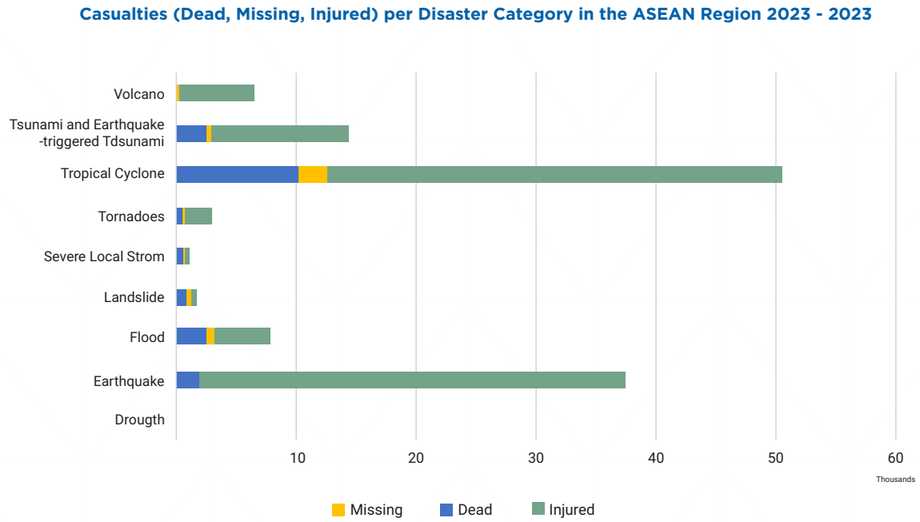


Figure 2.6. Casualties (dead, missing, injured) per disaster category in the ASEAN region (Source: "ADINet," 2024).

Figure 2.6 presents data on casualties (including fatalities, missing individuals, and injured people) in the ASEAN region from 2012 to 2023. The figure highlights the impact of various disaster types during this period. Earthquakes and tsunamis account for the highest number of casualties, contributing 50.6% of the total. Tropical cyclones and associated disasters represent 41.4% of casualties; tropical cyclones and their related disasters have affected the region during the same period. In terms of the affected populations, Figure 2.7 reveals that hydrometeorological disasters have the most significant impact. Tropical cyclones remain the primary cause of affected populations, representing 45.2% of all disasters in the ASEAN region from 2012 to 2023. Additionally, other hydrometeorological events — such as flooding, landslides, storms, and wind-related disasters — contribute 39.6% of the total disaster occurrences.

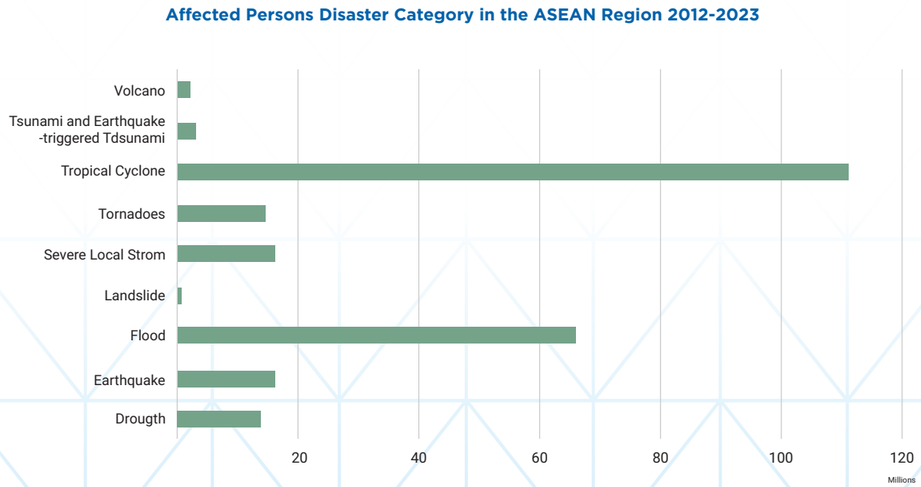


Figure 2.7. Affected persons per disaster category in the ASEAN region (Source: "ADINet," 2024)

Table 2.2 presents the most recent analysis results, which remain consistent with last year's assessment. Notably, Myanmar, the Philippines, and Indonesia continue to be the AMS facing the highest risk. Myanmar stands out as the most vulnerable AMS, driven by a combination of factors, including having the third-highest "natural hazard exposure," the highest "vulnerability," and the lowest "coping capacity." Ongoing multi-dimensional challenges, including a significant displaced population due to conflict situations, contribute significantly to this vulnerability score. The Philippines and Indonesia follow closely as the second and third highest-risk countries, respectively. Their exposure to natural hazards remains a critical factor. Together, they account for over 80% of the disasters in the ASEAN region ("ADINet," 2024), with Indonesia at 70.5% and the Philippines at 11.5%. Additionally, the Philippines faces the second-highest "vulnerability" and the fifth-lowest "coping capacity."

ASEAN Riskscape

Member State	Risk	Risk Rank	Resilience	Resilience Rank	Coping Capacity	Coping Capacity Rank	Vulnerability	Vulnerability Rank	Exposure	Exposure Rank
Brunei Darussalam	0.246	9	0.754	2	0.660	2	0.160	9	0.236	10
Cambodia	0.418	6	0.484	9	0.390	9	0.399	3	0.339	9
Indonesia	0.533	3	0.590	6	0.520	6	0.330	5	0.694	2
Lao PDR	0.447	5	0.512	8	0.410	8	0.361	4	0.409	6
Malaysia	0.373	8	0.861	3	0.640	3	0.276	6	0.434	5
Myanmar	0.585	1	0.405	10	0.320	10	0.487	1	0.575	3
Philippines	0.566	2	0.555	7	0.530	5	0.419	2	0.720	1
Singapore	0.218	10	0.869	1	0.820	1	0.079	10	0.365	8
Thailand	0.457	4	0.637	4	0.560	4	0.275	7	0.575	4
Viet Nam	0.380	7	0.627	5	0.520	6	0.243	8	0.387	7

Table 2.2. ASEAN RISK Scores and Rankings for ARMOR 4th Edition show Indonesia, Myanmar, and the Philippines remain the three most at-risk AMS to disasters, consistent with the findings of the past three editions of ARMOR. Likewise, Brunei Darussalam, Malaysia, and Singapore remain to be the least at risk.

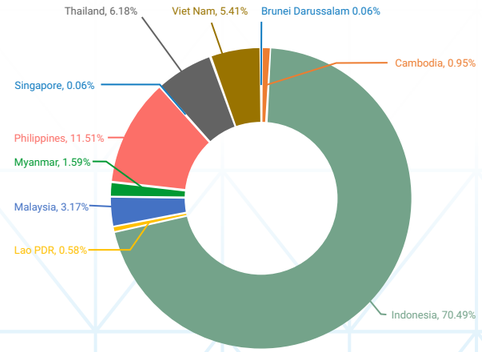


Figure 2.8. The distribution of disaster occurrences in the ASEAN region from July 2012 to December 2023 shows that most of the disasters occurred in Indonesia and the Philippines.

Singapore and Brunei Darussalam stand out as the AMS with the lowest risk. Their "natural hazard exposure" is notably minimal within the region. Singapore is exposed to only two of the assessed natural hazards (landslides and wildfires). At the same time, Brunei Darussalam faces exposure to four out of the seven hazards assessed (flood, landslide, tsunami, and wildfire). In addition to their low "hazard exposure," these AMS exhibit remarkable "resilience" as they both have the highest "coping capacity" score and the lowest "vulnerability" scores amongst all ASEAN states, ranking first and second in "resilience." Regarding disaster occurrences resulting from natural hazards, both Singapore and Brunei Darussalam represent less than 0.1% of the total disasters in the ASEAN region ("ADINet," 2024).

Change in the ASEAN Riskcape

PDC's AIM 3.0 is a recent update with improved spatial resolutions, resulting in a more accurate assessment of exposures. Hazard zones do not appreciably change over the short term; therefore, this article's ASEAN RISK assessment is aggregated with the "vulnerability" and "coping capacity" scores of previous editions of ARMOR to allow for comparison across time.

A slight average increase in "vulnerability" scores from the 1st edition indicates that most AMS have seen increased "vulnerability" scores. The change in "vulnerability" has decreased when including this year's assessment. This is due to an overall decrease in these scores for this year's assessment. The most significant decreases in "vulnerability" scores were in Cambodia, Myanmar, and the Philippines.

Figure 2.9. Comparison of the ASEAN RISK assessments using data in the 4th edition, 3rd edition, and 1st edition. The figure shows that, since the 1st edition, there has been a general decrease in "resilience" in the ASEAN region. However, Lao PDR, Singapore, Thailand, and Viet Nam show an improvement in "vulnerability," and Brunei Darussalam shows an improvement in "coping capacity." Between the 3rd and 4th editions, there has been a general improvement in the "resilience" of the ASEAN region.

In line with the decreases in "vulnerability," all AMS (except Singapore) saw slight increases in "coping capacity" scores. A small average decrease in "coping capacity" has persisted since the 1st edition. All AMS have seen a decrease in "coping capacity."

Myanmar saw the largest decrease in "coping capacity" since the 1st edition, followed by Viet Nam and Lao PDR. Those AMS with the highest "coping capacity" scores have the smallest decrease in "coping capacity" since the 1st edition.

Exposures are based on PDC's updated AIM. Hazard zones do not appreciably change over the short term; therefore, the current exposure assessment used for this edition was aggregated with past edition "vulnerability" scores and "coping capacity" scores to allow for comparability across editions for exposure and risk.

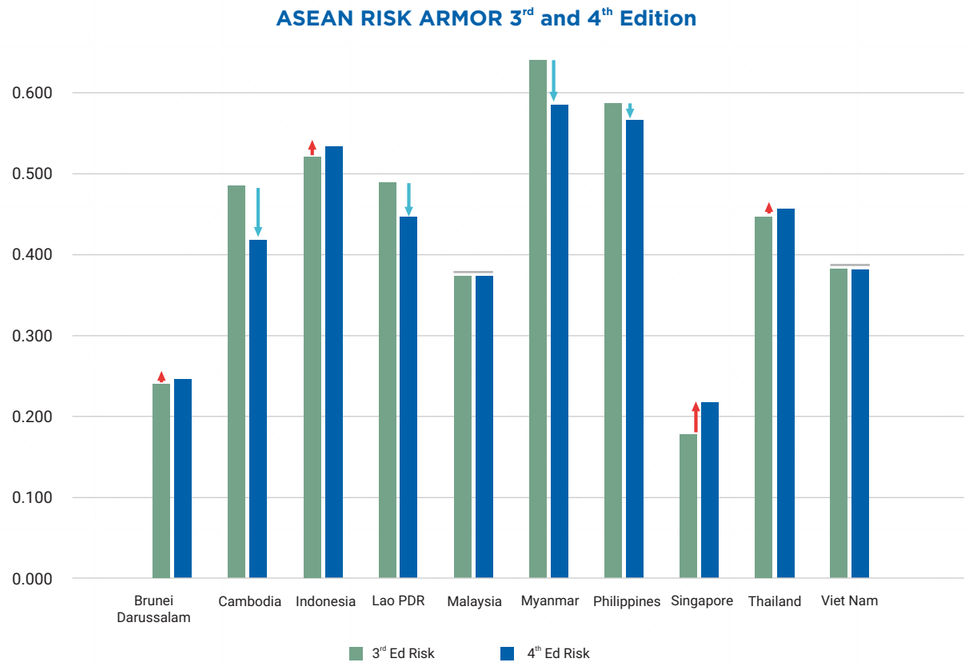


Figure 2.10. The ASEAN RISK from the ARMOR 3rd edition and 4th edition with the ASEAN RISK score show a decrease for Cambodia, Lao PDR, Myanmar, and the Philippines, while Brunei Darussalam, Indonesia, Malaysia, Singapore, Thailand, and Viet Nam show a slight increase to no change in ASEAN RISK score.

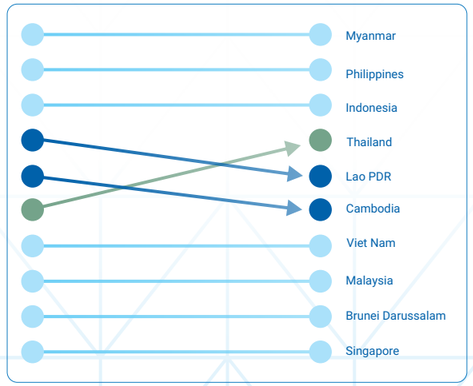


Figure 2.11. The ASEAN RISK score of AMS change from the ARMOR 3rd edition (left) to the ARMOR 4th edition (right) shows that there was a change for Thailand, Lao PDR, and Cambodia.

Myanmar and the Philippines have the largest increase in risk scores since the 1st edition. This remains unchanged from last year's assessment. Thailand and Singapore saw the smallest increase in risk scores since the 1st edition. Myanmar and the Philippines have consistently had the highest risk scores across all years. This pattern is consistent with what was found for the "vulnerability" and "coping capacity" scores, whereby those with the least favourable scores across all thematic areas trend in the negative direction year over year.

Compared to last year's assessment, all AMS have demonstrated enhanced "resilience." Notably, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, and the Philippines have improved their "vulnerability" and "coping capacities." Singapore and Viet Nam have also made strides in addressing "vulnerability," while Brunei Darussalam has strengthened its "coping capacity." These collective efforts have led to adjustments in the ASEAN region's disaster riskscape. Specifically, Cambodia, Lao PDR, Myanmar, and the Philippines now exhibit a reduced risk score. Conversely, Brunei Darussalam, Indonesia, Malaysia, Singapore, Thailand, and Viet Nam have seen a slight increase or no change in their risk scores compared to the previous ASEAN RISK (Dimailig et al., 2022).

Sustainability and Risk

Incorporating SDG Progress scores into the ASEAN RISK assessment provides insight into the efforts to meet the SDGs and how they may intersect with the disaster risk reduction efforts. Overall, there are minor changes in risk when considering SDG Progress. There is an average reduction in risk scores of 9% across all AMS. Singapore and Brunei Darussalam saw the largest reductions in risk scores, followed by Thailand. From this information, we see that AMS with the lowest risk scores benefitted from the consideration of SDG Progress. Amongst the AMS with the highest risk scores (Myanmar, the Philippines, and Indonesia), Indonesia saw the most significant reduction in risk score (approximately 6%), followed by the Philippines (5%) and Myanmar (2%). When compared relatively, only Lao PDR and Thailand changed ranks. This is due to the closeness in SDG Progress scores for all AMS.

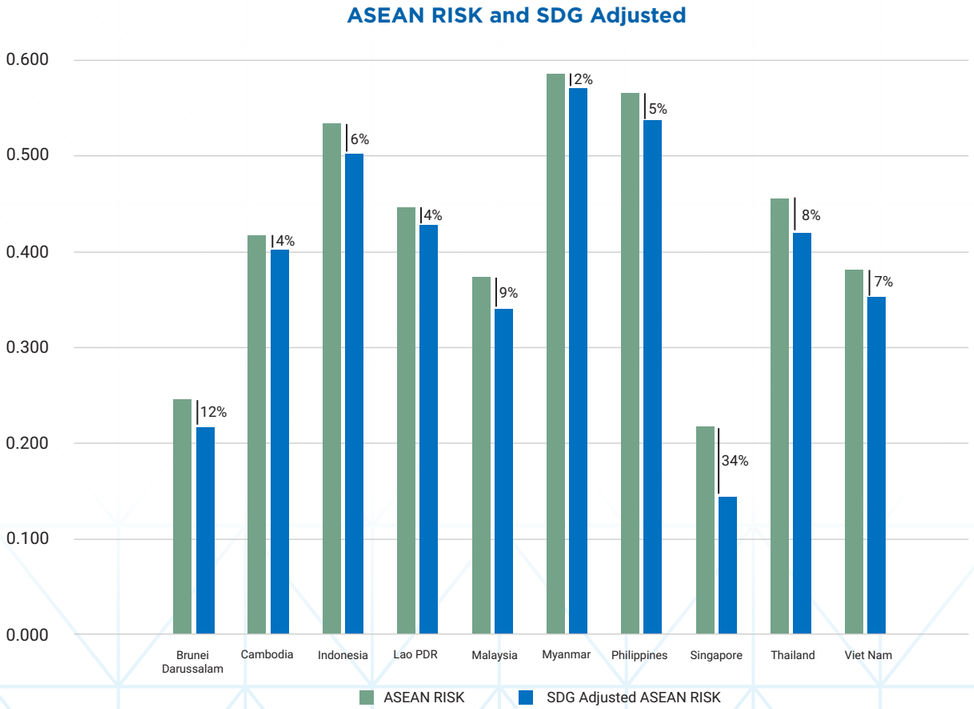


Figure 2.12. Incorporating SDG Progress to ASEAN RISK shows decreased risk in all AMS, with the highest percentage change in Singapore (34%) and Brunei Darussalam (12%).

[2]Sachs, J.D., Lafortune, G., Fuller, G., Drumm, E. (2023)
[3]https://dashboards.sdgindex.org/profiles/indonesia access on 31 January 2023

Singapore and Brunei Darussalam have experienced the most significant percentage changes in the ASEAN RISK assessment after incorporating progress related to the SDGs. Specifically, Singapore (Sachs et al., 2023) has made positive strides in achieving SDG goals related to Clean Water and Sanitation (goal #6), Responsible Consumption and Production (goal #12), and Climate Action (goal #13). These achievements indicate that Singapore is "on track or maintaining SDG achievement" in these areas. According to the SDG index dashboard (Sustainable Development Report, n.d.), Singapore's overall progress towards SDG targets stands at 60.7% of targets having been achieved or being on track, 18% showing limited progress, and 21.3% worsening. Despite the positive trends, Singapore faces significant challenges across various SDG goals, including Zero Hunger (goal #2), Clean Water and Sanitation (goal #6), Decent Work and Economic Growth (goal #8), Responsible Consumption and Production (goal #12), Climate Action (goal #13), Life Below Water (goal #14), Life on Land (goal #15), Peace, Justice, and Strong Institutions (goal #16), and Partnership for the Goals (goal #17).

As the second highest in decreased risk, Brunei Darussalam has made commendable progress towards several SDGs. Notably, SDG goals related to Clean Water and Sanitation (goal #6), Industry, Innovation, and Infrastructure (goal #9), and Sustainable Cities and Communities (goal #13) are showing positive trends, indicating that they are "on track or maintaining SDG achievement." According to the SDG index dashboard, Brunei Darussalam's overall progress towards SDG targets can be summarised as 39.6% of targets having been achieved or being on track, 33.3% showing limited progress, and 27.1% worsening. Despite these challenges, Brunei Darussalam remains committed to addressing critical issues across various SDG goals, including Zero Hunger (goal #2), Good Health and Well-Being (goal #3), Gender Equality (goal #5), Clean Water and Sanitation (goal #6), Affordable and Clean Energy (goal #7), Decent Work and Economic Growth (goal #8), Industry, Innovation, and Infrastructure (goal #9), Responsible Consumption and Production (goal #12), Climate Action (goal #13), Life Below Water (goal #14), Life on Land (goal #15), Peace, Justice, and Strong Institutions (goal #16), and Partnership for the Goals (goal #17).

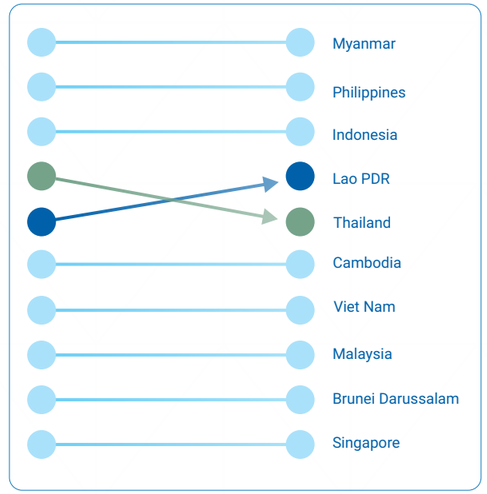
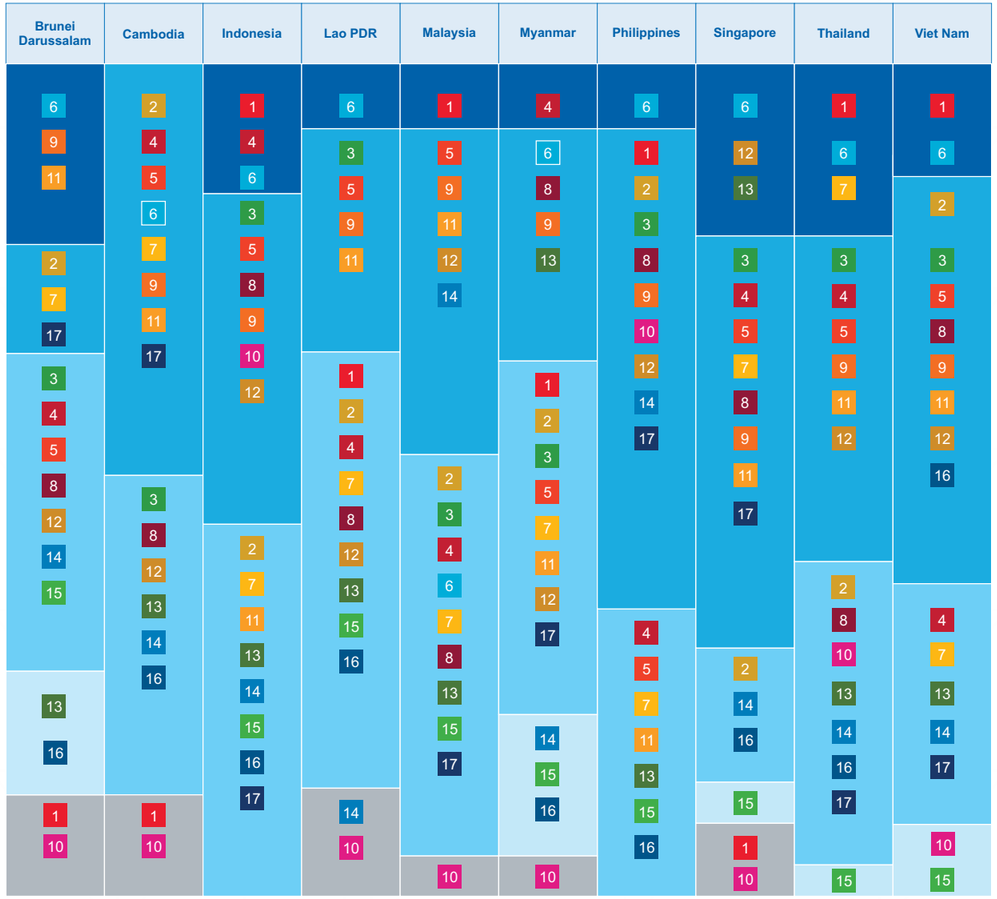


Figure 2.13. There has been no significant change to the risk score ranking of AMS with the addition of SDG Progress. Lao PDR moved higher in the ranking, while Thailand ranked lower. Myanmar, the Philippines, and Indonesia still comprise the three most-at-risk AMS, both in disaster risk and in the adjusted SDG Progress.

As three AMS with elevated disaster risk, Myanmar, the Philippines, and Indonesia have made commendable progress towards several SDGs. Indonesia demonstrates positive strides in achieving No Poverty (goal #1) and Quality Education (goal #4). Indonesia and Myanmar are "on track or maintaining SDG achievement" for Clean Water and Sanitation (goal #6). According to the SDG index dashboard for the status of SDG targets in these AMS, Myanmar shows that 18.8% of SDG goals have been achieved or are on track. The Philippines shows that it has achieved 34.7% of SDG goals, representing positive progress. Indonesia shows that 36.2% of SDG goals are moving in the right direction. Despite these achievements, these AMS face significant challenges across various SDG goals, with the exception of Responsible Consumption and Production (goal #12) and Climate Action (goal #13).



SUSTAINABLE DEVELOPMENT GOALS

SDGs Trend

	On track or maintaining chievement
	Moderately Increasing
	Stagnating
	Decreasing
	Insufficient data

Table 2.3. SDGs Trend for each ASEAN Member State, which shows that Brunei Darussalam (6 SDGs), Cambodia (8 SDGs), Indonesia (9 SDGs), Lao PDR (5 SDGs), Malaysia (7 SDGs), Myanmar (5SDGs), Philippines (10 SDGs), Singapore (11 SDGs), Thailand (9 SDGs), and Viet Nam (10 SDGs) has achieved trends on maintaining achievement and moderately increasing.achievement (Source: Sachs et all, 2023).

Lao PDR and Thailand have experienced changes in their rankings (Figure 2.12). Thailand demonstrates positive progress, indicating that it is either on track or maintaining achievements for SDGs #1 (No Poverty), #4 (Quality Education), and #7 (Affordable and Clean Energy). In contrast, Lao PDR exhibits similar progress for SDG #6 (Clean Water and Sanitation). According to the SDG index dashboard, the status of the SDGs reveals that 25.5% of Lao PDR's SDGs and 43.1% of Thailand's SDGs have been achieved or are on track. However, 38.2% of Lao PDR's SDGs and 26.4% of Thailand's SDGs face limited progress. Lao PDR encounters significant to major challenges across most SDGs, except for #12 (Responsible Consumption and Production) and #13 (Climate Action). Conversely, Thailand grapples with significant to major challenges in SDGs, except for goals #1 (No Poverty) and #4 (Quality Education).

Cambodia, Viet Nam, and Malaysia remain consistent in their rankings from previous years. Both Viet Nam and Malaysia exhibit positive progress, signifying that they are either on track or maintaining achievements for SDGs #1 (No Poverty, applicable to both countries) and #6 (Clean Water and Sanitation, specifically for Viet Nam). In contrast, Cambodia demonstrates, at most, moderate growth. According to the SDG index dashboard, the status of SDGs shows that 28.4% of Cambodia's SDGs, 36.6% of Malaysia's SDGs, and 35.7% of Viet Nam's SDGs are achieved or on track. Another 49.3% of Cambodia's SDGs, 32.4% of Malaysia's SDGs, and 41.4% of Viet Nam SDGs are considered to have limited progress. In terms of challenges, Cambodia faces significant to major challenges for all SDGs except #1 (No Poverty), #12 (Responsible Consumption and Production), and #13 (Climate Action). In contrast, Malaysia faces significant to major challenges for all SDGs except #1 (No Poverty), #4 (Quality Education), and #9 (Industry, Innovation, and Infrastructure). Lastly, Viet Nam faces significant to major challenges for all SDGs except for #1 (No Poverty), #4 (Quality Education), #5 (Gender Equality), #12 (Responsible Consumption), and #13 (Climate Action).
In general, the AMS have implemented or planned their activities to enhance resilience by reducing their vulnerability and improving their capacity to align with sustainability, in this case, to achieve SDGs. While challenges still remain, AMS have several activities with positive progress.

On a regional basis, ASEAN has assessed eight SDGs with 29 from 231 indicators ("ASEANstats," 2022; Economic and Social Commission for Asia and the Pacific, 2023). According to the reports, for SDG #1 (No Poverty), the number of people vulnerable to climate-related disasters has increased; around 2,500 individuals per 100,000 population in ASEAN died, were missing, or were otherwise directly affected by climate-related disasters in ASEAN. For SDG #2 (Zero Hunger), child malnutrition has lessened. In contrast, for #3 (Good Health and Well Being), some progress in maternal and child health in ASEAN continued, and goals #2 and #3 also contributed to improving "resilience" in ASEAN by decreasing the number of vulnerable people. The other SDGs that also had improved trends were #4 (Quality Education), #7 (Affordable and Clean Energy), #8 (Decent Work and Economic Growth), #9 (Industry, Innovation, and Infrastructure), and #17 (Partnership of the Goals). These improvements also strengthen the region's "coping capacity."

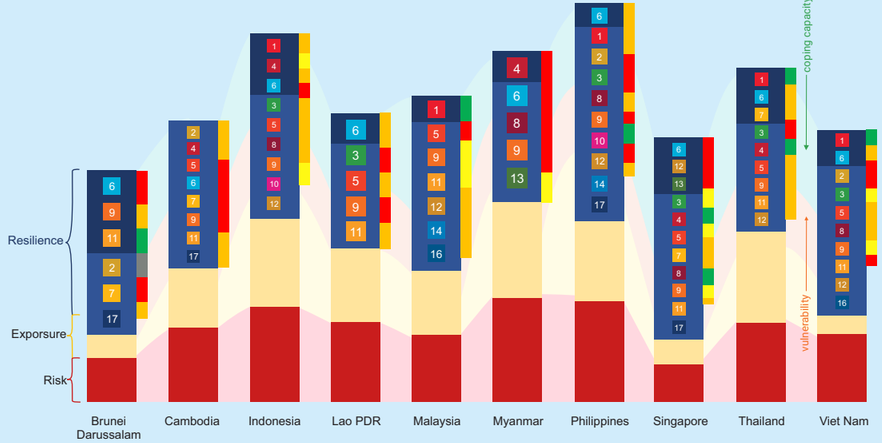
In the context of the AMS, although the concept of sustainable resilience is relatively new, several activities have been undertaken by the member states through their NDMOs. Even though not all officials in the NDMOs are familiar with the terms of sustainable resilience, they have managed to provide information on their activities to increase their resilience while also taking into account sustainability. The achievement of SDGs varies across the AMS, reflecting national activities based on the unique circumstances of each AMS. Despite facing distinct challenges, these AMS are actively working to improve disaster resilience while aligning with the SDGs. For instance, efforts to identify disaster risk zones within each AMS, such as mainstreaming risk-informed early action programmes and management, contribute significantly to achieving specific SDGs. These include SDGs #1 (No Poverty), #2 (Zero Hunger), #9 (Industry, Innovation, and Infrastructure), #11 (Sustainable Cities and Communities), and #13 (Climate Change). Additionally, integrating disaster risk awareness, training, and education into student curricula represents another impactful initiative. This effort directly supports SDG #4 (Quality Education) and reinforces the commitment of the AMS to build a more resilient and sustainable region.

Conclusion and Recommendations

Disaster risk assessment is one of the vital foundations for ASEAN to strengthen its disaster resilience. As it starts by understanding the current risk assessments, ASEAN can identify gaps and opportunities to enhance its disaster resilience for sustainable development. This process helps determine proper actions and interventions to minimise risk while increasing overall resilience.

The current ASEAN RISK assessment reveals that ASEAN remains highly vulnerable to disasters due to its geographical location and exposure to natural hazards. Over time, ASEAN has observed an increased disaster risk since the 1st edition of ARMOR; however, since the 3rd edition of ARMOR, there has been an improvement in "resilience" related to "vulnerability" and "coping capacity." Additionally, the AMS' sustainability efforts in achieving the SDGs play a crucial role in reducing disaster risk.

The overall increase in resilience indicates that ASEAN is starting to move in the right direction for sustainable resilience. Despite an annual rise in "multi-hazard exposure," the growing "resilience" component helps balance or even overcome this exposure, further reducing disaster risk in the ASEAN region. This article recommends that the ASEAN region explore how sustainable resilience can be shared amongst AMS, leveraging their strengths in achieving SDGs to enhance regional resilience.



Resilience			
SDGs Trend	SDGs Challenges		
On track or maintaining achievement	Goal Achievement	Significant challenges	Insufficient data
Moderately Increasing	Challenges remain	Major challenges	

Figure 2.13. ASEAN RISK shows that Myanmar, the Philippines, and Indonesia are still a top disaster risk in the ASEAN Region. Zooming into the "*resilience*" component, adjusting with SGDs, each member state also has achieved a moderate increase to on track/ maintaining achievement on the SDGs despite their challenges. SDG on No Poverty shows a better trend with solved challengesn ("Goal Achievement") in Malaysia, Thailand, and Viet Nam, while Brunei Darussalam is on the SDGs for Sustainable Cities and Communities. This can be an example of the ASEAN to explore its possibilities and how sustainable resilience can be shared to strengthen the regions.

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Articles

ARMOR
ASEAN Risk Monitor and Disaster Management Review
ONE ASEAN ONE RESPONSE
4TH Edition
#3

The Disaster Threat Passivity Phenomenon: A Concept Analysis

Authors:
Randy Ian F. Gallego, RN, MA

#3

The Disaster-Threat Passivity Phenomenon: A Concept Analysis

Author: Randy Ian F. Gallego, RN, MA

Abstract:

The tendency of the public to demonstrate passive and complacent attitudes despite the imminent presence of disaster hazards continues to be a potent ground for individual- and community-level vulnerabilities. Yet, this perspective in the disaster mitigation and response efforts remains under explored. A concept analysis process was conducted using Walker and Avant's iterative six-step process to build and understand the phenomenon of disaster-threat passivity: its defining attributes, antecedents, consequences, and clear empirical referents. A systematic integrative research review was conducted, and this exhaustive analysis process found that disaster-threat passivity is characterised as the attitudinal tendency of individuals to disregard or undervalue the known risks and consequences associated with a disaster hazard due to their uncritical positions, perceptions, and understanding of a disaster threat (uninformed knowing). These judgments or assumptions are maintained over time (complacent attitude learning) until habits of inaction are generated (e.g., stalling of activities directed towards disaster readiness), leading to the non-optimisation of prescribed disaster preparedness-mitigation strategies (passive habits forming). Complacent norms are engendered by several factors, including limited access to resources, issues with self-efficacy, and the sociocultural/political climate. Passive behaviours serve as indicators that warrant the need for counter-interventions in the form of guided responsiveness. Guided responsiveness are structured, trans-dimensional, intensive, and disaster-specific strategies that reflect a sustainable adoption of assertive actions towards disaster preparedness. By comprehending the disaster-threat phenomena, the public can be empowered to adopt assertive behaviours and practices, enabling them to attain resilient living despite the inevitable presence of disaster threats.

Keywords: concept analysis, Walker and Avant, complacency, resiliency

Introduction

he potential for widespread casualties stemming from natural hazards is not new; such occurrences have been a historical reality. Over time, human actions have significantly amplified the process of deterioration and vulnerability within the natural safeguards that historically mitigated these catastrophes. Activities like deforestation and unregulated waste disposal serve as prime examples of the multifaceted factors driving intense flooding, environmental pollution, and loss of biodiversity. While these concerns are frequently witnessed in urban locales, their far-reaching consequences permeate throughout rural communities, even at the regional level. As a result, extensive efforts are now being made to strengthen government-led disaster response initiatives (Gumasing & Sobrevilla, 2023).

In recent times, a fresh perspective has emerged concerning the ongoing discourse on disaster responsiveness. While the immediate focus remains on addressing vulnerabilities from evolving geographical perils and climatic shifts, scholars are now illuminating the seeming indifference and reluctance displayed by the general populace in adopting strategies and measures aimed at curtailing the impact of disaster risks (Donahue et al., 2014). This disposition is frequently identified as complacency and passivity. It diverges from a mere lack of awareness, which pertains to a shortage of information about a recognised natural hazard. Even a well-informed public can, at times, exhibit complete passiveness or complacency. A recent study shows that even individuals who have been educated regarding the risks posed by changing climactic conditions continued to display a lack of proactive measures to mitigate their impact (Haney, 2021). Similarly, Wang and Kapucu (2008) emphasised that while complacency should not be equated outright with insufficient public preparedness, a discernible degree of correlation between the two is usually indicated.

To illustrate their point, Odero and Mahiri (2022) noted that even in the face of recurrent floods in a river basin in Kenya — a situation that jeopardised public health, disrupted both settlements and critical infrastructure, triggered food insecurity due to agricultural losses, and engendered a pervasive sense of despondency amongst the population — residents of the area persisted in exhibiting behaviours, such as indifference towards community-driven disaster preparedness initiatives, particularly during periods of tranquillity when no immediate crisis was unfolding. Moreover, a 2013 survey conducted in the United States found that a significant portion of the American population exhibited a concerning degree of indifference or even apathy towards emergency notification warnings. The survey suggested that the recurring pattern of disasters and their devastating effects can, to a large extent, be anticipated based on the prevailing attitude of disinterest and lack of engagement with emergency communications and preparedness within communities (Federal Signal Corporation, 2013).

In Philippine society, a similar sense of passivity can be vividly illustrated through a commonly observed trait amongst Filipinos known as the *bahala na* attitude. This perspective is characterised by surrendering to the unfolding of destiny and uttering the phrase, "Let's leave it up to God." While it might be perceived as embracing fatalism, it is worth noting that certain Filipinos adopt this stance as a way of coming to terms with the formidable forces of nature (Robles, 2018).

Interestingly, there exists a relative scarcity of literature investigating the intricate nuances of the attitude of complacency regarding disaster mitigation and preparedness amongst the general public. While a substantial body of work revolves around the broader realm of disaster management and resilience, only a handful of authors have delved into the realm of micro- and macro-level passivity and its role within the comprehensive framework of disaster response.

Therefore, it is important to comprehensively delve into the complexities of the phenomenon known as "disaster passivity" and carefully analyse how it is conceptualised and examined within the existing realm of scientific literature. To effectively address the shortcomings found in ongoing disaster preparedness endeavours, it becomes essential to adopt a proactive stance. This involves closely examining the societal frameworks that shape behaviours and attitudes related to disaster response. Such an exploration holds the promise of uncovering fresh insights, novel patterns, and creative methodologies to address the issue.

Furthermore, it is crucial to shed light on the collaborative roles assumed by key stakeholders in the context of disasters. This emphasis on collaboration takes on particular significance when directed towards practitioners actively engaged in the management of emergencies. Notably, this focus should extend to healthcare professionals, who play a vital part in these scenarios.

Methods

This study employed the concept analysis framework outlined by Walker and Avant (2010), which adopts a systematic approach to clarify ambiguous and unclear concepts prevalent in the field of nursing as well as other health professions. This model is anchored on the iterative process enumerated in the model, which includes (a) choosing the concept to be studied, (b) deciding the aim of the study, (c) identifying the uses of the concept, (d) clarifying its defining attributes, and (f) detecting its antecedents, consequences, and clear empirical referents. Furthermore, the model operates under the assumption that concepts may change slightly as times change; however, its essence is likely to remain.

In this analysis, the search was confined to the time frame spanning from January 2000 to January 2022. The keywords/search terms employed were "attitudes of complacency/passivity/indifference towards natural hazards," which resulted in 400 hits in ProQuest, 68 in PubMed, and none in Mendeley. Another search term used was "guided responsiveness during disaster emergency," which produced 288 records in ProQuest, 15 in PubMed, and one in Mendeley. Therefore, the combined references identified through the search databases amounted to 772 records. Eligible papers had to be published in English, and their inclusion required full-text accessibility. Automatically excluded were articles that were duplicates, unrelated, abstract-only, or lacking full texts. Beyond the utilisation of the three databases, manual extraction of resources was also employed through the Google Scholar engine, which yielded an additional 28 potential citations (Figure 3.1).

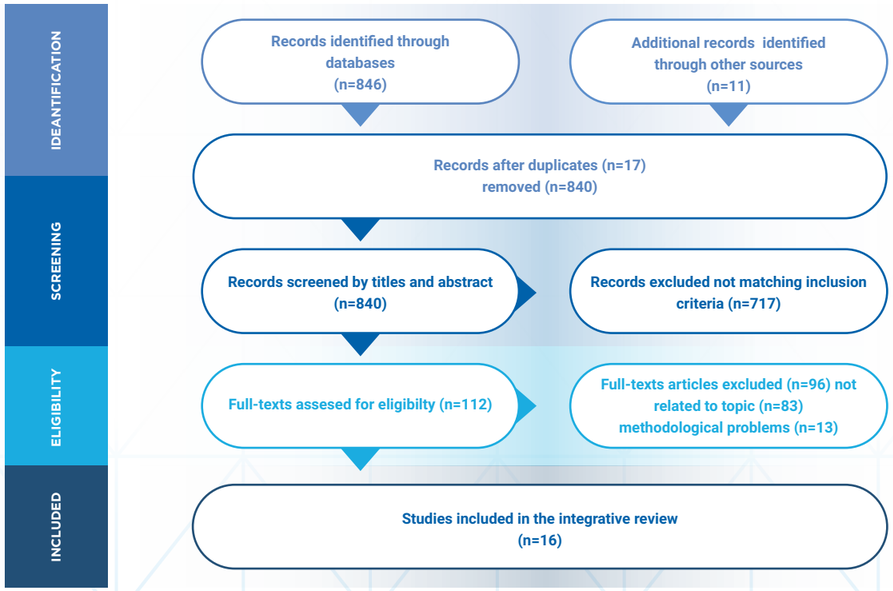

Figure 3.1. The flow of document screening utilising the PRISMA model.

The author oversaw the evaluation of the title, abstract, and article content. These external reviewers conducted the initial screening of titles and abstracts. In cases where there was a divergence in opinions between the independent reviewers regarding the inclusion or exclusion of papers, the corresponding author acted as the third reviewer to make the final decision. After a thorough title and abstract screening, 37 full studies were evaluated for final inclusion (Annex 1). The collection of sources was exhaustive until adequate saturation and coverage were achieved, following the approach cited by Nuopponen (2010). The objective was to ascertain the defining attributes of the concept "disaster-threat passivity," as well as identify its most fitting features or characteristics.

Results

What is Passivity?

From the literature search, the term "passivity" has been identified and conveyed to represent a range of meaning and utility. Passivity is defined as the state or condition of being passive (Collins Dictionary, n.d.). As it is, it can be understood as the "trait of remaining inactive; a lack of initiative" (Vocabulary.com, n.d.). Essentially, when one is passive, one is believed to have a resignation and acceptance of what will happen without having an active response or resistance. This feature is seen as synonymous with the attitude of indifference, idleness, apathy, docility, insouciance, and lassitude (Wordhippo.com, n.d.).

What is Disaster-Threat Passivity?

In general, the inclination towards passivity or complacency in the face of a potential disaster is intricately moulded by an individual's cumulative encounters with past calamities (Qasim et al., 2015) and ongoing exposure to impending hazard scenarios. To put it differently, the tendency to disregard an impending disaster threat stems from a complex interplay of diverse factors, including inadequate awareness of disaster preparedness (Gregg et al., 2004; Wu et al., 2022), a flawed perception of disaster risks (Highfield et al., 2013), and an optimistic outlook that lacks a realistic basis (Haney, 2021). In essence, the phenomenon of passivity is not merely a spontaneous reaction but rather a reflection of an individual's history, knowledge, and outlook. It is the result of a continuous interplay between past experiences and present circumstances. Consequently, an individual's current disposition of passivity, forged through a multifaceted process over time, becomes deeply ingrained in their behaviour and shapes their responses, whether they are aware of it or not. This passive demeanour typically solidifies as the prevailing "norm" during times of relative calm and stability, persisting until an actual disaster event unfolds.

In essence, an analysis of the existing literature on the concept of disaster-threat passivity clarifies the key characteristics and attributes connected to this concept. These characteristics encompass (i) "uninformed knowing," which refers to the possession of misinformed and baseless perceptions regarding disaster hazards, (ii) "complacent attitude learning," which involves forming subjective judgments that often do not align with the actual level of threat or hazard, and (iii) "passive habits forming," which entails developing habits of inaction that hinder the optimisation of recommended disaster preparedness and mitigation strategies. Importantly, these three attributes closely correspond to the constructs integrated into the researcher-developed definition of "passivity" (Figure 3.2).

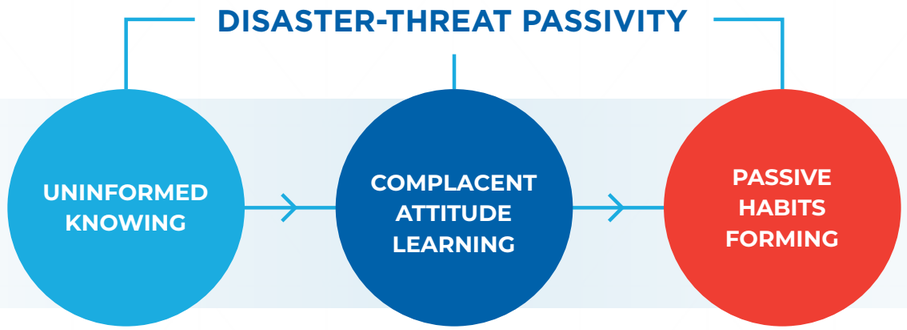

Figure 3.2. The Attributes of Disaster-Threat Passivity

Uninformed Knowing

Studies show that people's actions and behaviours are often driven by their perceptions and awareness of hazards, which are shaped by their assessments of their vulnerability (Hansson et al., 2020; Jervis, 1978). Hence, it is argued that a heightened awareness of the existence of a hazard is typically enough to prompt individuals to actively seek protective measures. Understanding the public's perceptions of hazards becomes crucial when developing strategies to enhance their ability and readiness to mitigate these hazards (Gallego & Tejero, 2023; Lindell & Perry, 1993). Therefore, passivity tends to increase when individuals hold uninformed perceptions and understanding of a specific disaster hazard.

A combination of factors and processes promotes an uninformed stance towards disaster threats. As cited in the literature, individuals who lack disaster-related education and awareness may have a heightened propensity for adopting passive behaviours. When individuals do not have access to educational resources or relevant information, they may not be aware of the various types of hazards that could impact their region (Torani et al., 2019). Likewise, without education and awareness, people may not fully understand the risks associated with these hazards (Hoffmann & Muttarak, 2017). They might underestimate the likelihood of a disaster occurring in their area or fail to recognise the potential severity of such events. In the absence of awareness, individuals are less likely to take proactive measures to prepare for disasters. This can include neglecting to create emergency plans, assemble emergency kits, or participate in community-preparedness initiatives.

Similarly, misinformation or misconceptions may also contribute to an "uninformed knowing." Sometimes, individuals may receive incorrect or outdated information about disaster threats. This misinformation can result from various sources, including social media, word of mouth, or unreliable news outlets. Such misinformation can lead to inaccurate beliefs about the nature and severity of disaster risks (Muhammed & Mathew, 2022). For example, people may believe that their region is immune to certain types of disasters or that the severity of a potential disaster is much lower than it actually is. When people base their preparedness actions on incorrect information, they may take inadequate or inappropriate measures (Dallo et al., 2023). This can lead to a false sense of security and leave them unprepared for the actual risks they face.

Cognitive biases, such as optimism bias or confirmation bias, are also attributive to the development of the uninformed position towards disaster threats. Optimism bias may lead individuals to underestimate the likelihood of a disaster affecting them. In contrast, confirmation bias can cause them to seek out and believe information that aligns with their existing beliefs, even if it is inaccurate (Gregg et al., 2004). In the same manner, individuals who have not personally experienced a disaster event may also have difficulty understanding the true extent of the threat. Without first-hand experience, they may underestimate the risks and fail to recognise the importance of preparedness.

Cultural norms and societal attitudes can also play a significant role in the development of the attitude of passivity (Ayeb-Karlsson et al., 2019). In some cultures or communities, there may be a tendency to minimise the importance of disaster preparedness or to prioritise other concerns over readiness. This is particularly illustrated in Bangladesh, where the belief that God will provide protection regardless of location led to people not evacuating to shelters. Cultural, folklore, and religious beliefs hindered the preparedness efforts of the government and disaster-response organisations (Ayeb-Karlsson et al., 2019).

In general, individuals are deemed vulnerable to risk when they lack the knowledge required for disaster preparedness. Communities must receive comprehensive education to significantly reduce the likelihood of suffering and loss during disaster emergencies (Shaw et al., 2004). In situations where there is an absence of well-founded knowledge regarding the potential impacts of disaster hazards, individuals and communities may respond to a looming catastrophic event with a minimal level of vigilance, indifference, and passivity; this is "uninformed knowing."

Complacent Attitude Learning

The second attribute, referred to as "complacent attitude learning," involves the development of subjective judgments that may not align proportionately with the presence of an existing or potential threat. Primarily, people's reactions to perceived hazards are shaped by their perceptions. When these perceptions are inaccurate or flawed, efforts aimed at promoting an individual's protection and safety can also become discrepant (Vassie, 2005). This can result in a general lack of interest and apathy towards the presence of the hazard. Over time, this disinterest can manifest in behaviours marked by indifference, a lack of concern, and a diminished motivation to take actions that could mitigate the hazard's impact. In fact, research has shown that when individuals are asked to assess their own risks, they often lack statistical evidence to support their judgments. Instead, they heavily rely on assumptions drawn from their recollections of information that they have heard or observed regarding the particular risk in question (Vassie, 2005). This reliance on subjective assumptions can subsequently influence their attitudes, which may or may not align with positive disaster-response practices. Therefore, the attitudinal tendency to adopt a disaster-passive attitude stems from the maintenance of a judgment or assumption towards a threat that is rooted in complacency and apathy towards the perceived threat.

Complacent attitude forming, as a component of disaster-threat passivity, can develop through various mechanisms and circumstances. A complacent attitude can arise when individuals have a distorted perception of disaster risks (Eiser et al., 2012). They might believe that the likelihood of a disaster is minimal, even if scientific evidence suggests otherwise. In the same way, inaccurate risk perception may be reinforced when individuals disregard or downplay past disaster events. They believe that if a disaster has not occurred recently, it is unlikely to happen in the future, even if historical records show otherwise.

Furthermore, a study posited that the effectiveness of fear appeals in addressing threats varies amongst individuals at different stages of change (Cho & Salmon, 2006). Fear appeals involve persuasive messages aiming to instil fear by outlining the negative consequences individuals may face unless they cease risky behaviours or adopt preventive measures (Witte, 1992, 1994). Witte (1994) further delineated that exposure to fear appeals triggers two concurrent message appraisal processes: threat appraisal and efficacy appraisal. Threat appraisal entails evaluating the severity and susceptibility to the threat, which assesses how serious and likely the negative consequences are.

According to Witte (1994), when both perceptions are high, the emotion of fear is evoked, propelling individuals towards further action. Following the experience of fear, individuals may respond either productively or counterproductively, contingent on their efficacy appraisal. Essentially, if perceived threat and efficacy are low, fear appeals are likely to yield null effects on behaviour change. In the disaster-response sphere, individuals may not perceive the disaster risk as serious or personally relevant, and they may feel powerless to take effective preparedness actions (Wong & Cappella, 2009).

Additionally, some individuals may come to accept certain disaster risks as a normal part of life. They may devalue the significance of these risks and believe that they can cope with them without taking proactive measures. This is often referred to as "risk normalisation." It is described as the process by which individuals or communities come to accept certain risks as a normal or routine part of their lives (Adegboyega et al., 2021). When people live in areas prone to specific risks, such as earthquakes, hurricanes, or flooding, they may become familiar with the possibility of these events. Over time, the familiarity can lead to a sense of comfort or acceptance. To the same degree, if certain hazards occur regularly but with relatively low severity, individuals might view them as routine events. For example, communities in hurricane-prone regions may experience frequent, but not necessarily devastating, storms. This repetition can contribute to risk normalisation. If individuals come to view a hazard as a normal part of life, they may be less motivated to take proactive measures to mitigate the risk or prepare for potential disasters.

Similarly, according to the Extended Parallel Process Model, individuals' responses to threat messages are influenced by four key factors: perceived severity, perceived susceptibility, response efficacy, and perceived efficacy (Popova, 2012). In the context of passive individuals, their lack of active involvement in disaster preparedness and mitigation efforts can be seen as a failure in both threat and efficacy appraisals. They may not perceive the threat of a disaster as sufficiently severe or personally relevant (low-perceived severity and susceptibility), and they may doubt their ability to effectively mitigate the threat or protect themselves (low-response efficacy and perceived efficacy). As a result, passive individuals may dismiss or ignore messages that aim to raise awareness about disaster risks and encourage proactive measures. They may believe that their actions will not make a difference or that the perceived inconvenience of taking action outweighs the perceived benefits. This mindset can lead to a lack of engagement in preparedness activities and contribute to increased vulnerability to future disasters.

Passive Habits Forming

Ultimately, a sense of complacency can manifest in passive behaviours, such as not participating in community-preparedness initiatives, ignoring official warnings, or failing to create emergency plans and kits. When a disaster event unfolds, passive individuals may hesitate or take no action to protect themselves or their families (Twigg, 2004). They may not evacuate when advised to do so, ignore evacuation orders, or delay seeking shelter or medical assistance. Therefore, passive behaviour erodes resilience because individuals and communities are not equipped to cope with disasters. Without proper preparedness measures, they are more vulnerable to the adverse effects of disasters, including injuries, property damage, and emotional trauma.

Disaster passivity is concerning because it engenders many detrimental outcomes and consequences (Gallego & Tejero, 2023). Passive individuals often respond slowly or ineffectively when faced with an emergency. This can result in critical delays in seeking help, making crucial decisions, or taking life-saving actions. Failure to take preventive actions can lead to significant property damage during disasters, leading to financial losses and the destruction of homes, belongings, and infrastructure.

Another drawback is the inclination of passive individuals to maintain a persistent dependency on others. Complacent behaviours can also lead to a reliance on external assistance. Individuals may expect that government agencies or relief organisations will fully address their needs in the aftermath of a disaster, which can strain resources and slow down response efforts. Communities that are unprepared for disaster occurrence can have an excessive need for aid, which can overwhelm emergency services and first responders. Events such as these necessarily demand financial support, diverting resources from other essential services and development projects (White et al., 2004). Furthermore, passive individuals not only add strain to government resources but also pose risks to themselves and others. Their lack of participation in risk reduction measures not only leaves them vulnerable but also increases the vulnerability of the entire community by failing to contribute to collective efforts aimed at reducing risks and vulnerabilities. Inaction by some individuals undermines community resilience and leaves the entire population more susceptible to the impacts of disasters (Imperiale & Vanclay, 2016).

Therefore, addressing passive habits requires a multipronged approach. Otherwise, it can perpetuate a cycle of vulnerability. If individuals and communities do not learn from past disasters and do not take action to improve preparedness, they continue to face risks, possibly increasing their vulnerability to future events.

Contextual Definition

Given the preceding analysis, disaster-threat passivity can be defined as the attitudinal tendency of individuals to disregard or undervalue the known risks and consequences associated with a natural hazard due to their uninformed positions, perceptions, and understanding of the disaster threat. This tendency is evident in habits such as inaction, complacency, and non-optimisation of prescribed preparedness-mitigation strategies directed to downscale the inevitable aftereffects of man-made and natural calamities.

Countering Disaster-Threat Passivity through Guided Responsiveness

Effectively addressing passive behaviour necessitates a comprehensive and multifaceted approach that includes public education, community engagement, clear and effective risk communication, and the promotion of personal responsibility. Encouraging individuals and communities to take proactive steps towards disaster preparedness is essential for building resilience and reducing the potential for harm during emergencies.

The study identified three key countermeasures that are essential to mitigate disaster-threat passivity: (i) "conscious enlightenment," (ii) "guided assertiveness," and (iii) "responsive-resilient living." Collectively, they are referred to as "guided responsiveness." It reflects the achievement of a resilient lifestyle through proactive measures. Each of these attributes contributes significantly to the overall understanding of the concept (Figure 3.3).

The initial attribute, conscious enlightenment, involves an individual's recognition of the imperative to transition from a wholly passive state to a highly proactive, disaster-responsive stance. This awakening typically occurs due to various factors, whether on an individual or community level. For instance, it may be triggered by a recent personal experience with a disaster or a persistent community-wide effort to enhance disaster preparedness. This heightened awareness arises from the perceived necessity of safeguarding oneself against the adverse consequences of disaster emergencies (Adio-Moses & Aladejana, 2016; Victoria, 2003). Given that disasters can result in a wide spectrum of immediate suffering and long-term complications (Strangeland, 2010), individuals, when sufficiently prompted, begin to experience a profound realisation of the importance of breaking away from passive habits.

The second attribute, guided assertiveness, underscores the phase in which individuals progress from recognising the importance of taking action and adopting strategies to overcome passivity to actively seeking opportunities to acquire disaster-responsive skills and behaviours. This transition is typically facilitated by the guidance and knowledge imparted by experts and scholars in the field of disaster response. In many cases, specific community sectors are empowered to provide this guidance and education.

For instance, in the Philippines, following repeated exposure to "mega-disasters" over the years and the positive experiences of mobilised communities in disaster preparedness and mitigation, an increasing number of societal groups are actively engaging in ongoing disaster responsiveness efforts (Victoria, 2003).

Traditionally, healthcare professionals, such as doctors and nurses, play intermediary roles in disaster planning and response, especially in assisting vulnerable populations during medical surge situations (Fox et al., 2007). However, it is essential to emphasise that while these responders hold vital roles in disaster management, education should extend to all other stakeholders involved in the disaster system (Ripoll-Gallardo et al., 2015). As highlighted by Covan et al. (2001), when people lack awareness of potential risks, they are likely to remain indifferent to the possibility of facing mass casualty incidents. Addressing this requires a concerted effort to educate the public consistently and emphatically.

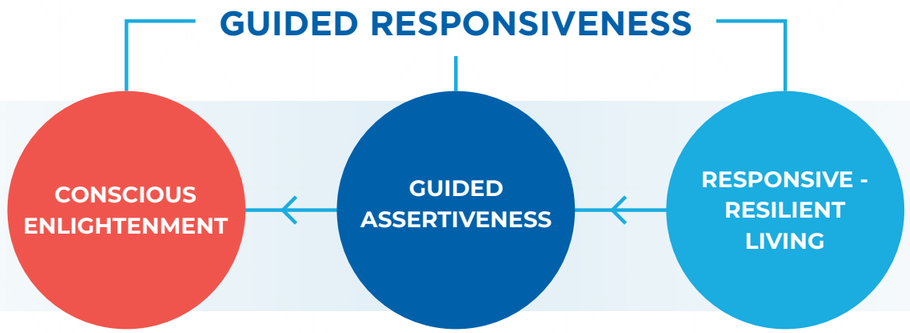

Figure 3.3. The Attributes of Guided Responsiveness

Disaster experts, therefore, have a crucial role in shifting behaviors from indifference to assertiveness through health education campaigns and capacity-building activities aimed at fostering resilient living. Education and outreach programs are recognized as essential tools in combatting passivity and indifference, ultimately motivating the public to become more responsive and proactive in disaster preparedness efforts (Federal Signal Corporation,2013).

The final attribute, responsive-resilient living, represents the culmination of the process. Disaster responders and community healthcare workers, with their comprehensive understanding of how disasters impact people's health, are well-positioned to facilitate community resilience during crises, such as hurricanes, cyclones, disease outbreaks, and more. They play a pivotal role in mobilising access to essential resources, including food, temporary housing, transportation, healthcare services, and employment opportunities. With appropriate training, healthcare professionals can deploy a wide range of supportive interventions to ensure that disaster victims have the necessary physical, psychosocial, and emotional support to progress towards recovery (National Academies of Sciences, Engineering, and Medicine, 2021).

Hence, guided responsiveness is the progressive recognition and active learning of strategies, through the help of an external prompt (e.g., nursing facilitation), to counter the habits of passivity, institute assertive behaviours/practices that mitigate the threats and impacts of natural hazards, and subsequently establish resilient living despite the constant exposure to disaster threats.

Conclusion

In conclusion, disaster-threat passivity is a complex phenomenon with significant implications for disaster preparedness and response. It encompasses a state of inaction, complacency, and indifference exhibited by individuals and communities when faced with potential disaster hazards. Passivity arises from various factors, including limited awareness, inaccurate risk perception, and a tendency to underestimate the significance of threats. This state of passivity can have dire consequences, including increased vulnerability, higher risks of injury and loss of life, property damage, and emotional trauma.

Addressing disaster-threat passivity requires multifaceted approaches, including education, community engagement, and clear-risk communication. The attributes of conscious enlightenment, guided assertiveness, and responsive-resilient living serve as crucial elements in understanding and addressing this issue. Disaster experts, healthcare professionals, and the broader community must work collaboratively to shift behaviours from indifference to assertiveness and foster a culture of disaster resilience. Through proactive measures, preparedness efforts, and a commitment to raising awareness, individuals and communities can reduce their vulnerability and enhance their ability to respond effectively to the ever-present threat of disasters.

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Annex 1

Summary of Articles Included in the Review

ARTICLE/ AUTHOR	AIM/ PURPOSE	METHODS	KEY FINDINGS
Resilience resistance: The challenges and implications of urban resilience implementation (Shamsuddin, 2020)	The paper introduced the concept of resilience resistance as an emerging challenge for urban resilience.	Policy Literature	Complacency can arise from the implementation process of policies, especially when they are perceived to be successful. The magnitude and extent of a potential threat may be viewed to be less or more manageable because there are already mechanisms that are in place.
Operational definition of disaster risk-reduction literacy (Kanbara et al., 2016)	This paper explored the conceptual and operational structure of the term "gensai literacy," a Japanese concept that can be translated into English as "disaster risk-reduction literacy" or "disaster mitigation."	Concept Analysis	Nurses have to be mindful of "gensai (disaster reduction) literacy," its societal prevalence and social construction, and its association with disaster impact. Disaster prevention and mitigation underscore both the saving of lives post-disaster and the provision of structural countermeasures, e.g., reconstruction and restoration.
Key priority research areas towards disaster risk reduction (Kanbara, 2021)	This report intended to highlight disaster insights and identify key priority research areas towards disaster-risk reduction and its contribution to the developing disaster nursing movement.	Report	Disaster risk management needs to have an interdisciplinary approach to allow people from different professional fields to work together. For instance, nurses can do collaborative work in research areas in engineering.
Disrupting the complacency: Disaster experience and emergent environmentalism (Haney, 2021)	This paper intended to answer the question: will the disruption caused by experiencing a local environmental disaster be enough to motivate residents to change their values and behaviours?	Qualitative Research	The experience of disaster drives the concern about the issues of climate change denial and complacency, thus prompting people to adopt pro-environment, household-level practices against disaster hazards.
Disaster preparedness knowledge and action: Population development perspective (Vicerra et al., 2018)	This study aimed to assess programmes for university students regarding the self-perceived knowledge of disaster preparedness, confidence in actual	Quantitative Survey-Type Design	Results reveal that the self-perceived preparedness level is different hypothetically and in actuality. Results further indicated that complacency does not usually
	preparedness, and engagement in performing knowledge to action.		occur, especially with typhoon events, because people in the studied age group have constant exposure to these threats in their present communities.
Disaster management response guidelines for departments of orthopaedic surgery (Born et al., 2016)	This report offered guidelines to address the basic elements of disaster-response planning by a department, including critical areas of communication, resource allocation, personnel assignments, and overall team coordination.	Report	Complacency in disaster emergencies is also an investigated phenomenon in other fields of practice. Disaster planning is seen as a responsibility for the rest of the healthcare team because it is for the nurses.
Experiences of nurses involved in natural disaster relief: A meta-synthesis of qualitative literature (Xue et al., 2020)	This paper aimed to undertake a systematic review and meta-synthesis of the qualitative evidence of nurses' experiences while working in natural disaster response.	Systematic Review, Meta-synthesis	It is asserted that disaster response demands a comprehensive set of knowledge, skills, and logistics management. It further suggests that a complete disaster deployment framework must be established — this has to involve provisions for both physical and mental healthcare. To improve nurses' resilience in disaster relief, hospital leaders must give targeted education to help nurses on ethical decisions.

A grounded theory of the practice of disaster spiritual and emotional care: The central role of practical presence (Schruba et al., 2018)	This paper aimed to explore the impact of large-scale disasters on country-level preparedness for persons with disabilities.	Quantitative, Descriptive-Type Survey	Vulnerable members of the population (e.g., persons with disabilities) need to have optimal representation at the disaster-preparedness dialogue table and be provided with opportunities to add valuable inputs on their potential special needs and contributions to improve disaster preparedness.
Core competencies in disaster management and humanitarian assistance: A systematic review (Ripoll-Gallardo et al., 2015)	This paper explored the competency sets for disaster management and humanitarian assistance available in the existing literature to guide the development of a common-disaster curriculum.	Systematic Review	The findings reveal that the majority of the articles in the literature concentrated on the healthcare sector and showed little agreement in terms of the terminologies used for a competency-based definition. It is crucial to underline that while healthcare plays a relevant role in disaster response, education must also be extended to other actors equally involved in disaster management.
Disaster preparedness for nurses: A teaching guide (Tillman, 2011)	This article gave a concise educational presentation on disaster nursing course content that can be used to guide disaster nursing care.	Special Teaching Guide	Although there is an increasing frequency in the occurrences of both natural and man-made disasters, many nurses are still unprepared to adequately respond to a large-scale emergency. The course content in this teaching guide is ideal in a continuing-education setting since it will not demand an extensive time commitment or in-depth instructor knowledge of disaster nursing response.

Nurses' competencies in disaster nursing: Implications for curriculum development and public health (Loke & Fung, 2014)	This study aimed to assess the perceptions of competencies required for disaster nursing by nurses in Hong Kong.	Qualitative Study	Ethical-legal competencies in disaster nursing were perceived to be mostly neglected by registered nurses in Hong Kong. Findings reveal that nurses find their disaster nursing competencies to be markedly inadequate, thus, the need to improve the present public health curriculum.
Addressing the issues of public complacency and apathy in emergency warning and mass notification(Federal Signal Corporation, 2013)	This report examined how human behaviour contributed to the public's failure in responding to the emergency warnings and directives during the Joplin tornado disaster in the United States.	Narrative Report	Attitudes of public passivity and complacency towards disaster preparedness activities are seen to be minimally discussed in the literature because of the dearth of resources on the phenomena despite it being an identified factor that increases disaster risks. The study shows the limited number of strategies initiated by disaster-oriented agencies (e.g., national government, healthcare sector) to counter attitudes of passivity.
Public complacency under repeated emergency threats: Some empirical evidence(Wang & Kapucu, 2008)	Using data collected from jurisdictions experiencing hurricanes, this study examined public complacency defined as the tendency to ignore hurricane-threat warnings.	Quantitative, Survey-type Design	There appear to be very few, specific communica -tion-related strategies devised to address attitudes of public complacency despite constant exposure to disaster hazards.

Ready or not? How citizens and public officials perceive risk and preparedness (Donahue et al., 2014)	This paper sought to have a better understanding of the nature of risk perceptions, disaster-preparedness behaviour, and the degree to which the perceptions and preferences of individual citizens were congruent with the expectations of public officials.	Quantitative, Survey-Type Design	In general, the findings show some degree of disconnectedness in terms of the citizens' perceptions of disaster risk and that of their public officials. Local officials tend to think that the citizens often procrastinate, lack preparedness, and are stingy, whereas the citizens believe that they are not adequately provided with the needed information to address disaster risks.
Salient public beliefs underlying disaster preparedness behaviors: A theory-based qualitative study (Najafi et al., 2017)	This study demonstrated how an elicitation method can be utilised to determine the consequences, referents, and circumstances of disaster preparedness behaviours (DPB).	Theory-Based Qualitative Study	DPB was seen as most advantageous in terms of health outcomes since it helps save lives, gives provision for basic needs, and provides protection before relief arrives. It is seen as disadvantageous in terms of preparedness anxiety. The most common social referents were family members. Major impedi -ments to DPB include lack of time and knowledge.
The effects of fatalism and denial on earthquake preparedness levels (Baytiyeh & Naja, 2016)	This paper investigated the impacts of awareness and beliefs on college students' preparedness for earthquake risks in Lebanon.	Quantitative, Survey-Type Design	The apparent indifference that people have towards disaster preparedness measures can probably be attributed to the lack of knowledge on how to prepare. Essentially, when people do not have a succinct idea of how to prepare, they are consequently exposed to a certain degree of risk.
Does it matter if you "believe" in climate change? Not for coastal home vulnerability (Javeline et al., 2019)	This paper addressed the question of whether public attitudes towards climate change influence behaviour.	Quantitative, Survey-Type Design	The study showed that knowledge and attitude on climate change have no significant influence on the person's attitude towards the existing level of their home's structural vulnerability nor homeowner actions or stated intentions to reduce structural vulnerability in the future.

Nursing education for disaster preparedness and response (Wilkinson & Matzo, 2015)	This paper presented issues associated with providing nursing care under mass casualty events.	Narrative Report	Nurses are considered to be one of the largest sectors involved in emergency response during a disaster. However, the majority of nurses are unprepared to respond because they perceive their level of knowledge and skills to be lacking in this area.
Disaster preparedness in Philippine nurses (Labrague et al., 2016)	This study explored the perceived level of disaster preparedness amongst Philippine nurses.	Descriptive, Cross-Sectional Research design	This study shows that nurses believe themselves to not be fully prepared for disasters and are not fully aware of disaster-management protocols in their workplaces.
Disaster preparedness among nurses: A systematic review of literature (Labrague et al., 2018)	This paper looked at peer-reviewed publications that measure nurses' preparedness for disaster response.	Systematic Review of Literature	Most significantly, the findings reveal that nurses are ill-prepared for disaster response. Even with the presence of methodological setbacks, the studies consistently show that nurses have a general feeling of unpreparedness in the aspect of disaster response. Factors that enhance disaster care competency include previous disaster response experience and disaster-related training.
Collaborative emergency management: Better community organising, better public preparedness and response (Kapucu, 2008)	This paper explored how effectiveness in coordinating community disaster-response efforts affects future public preparedness.	Quantitative, Survey-Type Design	The findings recommend that pre-season planning, open communication between emergency managers and elected officials, and the use of technology all significantly impacted the level of co -mmunity response. These were strategies used by emergency responders to counter public complacency during the hurricane season in Florida.

Risk information seeking behavior in disaster resettlement: A case study of Ankang City, China (Shi et al., 2020)	This study sought to understand the various ways to improve risk communication in disaster resettlement.	Quantitative, Survey-Type Design	The results show that people's information-seeking behaviour depends heavily on the presence of village committees and the interactions within them. Social media is seen to be a lesser avenue for the dissemination of risk information. In general, relevant channel beliefs, the sufficiency of information, the perceived nature of hazards, and self-efficacy are seen to directly influence risk information-seeking behaviour.
Facts and fears: Understanding perceived risk (Vassie et al., 2005)	This paper analysed biases displayed by laypeople and experts when they come up with judgments about a certain risk.	Quantitative Study	Perceived risk can be quantified and predicted. People's perception of the level of current risk strongly determines the degree of adjustment to a certain risk. This means that as the perceived risk increases, the desire to reduce it also increases.
Assessment of knowledge and awareness of global warming among inhabitants of industrial areas of an urban community in Nigeria (Adio-Moses & Aladejana, 2016)	This study assessed the knowledge and awareness of causes, effects, and mitigating measures of global warming amongst residents living in the industrial areas of Ibadan in southwestern Nigeria.	Quantitative, Survey-Type Design	The findings reveal poor awareness and a display of indifference to global warming by the respondents. Indifference may be attributed to the presence of misconceptions about the threat of global warming and its potential complications. Likewise, high levels of poverty and illiteracy may also be contributors to indifference.
Community-based disaster management in the Philippines: Making a difference in people's lives (Victoria, 2003)	This article emphasised the features, processes, components, and gains of community-based disaster management of key institutions and units involved in the Philippine Disaster Management Forum.	Report	The Philippine experience attests to the effectiveness of engaging communities in disaster preparedness and mitigation. Vulnerabilities cannot be reduced by the local communities alone; the concerted efforts of the various stakeholders involved in disaster management and planning need to be instituted and established on the ground to see better gains.

Complacency and crisis management in large organizations (Ali, 2014)	This paper addressed the nature and importance of crisis management in large organisations. It stressed the various factors that result in complacency in big organisations and highlighted the relationship between complacency and crises.	Editorial	Organisations that are relatively large, successful, and with established longevity tend to underes -timate the severity of certain crises, leading to their inability to respond adequately to them. This kind of organisational culture breeds complacency, which can be confronted by deploying available resources and revitalising a crisis-responsive organisational norm.
Local responses to disasters: Recent lessons from zero-order responders (Briones et al., 2019)	This paper defined and discussed the concept of zero-order responders. It aimed to examine the prospective lessons and value of assimilating disaster-stricken victims into disaster risk reduction and disaster risk management programmes.	Qualitative Study	In disaster crises, there is usually a period between the time of the impact of the disaster and the arrival of relief support. During this time, disaster victims are left to their own devices and self-coping mechanisms for survival. Since local knowledge is not a standalone resource to counter disaster response, societal flexibility and adaptive capacities need to be integrated into the overall disaster risk reduction and disaster risk management development.
Dynamics of communication in emergency management (Dunn et al., 2002)	This study explored the dynamics of communication amongst the emergency management team tasked with controlling a simulated hazardous chemical spill.	Quantitative Study	Two communication factors were examined: task-specific factors (i.e., the characteristics of the emergency management task) and situation-specific factors (i.e., the unique characteristics of the current situation). The findings reveal that both these factors were crucial in identifying the pattern of communication between key team members.
Population composition, migration and inequality: The influence of demographic changes on disaster risk and vulnerability (Donner & Rodríguez, 2008)	This paper interpreted the impacts of the changing demographic diversity within the context of economic, cultural, and social capital due to the broader human ecological forces.	Qualitative Study	The devastating impact of disasters can be connected to the intersection between poverty and the long-standing presence of social discrimination and racism. Social, economic, and cultural factors also increase vulnerability to disasters in certain populations. Hence, these contexts must be taken into account when developing disaster-related policies.

How should disasters be managed? The government's view on community-based disaster management (Capili, 2003)	This paper discussed the present disaster risk reduction and management efforts in the Philippines.	Report	People's capacity to cope with the consequences of disaster has been seen to diminish over time. It is crucial to address the public's vulnerabilities by identifying their root causes and mitigating their potential impacts. It is also critical to prepare community members with skills and strategies to confront disaster hazards before they become full-scale crises.
Floods and public perception of their Effect. Case study: Tecuci Plain (Romania), year 2013(Comănescu & Nedelea, 2016)	This study explored the perceptions and concerns of Cudalbi's inhabitants (Tecuciului Plain) in relation to the occurrence and effects of the September 2013 floods in their area.	Case Study	The results show the seeming unpreparedness and lack of training on the part of the residents to respond to the flooding incidences in their locality. Likewise, it was seen that the respondents did not show apparent concern about the flood risk despite knowledge of the causes and nature of flooding. The results also show that the residents felt that there was a lack of information about the presence of community-level action plans and a lack of volunteerism. However, the respondents showed their intention to know more about existing emergency warning systems.
Social memory and resilience in New Orleans (Colten & Sumpter, 2008)	This paper examined the historical records compiled after Hurricane Betsy in 1965 and how they were utilised in preparation for the tropical storms in 2005.	Report	Aside from being future-oriented, there is also a need to systematically incorporate the lessons from past disaster events in all hazard management plans. Studies indicate that people can integrate historical lessons from the past in their present and future responses to crises.

What determines flood risk perception? A review of factors of flood risk perception and relations between its basic elements (Lechowska, 2018)	This paper attempted to address the question: what determines flood risk perception?	Systematic Review	The findings of this review show that there is no one particular characteristic that determines risk perception. However, the most notable elements of flood risk perception include worry, preparedness, and awareness.
Risk perception – issues for flood management in Europe (Bradford et al., 2012)	This paper explored a new approach that assesses the role of public perception in the development of flood risk communication strategies in Europe.	Case Study	Risk perception is regarded as a backbone of social resilience that represents an innovative approach to tackling the issue of disaster management. Public engagement and participation are recommended strategies to improve flood risk management.
Making communities disaster resilient: Challenges and prospects for community engagement in Nepal (Pandey, 2018)	This paper aimed to assess the local dynamics of community-based disaster management (CBDM) practices in two case sites in Nepal.	Policy Review and Field Verification	CBDM helps communities gain resiliency against disaster hazards. While already existing in the literature, the study found that CBDM is not identified as an important disaster management strategy in the current policies in Nepal.

Articles

ARMOR ONE ASEAN ONE RESPONSE
ASEAN Risk Monitor and Disaster Management Review 4TH Edition
#4

Towards Better Information for Climate Resilience in Southeast Asian Informal Settlements

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#4

Towards Better Information for Climate Resilience in Southeast Asian Informal Settlements

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Abstract:

Southeast Asia's urban population faces climate risks in the form of flooding, drought, and urban heat. Residents of informal settlements often experience the most severe risk due to higher exposure and increased vulnerability to climate hazards. As climate adaptation projects flourish, there is a need to better characterise the hazards, e.g., the magnitude of floods and ambient temperatures, and monitor project effectiveness, e.g., the reduction in flood or temperatures due to an intervention. This is particularly true for nature-based solutions, such as river restoration or tree planting, for which the evidence base is more limited in the region. In this article, we synthesise the climate risks in informal settlements in Southeast Asia and opportunities for nature-based solutions to mitigate such risks. Next, we describe three technological approaches — low-cost sensors, information technology tools for citizen science, and satellite imagery — that show strong potential to improve climate risk assessment and management in informal settlements. Finally, we present two case studies applying these technologies to better assess climate hazards in informal settlements. The first exemplifies the potential of low-cost temperature sensors to assess heat exposure in informal settlements, while the second illustrates the use of citizen science in community flood monitoring. We conclude with a discussion on the upscaling of these technologies in informal settlements and the role of institutes of higher learning in promoting climate resilience in the region.

Keywords: informal settlement, climate risks

Introduction

More than one billion people live in informal settlements globally, most of them concentrated in South and Southeast Asia (United Nations, 2023). Amongst Association of Southeast Asian Nations (ASEAN) countries, informal settlements comprise more than 30% of the urban population in Cambodia, Myanmar, and the Philippines and more than 15% in Indonesia and Laos PDR (World Bank, 2020). They are expected to grow disproportionately, possibly five times faster, than the overall urban population in Asia (United Nations Human Settlements Programme [UN-Habitat], 2020). Informal settlements are typically defined as having limited access to infrastructure and services, poor-quality housing, and uncertain land tenure (UN-Habitat, 2015). Communities living in these settlements are often marginalised, suffer from stigma and have unequal access to opportunities.

Residents of informal settlements are considered inherently vulnerable to climate change and are disproportionately affected by hazards, such as heatwaves and floods (Satterthwaite et al., 2020). Competing socioeconomic needs, such as securing food and housing, can outweigh adaptation action and disaster risk management. Moreover, communities living in informal settlements often have less capacity to access governmental support and insurance. Investments in adaptation measures to cope with the effects of climate change (such as flood walls, thermal insulation, or reinforced structural foundations) are often higher in more affluent areas. Together, these socioeconomic factors make some informal settlement residents particularly vulnerable to the increasing impacts of climate hazards (Sandoval & Sarmiento, 2020).

Climate change is altering the frequency and intensity of hazards in Southeast Asia (Ranasinghe et al., 2021). Changing precipitation regimes are expected to intensify both flood and drought risk. Rainfall is projected to increase in the northern countries of Southeast Asia, with areas such as the Mekong Delta expected to experience more frequent and severe flooding (Ranasinghe et al., 2021). Extreme heat could exceed 41°C by approximately 250 days under the Shared Socioeconomic Pathway (SSP) 5's high greenhouse gas emission scenario SSP5-8.5 in 2100 (Ranasinghe et al., 2021). Together, higher temperatures and more variable precipitation are also expected to increase the severity of droughts in the region (United Nations Economic and Social Commission for Asia and the Pacific, 2020). In urban settlements, local environmental change can exacerbate the impacts of floods, drought, and extreme heat, especially for vulnerable communities such as informal settlements (Satterthwaite et al., 2020).

Building resilience in informal settlements is now recognised as a key goal in international urbanisation policies and frameworks, including the New Urban Agenda, Sustainable Development Goal 11, and the ASEAN Sustainable Urbanisation Report (ASEAN Secretariat, 2022; United Nations, 2023). All three documents recognise uncontrolled urban sprawl as a key issue facing Southeast Asian cities and highlight the linkages between sustainable urbanisation, economic opportunities, and improving health and well-being. Building climate resilience in informal settlements is an ongoing priority amongst ASEAN countries and is considered key to sustainable development in the region (ASEAN Secretariat, 2022). Overall, there is a consensus that building resilience and reducing the vulnerability of informal settlements will involve decentralised and flexible strategies to manage climate risks. The Sendai Framework for Disaster Risk Reduction — a flagship document issued by the United Nations to advance disaster risk reduction and build resilience — explicitly argues for "a broader and a more people-centred preventive approach to disaster risk" (United Nations Office for Disaster Risk Reduction, 2015, p.10). This approach complements physical risk reduction measures such as the construction of conventional drainage systems or improved building standards. It also supports direct community engagement practices in the development of local disaster risk management strategies and the implementation of early-warning systems.

A promising approach is the use of nature-based solutions to manage the challenges of increasing disaster risk in informal settlements. In practice, these solutions are defined as ecosystem-related interventions that rely on natural and semi-natural processes to address societal issues while also enhancing biodiversity (Cohen-Shacham et al., 2016). They include mangrove restoration, green roofs, and community gardens and have been shown to provide multiple benefits, such as managing water runoff, reducing temperatures locally, and providing spaces of cultural and recreational value to communities. However, the effective design and implementation of nature-based solutions require localised climate risk information. The scarcity of data in informal settlements challenges accurate assessments of climate risk and the design of effective solutions (Satterthwaite et al., 2020).

In this article, we synthesise three major climate risks in informal settlements in Southeast Asia and opportunities for nature-based solutions to address these risks. Next, we examine three technological approaches to better characterise and assess climate risks in this context. We posit that these approaches can be leveraged to support the implementation and monitoring of community-based, decentralised, nature-based solutions that will play a central role in enhancing climate resilience in the context of informal settlements. To mainstream these technologies and solutions, we discuss implementation challenges and opportunities specific to informal settlements in Southeast Asia.

Climate Risk in Informal Settlements in Southeast Asia

Floods

Informal urbanisation often leads to the occupation of flood-prone areas, such as flood plains or coastal areas. Poor drainage and dense built-up areas with little infiltration capacity exacerbate the flood risk. With rising sea levels and intensifying storm surges and rainfall events, flooding in these areas is expected to worsen. In total, 12% of the ASEAN population is exposed to floods, including a large proportion of informal settlements (AHA Centre, 2020). In addition, informal settlement residents have limited adaptive capacity and often experience worse and longer-lasting impacts of floods than other urban populations (Escobar Carías et al., 2022). Flood predictions at the settlement scale remain challenging, precluding effective risk management (Starkey et al., 2017; Wolff, 2021). Given the prevalence of hydrometeorological hazards in the region, an improved understanding of local hydrological dynamics, such as water levels during floods and adaptation solutions, is essential.

Urban heat

Southeast Asia already experiences hot weather, which will only be exacerbated by climate change. Exceedance of the high heat stress of 35°C is projected to rise by 10–50 days in most Asian regions under SSP5-8.5 (except in the Arctic and Siberia) and by over 60 days in Southeast Asia (Ranasinghe et al., 2021).

Urban heat islands compound already hot and humid conditions in tropical cities. Urban heat islands occur where the removal of vegetation and increase in artificial surfaces in cities elevate urban temperatures relative to non-urban surroundings. Rapid urbanisation across Southeast Asia has driven the expansion of urban heat islands, where urban temperatures can be elevated by more than several degrees. While much research has focused on urban heat in the context of megacities (e.g., Jakarta and Manila), a growing body of research shows that small- and medium-sized cities, and indeed, peri-urban development, like informal settlements, are not immune from the impacts of urban heat islands (Cardoso et al., 2017; Ramsay et al., 2023). Some informal settlements may even experience worse urban heat exposure than formalised urban development due to dense housing, poor ventilation, and limited green space (Jacobs et al., 2019). However, proximity to green and blue spaces, such as waterways, agricultural areas, or vegetated patches of land, protects some informal settlements from the worst urban heat exposure observed in urban core areas (Ramsay et al., 2023).

Drought

Drought conditions compound existing water insecurity in informal settlements. The lack of a secure water supply, such as piped mains water, means that many informal settlement residents rely on other sources, such as groundwater or rainwater harvesting. For example, a study of 12 informal settlements in Makassar, Indonesia, reported that only 35% of households had access to the municipal water supply, instead relying on bores, wells, rain, or bottled water (French et al., 2021). During seasonally dry periods or longer droughts, increased water supply constraints can result in household water storage, which increases the risk of mosquito-borne diseases, such as dengue and malaria. Similarly, reliance on contaminated water supplies during droughts can increase the risk of infectious disease transmission. Water insecurity also compounds urban heat risk, as access to safe drinking water is critical to manage heat stress during extreme conditions. Droughts are not only a concern for water security, but they also negatively affect food security, especially for low-income households.

Nature-based Solutions in Informal Settlements

To address climate risks, local governments, multilateral agencies, and environmental non-governmental organisations now widely promote nature-based solutions (Cohen-Shacham et al., 2016, 2019). These solutions, such as mangrove restoration or community gardens, should be designed following inclusive, transparent, and empowering governance principles. Their multi-functional properties — water regulation, temperature reduction, food production, etc. — make them valuable to address multiple challenges in the context of informal settlements. Yet, there is still scarce information on their optimal design and value in this context, although documentation of their implementation challenges and opportunities is increasing in the region (Wolff et al., 2023).

A recent review found 32 projects already utilising nature-based solutions in informal settlements in Southeast Asia (Figure 4.1; Wolff et al., 2023). Indonesia and Viet Nam had the highest number of informal settlement nature-based solutions projects documented in English, followed by other initiatives in Thailand and Cambodia (Figure 4.1). The review found that at least six different types of nature-based solutions — including tree planting, community gardens, constructed wetlands, and coastal reforestation — are already being used in the context of informal settlements in the region. Improving climate resilience was a central motivation for the majority of the reviewed projects. As such, while mangrove planting and other well-established nature-based solutions can be useful to protect coastal areas, it appears that other solutions, such as community gardens and constructed wetlands, can also play an important role in climate adaptation plans by improving living conditions in the region. For example, constructed wetlands to improve grey and flood water management not only provide flood protection but can also improve water security, reducing vulnerability to drought periods (Wolff et al., 2023). Amongst other examples, several projects in Viet Nam demonstrate the potential of nature-based solutions in the context of informal urbanisation. These projects (Figure 4.1) are implementing naturalised canals with vegetated banks as a strategy to reduce water speed and increase infiltration capacity in informal settlements.

The same review indicated that most of the projects currently implementing nature-based solutions in informal settlements do not employ comprehensive monitoring and evaluation frameworks. The analysis of how grey literature and academic sources describe the projects suggests that the lack of monitoring of these solutions "reveals a fundamental gap in the literature, limiting the evaluation of nature-based solutions in the medium and long term" (Wolff et al., 2023, p. 282). Despite the growing emphasis on nature-based solutions to manage climate risks, there is a shortage of evidence for their efficacy, especially in informal settlements. Improved local data collection can be leveraged to monitor the effectiveness of solutions, such as the reduction in heat exposure and decreases in peak water levels, to improve design and implementation. In the next section, we describe how low-cost sensors, citizen science, and remote sensing can help address this goal.

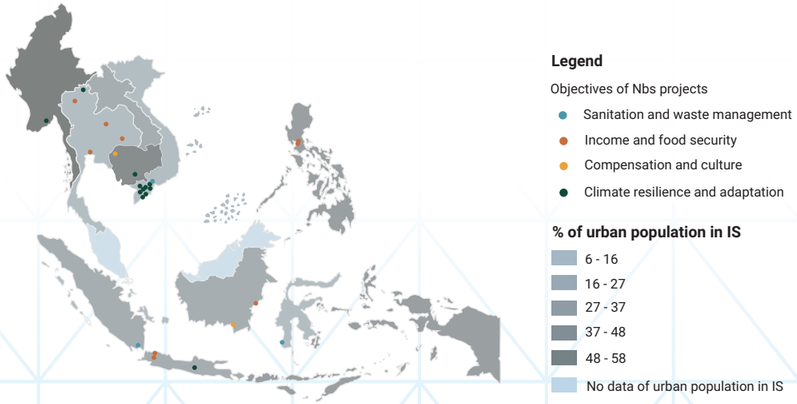


Figure 4.1. Map of nature-based solutions (NbS) in informal settlements (IS) in Southeast Asian countries (Source: Authors, based on data from Wolff et al., 2023).

Technological Approaches to Assess and Manage Climate Risks in Informal Settlements

Data Limitations in Informal Settlements

Data scarcity remains a central challenge to quantifying and managing climate risks in informal settlements (Satterthwaite et al., 2020). The fine-scale environmental data required to characterise hazards and assess risk across cities are infrequently available for the region (e.g., low density of meteorological stations), much less for informal settlements. Moreover, owing to their marginalised condition, informal settlement residents are rarely captured in centralised data collection, such as censuses, making it difficult to assess the impacts of climate hazards on their health and livelihoods. Local-scale approaches that capture the intersection of environmental hazards, biophysical functions of ecosystems, and socioeconomic vulnerabilities in informal settlements and can be integrated into city- and national-level assessments are required (Starkey et al., 2017; Wolff, 2021).

Rapidly evolving sensor technologies have the potential to fill some of these data gaps and provide improved risk assessment and management in informal settlements. Modern sensors, ranging from low-cost data loggers to satellite sensors, can provide robust, real-time data at the local scales required to assess climate risks across cities (Muller et al., 2015). The uptake of these technologies is often accompanied by a natural shift away from centralised data collection to community-driven and citizen science initiatives. A growing body of international research demonstrates the success of these approaches, with significant potential for greater uptake in informal settlements. While international best practices can inform the design of low-cost sensors and the use of remote-sensed data, building local capacity in subnational governments and universities will be critical to ensure the long-term management of these technologies and the use of the data for risk management.

Low-cost environmental sensors

Low-cost sensors are increasingly used to quantify environmental hazards, especially in biophysically complex environments such as urban informal settlements. While there is no universally agreed definition of "low-cost" sensors, the term refers to sensors that are inexpensive compared to the cost of the traditional instrument for a given purpose (Kang et al., 2022). Apart from their lower price tag, low-cost sensors also have great potential in "do it yourself" environmental monitoring due to their modularity and open-source philosophy, making them widely accessible to communities across the world (Mao et al., 2019; Hamel et al., 2024). Low-cost sensors can measure a wide range of climatic variables essential for assessing climate risks, including temperature, humidity, precipitation, soil moisture, and water levels (Paul et al., 2018).

Dense networks of sensors, made possible by their reduced costs, can capture fine-scale spatial and temporal variation. In addition, the ubiquity of smartphones and internet connectivity has enabled near-real-time data collection and collation of "big data." For example, crowdsourced temperature measurements from personal weather stations have been used to quantify urban heat islands across Europe (Venter et al., 2021). Sensor networks have been successfully implemented to measure water flow and discharge in informal settlements in South Africa, with a view to improving drainage and stormwater infrastructure (Fell et al., 2019). Real-time transmission technologies can also support the development of affordable early-warning systems for flooding (Pandeya et al., 2021; Shi et al., 2021).

Some challenges involved in the installation and maintenance of sensor networks may be exacerbated in informal settlements. For example, collecting robust data from low-cost sensor networks requires careful calibration of sensors and documentation of metadata, which requires technical support. Human interference with sensors can also introduce error or uncertainty into data or cause equipment loss. Yet, these challenges also provide opportunities for better community engagement and participatory approaches (Manshur et al., 2023), critical for a just and sustainable implementation of nature-based solutions.

Information Technology Tools for Citizen Science

Citizen science has gained traction as an approach for community members to work in partnership with experts and decision-makers. Ranging from "community-based research" to "participatory mapping" and "co-design," citizen science invites communities, including residents of informal settlements, to participate in the process of risk management.

Within citizen science, community participants can be engaged throughout the research process, contributing to the design, collection, and even interpretation of scientific data. Typical projects include monitoring environmental hazards such as flooding (Starkey et al., 2017; Wolff et al., 2021) or sediment movement in coastal areas (New South Wales Department of Planning and Environment, 2021). These approaches tend to generate rich datasets with more distributed data points across time and space, build engagement with scientific topics, and strengthen community bonds. While citizens can be enrolled in citizen science purely as data collectors, there is growing recognition that citizens can also participate in these projects in ways that can make science more transformative and community centred.

In the context of informal settlements, where the implementation of nature-based solutions is gaining traction (Figure 4.1), citizen science can play an important role in engaging the community, as well as collecting site-specific data. Flood monitoring, for example, has been piloted in informal settlements using daily photographs of flood gauges shared via smartphone messaging to document local water-level variation (Wolff et al., 2021). Challenges exist in maintaining community engagement, though, especially over long-term monitoring, and care must be taken to minimise the financial or time burden on community members involved, especially in low-income settings. Allowing direct access to the collected data can alleviate these challenges by empowering communities with the evidence to understand their own vulnerabilities and to advocate for government support. Linking citizen science with climate adaptation projects can influence the design and implementation of nature-based solutions by bridging an important gap between theory and policy: the need to use an adaptive and site-specific approach.

Satellite Remote Sensing

The growing body of open-source, remote-sensed environmental data provides an opportunity to scale up climate risk assessments in informal settlements. Remote-sensed data are continuous across space, meaning that outcomes from localised approaches, including low-cost sensing and citizen science, can be extrapolated across city-wide and regional scales. For example, Sentinel-2 and Landsat imagery, with spatial resolutions of 10 and 30 metres, respectively, are fine scale enough to capture even small informal settlements within broader urban landscapes. These sensors capture important data for climate risk assessments, including urban land cover impacts on hydrological risk (e.g., surface runoff and inundation) and urban heat islands (e.g., surface temperature and vegetation cover) (Zhu et al., 2019). In doing so, remote sensors can prove useful in designing and monitoring the efficacy of nature-based solutions in informal settlements.

Improved computing power and efficiency offered by platforms, such as the Google Earth Engine and the Microsoft Planetary Computer, have helped to overcome analytical barriers associated with accessing and processing remote-sensed data. Outputs from these platforms can be presented in web applications, which allow stakeholders and communities to easily access data for climate risk assessment in informal settlements (Chakraborty & Lee, 2019; Figure 4.2). Cloud cover remains a limitation in the tropics, especially during the wet season. However, the relatively high frequency of imaging combined with improved processing power to filter the large time series of data and build composite images has largely overcome these challenges.

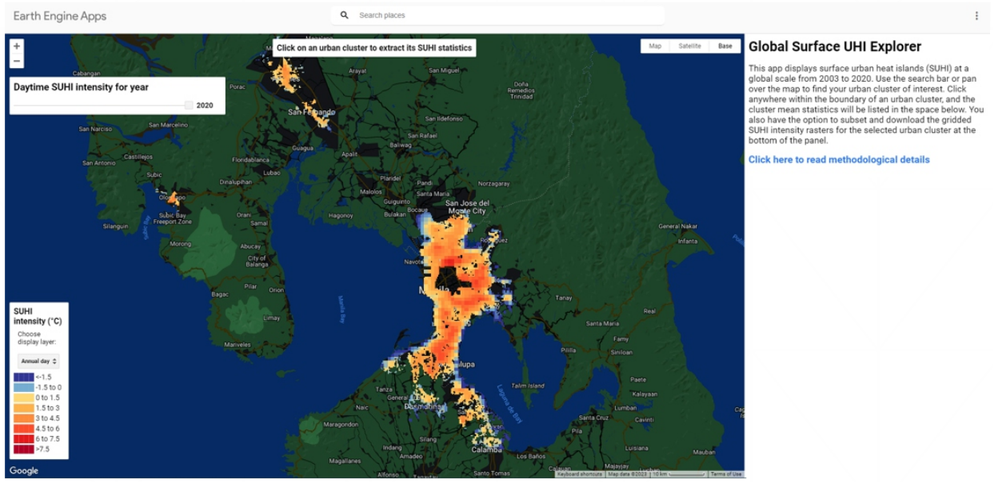


Figure 4.2. Google Earth Engine outputs can be presented in publicly available applications such as the Global Surface UHI Explorer by the Yale Center for Earth Observation (Source: Earth Engine Apps [https://yceo.users.earthengine.app/view/uhimap]).

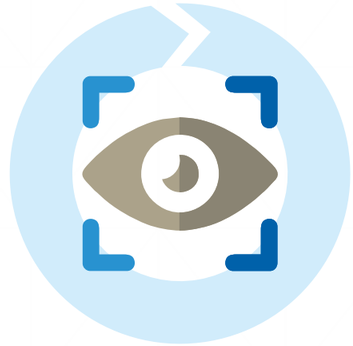
The outstanding challenge for remote sensing-based risk assessments in informal settlements is the lack of spatial information for the settlements themselves. Thus, the majority of remote-sensing studies in informal settlements have focused on mapping or predicting the locations of settlements based on the analysis of urban morphology (Zhu et al., 2019). For example, Matarira et al. (2022) used open-source data in the Google Earth Engine to identify informal settlements in South Africa with 80% accuracy. Such information is essential to quantify exposure, but care must be taken in publishing exact locations. While remote-sensing technologies represent a unique opportunity to map informal settlements, researchers and practitioners must exert caution when using these data. Residents of these settlements have historically been targeted by "urban upgrading" projects in Southeast Asia, which have, at times, been used to dispossess and evict vulnerable communities. Given the uncertain land tenure and housing conditions of many of these settlements, researchers should be aware of the power imbalances and unintended consequences of disclosing such datasets.

Case Studies: Quantifying and Managing Climate Risks in Informal Settlements

Heat Monitoring in the RISE Programme

The Revitalising Informal Settlements and their Environments (RISE) Programme, initiated in 2018, is trialling nature-based solutions to alleviate environmental and health challenges in informal settlements in the Asia-Pacific (Figure 4.1). As part of the programme, low-cost temperature and humidity sensors were used to quantify the magnitude and frequency of urban heat exposure in 12 informal settlements in Makassar, Indonesia. Networks of iButton sensors (~65 sensors per settlement) were placed outdoors and in houses to measure the thermal conditions that people actually experience in their day-to-day lives (Image 4.1). The magnitude of heat exposure in the informal settlements, calculated as the wet bulb temperature from the hourly temperature and humidity measurements, was, on average, 1.3°C warmer than the corresponding data from the local weather station (Figure 4.3; Ramsay et al., 2021). Moreover, heat exposure outdoors, and even in houses, frequently exceeded international recommendations for work and rest. Overnight, heat exposure was often worse indoors, showing that informal housing provides little protection from urban heat.

This case study highlights the importance of quantifying heat exposure at local scales to provide accurate information for risk management. Risk assessments using data from weather stations located outside of urban areas or coarse-scale climate data likely underestimate the magnitude of exposure in informal settlements. However, such intensive monitoring is often financially infeasible. Instead, local case studies can be integrated with remote-sensed satellite data to extrapolate climate information at broader scales. For example, the in-situ temperature measurements presented here were also used to validate a remote sensing analysis of urban heat islands in a broader analysis of 31 informal settlements across the city (Ramsay et al., 2023).



Strong community engagement fostered through the RISE programme underpinned the success of this case study. Ongoing engagement allowed community fieldworkers to successfully maintain the sensor network over several years and engage with households willing to host temperature sensors in their homes. This heat exposure assessment also forms part of the baseline environmental data to assess the proposed nature-based water infrastructure upgrade being implemented by RISE (French et al., 2021).

Image 4.1. Low-cost iButton temperature sensors housed in solar radiation shields in informal settlement communities in Makassar, Indonesia (Source: RISE Consortium).

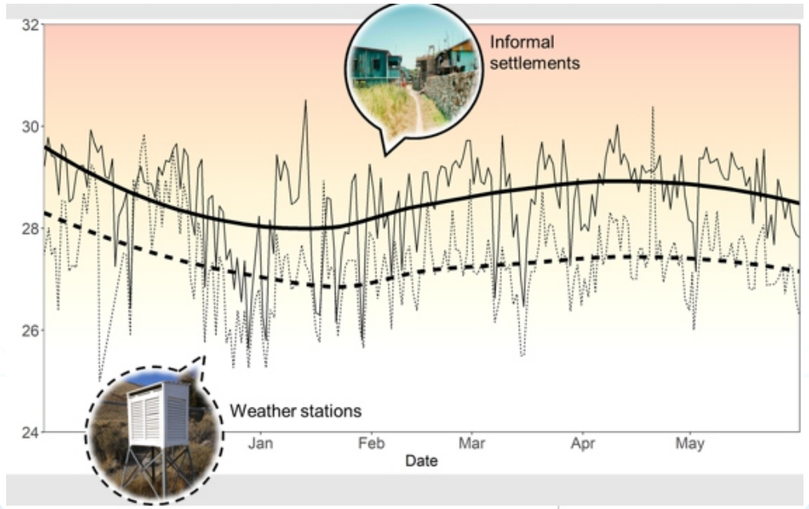


Figure 4.3. Extreme heat measured locally (2018–19) in informal settlement communities (solid line) in Makassar, Indonesia, is underestimated by corresponding weather station data (dashed line; National Oceanic and Atmospheric Administration Integrated Surface Dataset) (Source: Authors, based on Ramsay et al. 2021).

PetaBencana: Citizen Science for Flooding in Indonesia

The PetaBencana platform is a useful case study on how citizen science can support the collection of data to monitor flooding in Southeast Asia. Established in Indonesia as a flood monitoring tool, the platform is freely accessible online (https://info.petabencana.id/) and provides critical information to support decision-making during floods. Its success is due in part to its wide accessibility through the mobile internet and a smartphone application that can be downloaded and installed for free (Fadmastuti, 2019). The PetaBencana platform features a user-friendly interface that is easily accessible by users anywhere in Indonesia, including in informal settlements. In the application, users can take photos and communicate rising water levels in real time to others and decision-makers. The application depends only on the ability of the user to indicate water levels in relation to known references, such as the scale of a car or a human being (Figure 4.4).

Through the PetaBencana application, a growing number of citizen scientists, including residents of informal settlements, have been able to share information and participate in flood-monitoring activities. This citizen-generated data is particularly relevant in the context of informal settlements, where the hydrological data available is limited in extent and distribution. By providing better flood data in understudied catchments, the PetaBencana project serves as an invaluable platform to help authorities prioritise emergency services and better communicate risks to residents during floods (Fadmastuti, 2019).

The PetaBencana project demonstrates how communities can participate in the process of monitoring environmental parameters of relevance to cities because of its simple and accessible interface. Its popularity amongst participants and interface that connects with social media attests to the success of this tool as a platform for collaborative data collection. Therefore, the project shows how participatory methods can engage residents in informal settlements in the collection of scientifically important data and the design and maintenance of climate adaptation strategies, including those relying on nature-based solutions.

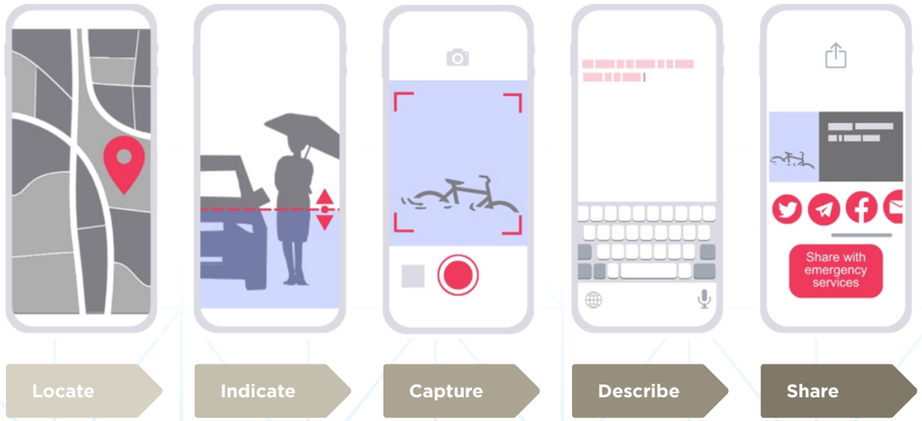


Figure 4.4. The interface of the Urban Risk Map platform communicates with multiple phone applications, such as social media, to offer community members an opportunity to report water-level variations in real time. (Source: Image modified from https://urbanrisklab.org/riskmap).

Discussion and Perspectives

The three technologies presented in this article — low-cost sensors, information technology tools for citizen science, and satellite imagery — are well-established for a range of operational applications. Their potential for climate adaptation has been demonstrated globally, including a growing number of applications in informal settlements. As such, the frontiers for research and implementation highlighted in this article concern the mainstreaming of these technologies in the context of informal settlements — where the needs are perhaps the greatest given the high vulnerability of these communities. These technologies are a unique opportunity to collect better data that can accurately represent the environmental hazards and specificities of informal settlements in the region (Figure 4.5). In doing so, mainstreaming these technologies will support the design and management of nature-based solutions, given the wide promotion of these approaches in climate adaptation and disaster risk reduction plans for the region (Figure 4.5). Nature-based solutions have the potential to address some climate risks while addressing other societal needs (e.g., economic development) and environmental issues (e.g., erosion of biodiversity). Better monitoring and evaluation of existing nature-based-solution projects would help share lessons across countries and design more effective projects in the future.

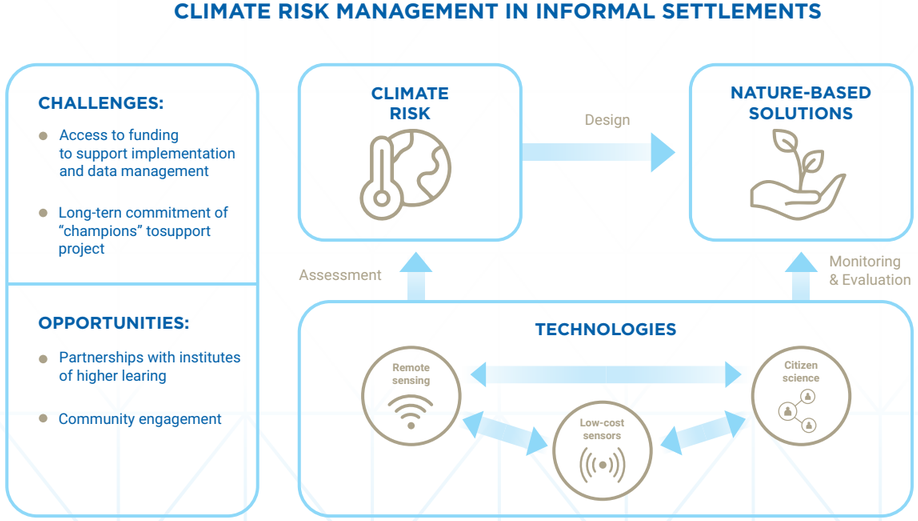


Figure 4.5. Sensor technologies and citizen science can support risk assessment and the implementation of nature-based solutions for climate risk management in informal settlements..

The case studies discussed are embedded within a transition in the ways in which disasters are addressed in Southeast Asia. This transition is characterised by the growing interest in community-based approaches to disaster risk reduction and the mainstreaming of nature-based solutions in informal settlements (Figure 4.1). They have demonstrated the huge opportunities offered by diverse monitoring technologies to understand, manage, and potentially reduce climate risks in informal settlements (Figure 4.5). The PetaBencana project illustrates how a local government can directly use crowdsourced data to improve decision-making. Low-cost sensors, whether for heat or water-level monitoring, can be used to better characterise the spatial and temporal extent of hazards. Moreover, data collected by these technologies can also be used operationally in early-warning systems, as has been done, for example, for flood monitoring in Thailand (Wannachai et al., 2022).

Notwithstanding this potential, we highlight two main challenges to mainstreaming these technologies (Figure 4.5). First and foremost, access to funding for deployment or implementation may be limited. While these technologies do not incur high capital costs for the users, they involve important human resources, in particular skilled technicians, to compile and process information. For example, understanding urban heat patterns from satellite images requires technical skills to process and interpret satellite imagery. Processing and visualising environmental data time series would also require such skills. In addition, installing low-cost sensors for heat or flood monitoring still incurs some capital costs that may be significant for the poorest communities in the order of USD 10 to 100 per sensor and much more if one accounts for the potential deterioration of the equipment over time.

Second, the long-term success of hazard monitoring and risk management projects hinges on the dedication of champions in the community, who may or may not be established community leaders. Without individual commitments to the project, the physical infrastructure (e.g., sensors) or social capital (e.g., knowledge of citizen scientists) will not be sustained. In a context where land tenure is uncertain and individual needs for basic requirements like food, water, and electricity might not be met, commitments to sustain such projects might be difficult to obtain without formal incentives.

Importantly, both case studies exemplify the role of institutes of higher learning in supporting the implementation of such technologies, with both programmes being supported by university researchers. This characteristic is not unique to our case studies, with other successful, large-scale projects also involving universities. This was the case for the Kampung Improvement Programme in Surabaya, Indonesia, a large informal-settlement-upgrading programme which was developed in collaboration with the Sepuluh Nopember Institute of Technology (Das & King, 2019). Furthermore, mobilising the private sector to improve the capabilities of monitoring climate-related risks in informal settlements will be key in filling resource gaps. An exemplary model for private sector partnership is the Philippine Disaster Resilience Foundation, an alliance of businesses that not only aims to improve the disaster management capacities of the private sector in the country but also takes a "whole-of-society" approach by supporting poor and vulnerable communities (Atienza & Quilala, 2021, p. 81).

Partnerships between civil society, local governments, private sector organisations, and institutes of higher learning offer multiple benefits, including long-term collaborations and higher levels of human resources, through the involvement of a team of researchers and students. These resources help build trust with the communities, a critical ingredient to the success of community-led risk management projects.

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Articles

ARMOR
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#5

Enhancing Sustainable Disaster Management Solutions on Displacement in Southeast Asia using Data-Driven Approaches

Authors:
Thannaletchimy Housset and Christopher Strub

#5

Enhancing Sustainable Disaster Management Solutions on Displacement in Southeast Asia Using Data-Driven Approaches

Authors: Thannaletchimy Housset and Christopher Strub

Abstract:

Countries across Southeast Asia rank as some of the most hazard-prone in the Asia-Pacific region and globally, as many are located along the Pacific Ring of Fire and the region's typhoon belt, exposing its inhabitants to a wide variety of hazards. While there have been many attempts to better prepare through disaster forecasting, predicting the size, location, timing, and impact of hazards with precision has been challenging. Better preparation towards mitigating the impacts of disasters should not only rely on forecasts. Another way for disaster risk and humanitarian communities to make informed decisions is by using historical data to derive trends and patterns of displacement. We consider four different case studies in Southeast Asia where disaggregated data, both temporally and spatially, can reveal patterns in displacement that can then inform policymakers on certain operational aspects of disaster preparedness — primarily how to mobilise and allocate resources adequately to populations displaced in shelters. The four case studies illustrate the benefits of data informing important aspects of resource mobilisation during periodic hazards, such as floods and storms. Additionally, they identify key reflections that policymakers need to consider when planning for the next round of similar disasters. There is a need to invest in a better understanding of all aspects of vulnerability to gauge how best to prepare for the worst disasters. This will ensure that disaster management solutions for displacement are based on evidence and sustainable.

Keywords: Displacement, disaster preparedness, seasonality

Introduction

Countries across Southeast Asia rank as some of the most hazard-prone in the Asia-Pacific region and globally, as many of them are located along the Pacific Ring of Fire and the region's typhoon belt. A major part of the population in the region lives in riverine plains, deltas, and coastal plains. Hence, the most populous areas are subjected to periodic and extensive hazards, such as floods, tsunamis, and cyclones. Moreover, the unique geographic and climatic conditions make this region one of the world's most vulnerable to disasters caused by sudden-onset hazards, as well as the slow-onset impacts of climate change (United Nations International Strategy for Disaster Reduction [UNISDR] & World Bank, 2010). Almost every year, the powerful typhoons that cause flooding and landslides batter the region. In addition, the region faces risks from earthquakes, volcanic eruptions, tsunamis, and forest fires that threaten life and property, and from drought that leaves serious lingering effects (UNISDR & World Bank, 2010).

Southeast Asia is home to most of the world's population, many of whom live in areas prone to a wide range of hazards, increasing the risk and scale of displacement due to disasters in this region (Internal Displacement Monitoring Centre [IDMC] & Norwegian Refugee Council [NRC], 2022). Almost 31% of the total disaster displacement recorded in the Asia-Pacific region between 2010 and 2021 has been reported in Southeast Asia (IDMC & Asian Development Bank [ADB], 2022). Of the countries in the region, the Philippines is the most affected by displacements and most at risk of extreme weather events in the Asia-Pacific region and globally (IDMC, 2023).

Much work has been done to improve the forecasting of disasters by increasing precision and shortening lead times. For instance, sub-seasonal-to-seasonal climate predictions done by Rahmat et al. (2020) explore the potential to predict disasters at lead times of one to three weeks before disasters strike. Despite the variety of models available to improve the predictability of disasters, their impact on people remains challenging to predict. The impact forecasting model by CLIMADA provided an estimate of the risk of displacement in Fiji by incoming Tropical Cyclone Yasa in 2020. CLIMADA estimated that between 3,000 and 400,000 people were at risk of being displaced by Yasa (Kam & Ponserre, 2022). The actual displacement recorded was about 23,000 (IDMC, n.d.). This illustrates the difficulties of predicting the impacts of disasters on displacement with precision.

While predicting displacement with exact precision is challenging, better data can enable us to be better informed and act before disasters strike, rather than invest primarily in the humanitarian response post-disaster. A way to make informed decisions to mitigate the impacts of hazards on people is to use historical data to derive trends and patterns of internal displacement.

We considered four different case studies in Southeast Asia where disaggregated data both temporally and spatially revealed patterns in displacement that could inform policymakers on how to mobilise and allocate resources adequately to shelter displaced populations. However, the accuracy of the analysis is reliant on the accuracy and consistency of the data reported. In cases where there is a lack of consistency in the data collection, this can yield incomplete and sometimes erroneous analysis. Insufficient details in the data (such as disaggregation of displaced populations) can also limit the comprehensiveness of responses provided. To be better prepared and informed on anticipatory action, data-driven approaches need to be complemented with sound analysis and consistent and detailed reporting.

Southeast Asia is home to most of the world's population, many of whom live in areas prone to a wide range of hazards, increasing the risk and scale of displacement due to disasters in this region

Data and Methodology

Producing accurate estimates of the scope, scale, and impacts of disaster displacement and predicting future movements are challenging in many countries around the world, given a lack of adequate reporting, differing concepts and metrics, and insufficient geographical and demographic coverage (Housset, 2022). However, many countries in Southeast Asia are exceptions to this, where data on most impacts of disasters, especially displacement, is consistently reported.

For the purposes of this article, we will be using the following terminologies:

- "Internal displacements" correspond to the estimated number of forced movements of people within their country's borders. In this article, we only consider internal displacements resulting from disasters (also called disaster displacements). These movements could include individuals who have been displaced more than once.

- "Internally displaced persons (IDPs)" correspond to the total number of people, at a specific point in time, who have been forced to leave their homes due to disasters and have not crossed an internationally recognised border.

- "Destroyed housing (DH)" corresponds to the number of homes destroyed as a result of disasters and is used as a proxy for displacement if no internal displacement data is available. The number of destroyed houses is typically multiplied by an average household size specific to each country to estimate internal displacements.

Our four case studies look at displacements in Indonesia, Malaysia, the Philippines, and Viet Nam. We use a mix of internal displacements, IDPs, and DH to assess the impact on internal displacements. Data on internal displacements in Indonesia is provided by the country's National Disaster Management Agency (BNPB), which maintains a publicly available database on losses and damages that includes information dating back to 1990 on the number of evacuations, affected people, and DH in specific locations.

The National Disaster Management Agency of Malaysia collects daily reports on people seeking shelter in government-owned evacuation centres (ECs) due to disasters, predominantly floods, which allows for the tracking of the number of IDPs seeking shelters over time. Due to the nature of daily (more precisely, four-hourly) reporting, this allows for a better understanding of when IDPs seek out shelters and for how long they require shelters to be open following a disaster.

In the Philippines, internal displacement data is compiled by the Disaster Response Operations Monitoring and Information Center (DROMIC), which provides information on internal displacements and IDP stocks — both disaggregated by ECs and outside the centres. Data is provided for specific disasters, and the coverage and extent of reporting is long-term (even up to one year) for large-scale disasters. For the purposes of this article, we study the displacement impacts following Super Typhoon Rai (locally known as Odette in the Philippines). This super typhoon was the largest disaster to affect the Philippines after Super Typhoon Haiyan (locally known as Yolanda) in 2013. Super Typhoon Rai started on 11 December 2021 and exited the Philippine area of responsibility on 21 December 2021. DROMIC began its reporting at the start of the disaster and continued to report on internal displacements consistently until 2023. The most recent report was published on 25 May 2023. All data on IDPs were used to estimate the pace of returns following Rai.

The two preceding examples from Indonesia and Malaysia are relevant for thinking about preparations in the context of frequent disasters that occur cyclically during the course of a year. However, policymakers tend to be less prepared in situations of extreme disasters. The Philippines' case study of Super Typhoon Rai is unique in providing insights on responses in the case of extreme disasters, which was made possible thanks to the availability of geographically disaggregated data and consistent reporting over time.

In all three case studies, we rely on actual data on internal displacements or the exact number of IDPs provided by disaster management agencies. However, for some countries in Southeast Asia, data on internal displacements or IDPs is not readily available for small- and medium-scale disasters. It is then necessary to use a proxy to estimate internal displacements. This is notably the case in Viet Nam, where the Viet Nam Disaster Management Authority regularly reports the impact of disasters through the number of private homes destroyed in its daily situation reports. We deduce that a household whose house has been destroyed can no longer live in it and should thus be considered internally displaced. The consequences of such situations would be to relocate to government facilities or the homes of their friends and/or relatives. To estimate internal displacements that occur through the destruction of one's home following a disaster, we take the number of houses reported as destroyed and multiply it by the average household size of the country.

Case Study One: Identifying Displacement Hotspots from Seasonal Floods in Indonesia

Using data on internal displacements compiled by BNPB from 2002 to 2022, we identified the most common hazards that trigger displacement in the country: floods (57%) followed by earthquakes (27%), as seen in Figure 5.1.

Though geophysical hazards, such as earthquakes, are not as frequent or regular, their impacts tend to be more severe, particularly in terms of displacement. Floods, on the other hand, are frequent and occur annually during the rainy season that typically starts in October and runs through April of the following year. According to IDMC's global disaster displacement risk model, 17.8 million people worldwide are at risk of being displaced by floods yearly, of whom 80% live in urban and peri-urban areas (IDMC & ADB, 2022). Figure 5.2 shows the evolution of displacements triggered by floods in Indonesia, primarily during the rainy season between 2002 and 2020, with the highest flood displacements occurring in 2002 and 2007.

Share of displacement per hazard in Indonesia (2002 – 2022)

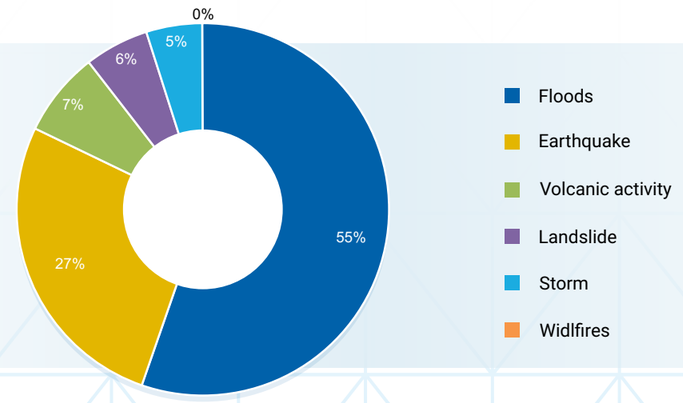

Figure 5.1 Share of displacement per hazard in Indonesia for the period 2002 – 2022 (Source: IDMC, n.d.).

Figure 5.2 Flood displacements in Indonesia for the period of 2002 – 2022 (Source: IDMC, n.d.).

Consistent reporting of internal displacements over time and space can help us determine the areas most affected by floods and, hence, experience higher levels of flood displacements. On average, we observed that certain provinces tended to report higher levels of flood displacements during the rainy season compared to others.

The hotspot map in Figure 5.3 is based on flood displacements in Indonesia over 20 years. A closer analysis of the hotspots indicated that these evolved. In 2002, most flood displacements were concentrated in provinces like West Kalimantan. In more recent years, flood displacements were most prominent in provinces like East and Central Java (Figure 5.4).

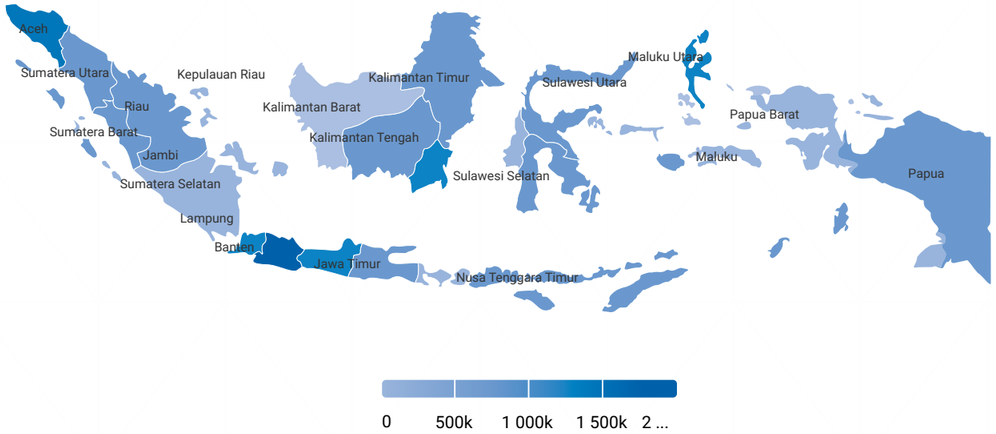

Figure 5.3 Hotspots of flood displacements in Indonesia for the period of 2002 – 2022 (Source: BNPB, n.d.).

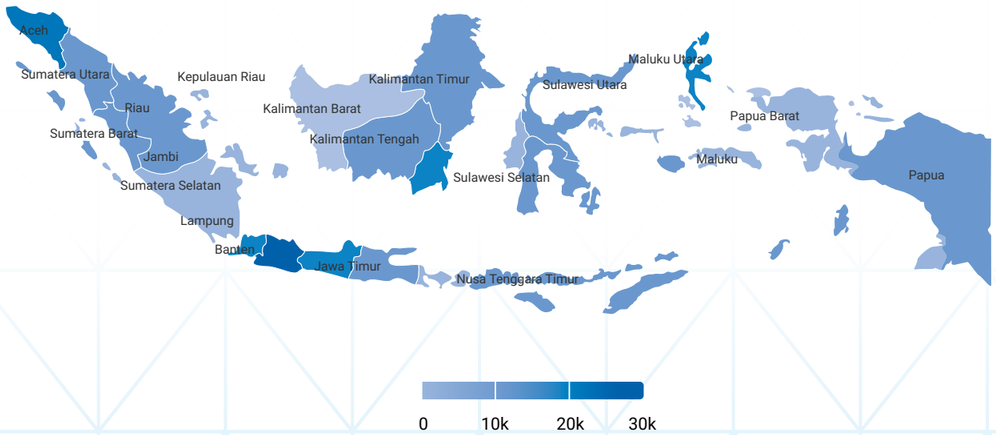

Figure 5.4 Hotspots of flood displacements in Indonesia in 2012 (Source: BNPB, n.d.).

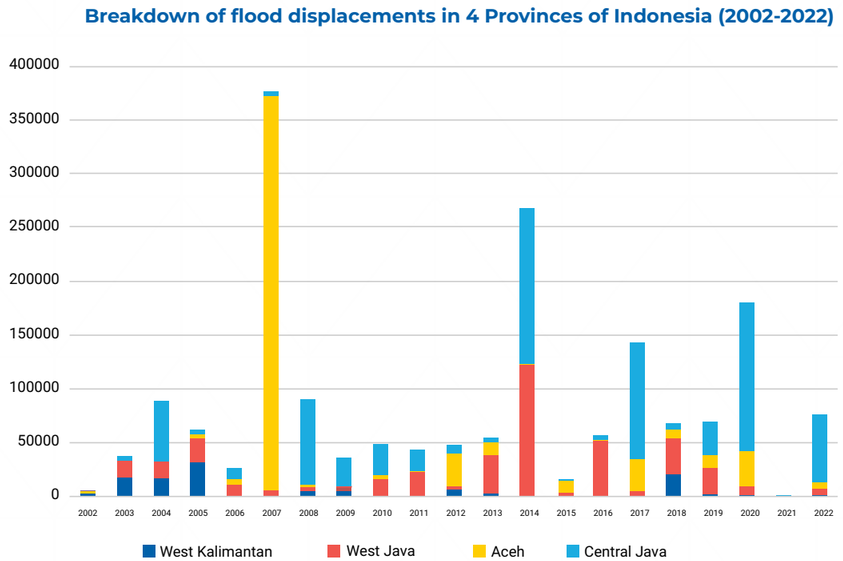

Figure 5.5 Evolution of flood displacements in key provinces in Indonesia for the period of 2002 – 2022 (Source: IDMC, n.d.).

This discovery highlights the importance of having spatially disaggregated data collected consistently over time to inform key policy recommendations on which provinces need to prepare ahead of the rainy season and the average displacement impacts they can expect to see. Due to the impacts of urbanisation and economic development over time, population density and city planning have changed drastically in many provinces over the last 20 years in Indonesia. This has a direct impact on the population densities in the provinces. Additionally, the infrastructure has improved in some provinces to support the increased urbanisation, whereas this has not been the case in others. The impact of urbanisation and economic development can increase the risk of exposure of a larger number of people in urban areas to floods during the rainy season if the infrastructure does not adequately allow for flood mitigation in typically flood-prone areas. As a result of these developments, we observed changes in displacement in four key provinces, namely West Kalimantan, West Java, Aceh, and Central Java (Figure 5.5). Figure 5.5 shows us that while these four provinces saw higher levels of displacement in recent times, displacement was not a concern 20 years ago. This analysis thus shows the challenges of predicting displacement in the future based purely on displacement data alone, as it lacks valuable information on urbanisation and policy advancements that may have contributed to the changed landscape, rendering them susceptible to floods and subsequent flood displacement.

The production of more timely and relevant data to support local early warning and early action can be key to mitigating disaster impacts, speeding up recovery, and the achievement of durable solutions.

Case Study Two: Assessing Length of Displacement During Seasonal Floods in Malaysia

In this case study on Malaysia, we were interested in looking at how long IDPs tended to stay in government-owned ECs, particularly during the periods of intensified flooding that typically happen during the rainy season. Like most Southeast Asian countries, Malaysia is affected by two distinct monsoon seasons: the southwest monsoon, spanning from May to September, and the northeast (NE) monsoon, which lasts from November to March (Malaysian Meteorological Department, n.d.). Amongst these, the NE monsoon emerges as the monsoon period with the greatest intensity in terms of internal displacement, as shown by the displacement data compiled by IDMC between 2016 and 2023 (IDMC, n.d.). Through the analysis of three different displacement measures, we tried to determine whether it is possible to isolate certain trends that could influence the development of government policies for sustainable resilience.

Using our first displacement measure, we assessed whether it was possible to identify the month that saw the highest internal displacements during the NE monsoon period over several consecutive seasons. To this end, we compared the total flow of IDPs moving to ECs as a result of floods during each NE monsoon season in the whole country from 2016 to 2023, categorised by month.[1]

Monsoon season	October	November	December	January	February	March
NE Monsoon 2016-2017	0	330	6,112	15,000	830	584
NE Monsoon 2017-2018	4,627	40,360	2,721	18,510	6,082	498
NE Monsoon 2018-2019	2,607	1,905	3,014	2,918	88	183
NE Monsoon 2019-2020	4,063	33,305	19,218	212	50	18
NE Monsoon 2020-2021	394	4,391	11,526	47,487	1,029	128
NE Monsoon 2021-2022	2,648	621	68,601	81	27,204	2,693
NE Monsoon 2022-2023	2,109	11,712	105,745	20,448	7,728	94,811

Table 5.1 Heat map of flood displacements in ECs in Malaysia during the NE monsoon periods from 2016 – 2017 to 2022 – 2023, by month (Source: IDMC, n.d.).

[1] The NE monsoon period extends from November to March, according to the National Disaster Management Agency of Malaysia. However, we included October in our analysis since NE monsoon rains tend to begin in late October, with the first displacement figures for the season being reported.

A thorough study of the available data reveals December as one of the months most affected by flood displacements during the NE monsoon in Malaysia. The total number of internal displacements during December from 2019 to 2022 regularly surpassed 10,000 per year, culminating in a notable peak of almost 106,000 in December 2022. January also displayed substantial flood displacements of over 10,000 people in 2017, 2018, 2021, and 2023, while November in the indicated years showed noteworthy displacements. This indicates that the initial months of the NE monsoon are consistently the most affected by flood displacements. However, this conclusion must be approached with a caveat due to the inherent variability of monsoon intensity across different years, as exemplified by the extraordinary peak of nearly 95,000 flood displacements recorded in March 2023.

Our second measure of displacement delved into the investigation of how flood displacements evolved during the NE monsoon periods from 2016 – 2017 to 2022 – 2023.

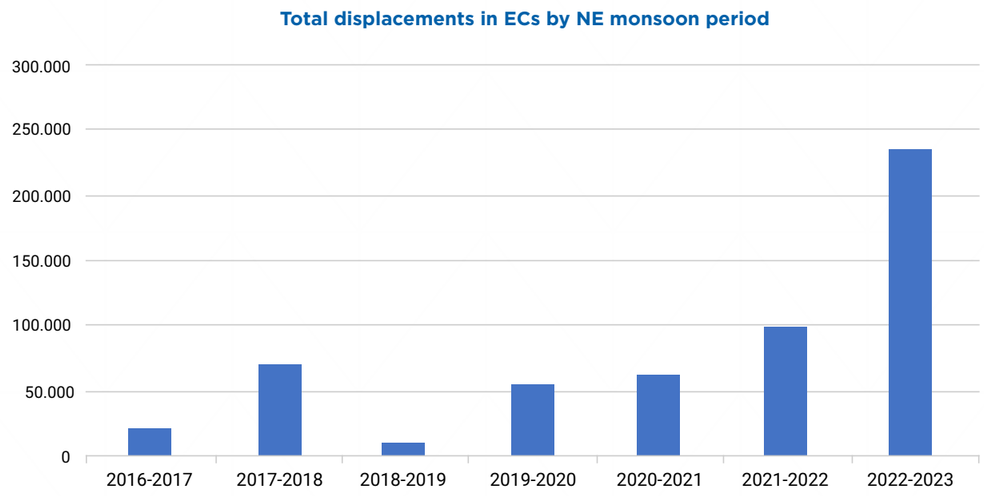

Figure 5.6 Flood displacements in ECs in Malaysia during the NE monsoon periods from 2016 – 2017 to 2022 – 2023 (Source: IDMC, n.d.).

A persistent upward trend in flood displacements since 2016 was observed. For instance, during the 2022 – 2023 NE monsoon period, approximately 243,000 displacements were recorded, marking a tenfold increase compared to the 23,000 recorded during 2016 – 2017. Although an increase in displacement over time could be interpreted as a negative impact as floods are displacing more people, this statement should be counterbalanced. In fact, an increase in people seeking shelter in ECs can also be seen as an enhancement in government disaster management policies, for example, through the provision of more places of refuge, the improvement of the quality of these infrastructures, better on-site care, or advancements in data collection methodologies.

Our third displacement measure focused on estimating the number of days it takes evacuees to enter ECs during a disaster. To estimate this number, we selected several significant IDP peaks that occurred during the NE monsoon periods between 2016 and 2023. For each peak, we calculated the number of entry days between the initial observed entry date and the date on which the peak in IDPs was attained. Based on the entry days of these peaks, we then averaged the number of entry days per NE monsoon period.

NE Monsoon Period	Location	Entry date	Peak date	Peak IDP	Entry days	Average entry days
2019-2020	Terengganu	30.11.19	02.12.19	5,890	2	3
	Kelantan	30.11.19	04.12.19	13,780	4	
2020-2021	Kelantan	07.12.20	21.12.20	2,670	14	14
2021-2022	Kendah	28.10.21	05.11.21	834	8	5
	Terengganu	26.02.22	01.03.22	17,522	3	
	Kelantan	26.02.22	02.03.22	8,843	4	
2022-2023	Besut, Terengganu	13.12.22	20.12.22	9,225	7	8.3
	Pasir Mas, Kelantan	13.12.22	21.12.22	13,777	8	
	Batu Pahat, Johor	02.03.23	12.03.23	39,944	10	

Table 5.2 Significant IDP peaks for the NE monsoon periods 2019 – 2020 to 2022 – 2023 and entry days (Source: IDMC, n.d.).

For example, for the 2022 – 2023 NE monsoon, using three peaks as a reference, we obtained an average of 8.3 days of entry. In other words, IDPs entered shelters within eight days of initial flooding during the 2022 – 2023 NE monsoon. Similarly, for 2021 – 2022, the average entry period was five days. For 2020 – 2021, a single peak of 14 days was recorded. For 2019 – 2020, an average of three days of entry was observed over two peaks.

We then used this average per individual monsoon period to establish an average for the NE monsoons throughout the entire period from 2016 to 2023. We obtained an average of 7.6 days of entry. During NE monsoon periods, IDPs, on average, seek shelter in ECs within a week of initial flooding. This implies that during a large-scale flood disaster, the time required for people to arrive in shelters in ECs typically ranges from one day to one week. Thus, governments need to ensure adequate shelters are open to IDPs within a day of intense flooding. They also should further ensure that these shelters can continue to accommodate IDPs for up to a week, as more and more people can be expected to seek shelters within the first week of severe flooding during the NE monsoon season.

The above three approaches allow us to isolate certain trends likely to influence the sustainable resilience policies of the government and disaster management agencies in Malaysia. Firstly, the most significant temporality in terms of flood displacements in ECs in Malaysia is the NE monsoon. The initial months of the NE monsoon, specifically December, tend to result in the highest flood displacements. Authorities can, therefore, prepare to allocate a major part of their resources and resilience efforts to the initial months of the NE monsoon.

Secondly, the data shows us that the number of displaced people tends to increase over time, which could foreshadow a greater allocation of resources by stakeholders in the years to come. Finally, we observed that during a large-scale flood disaster, IDPs took an average of between one day to one week to enter ECs following initial flooding. It is during this initial week that the authorities must be prepared to concentrate their efforts, taking into consideration the fact that certain regions must potentially be able to accommodate several tens of thousands of people in their infrastructures, as was the case in March 2023 with almost 40,000 IDPs seeking shelters due to floods in Batu Pahat, Johor (IDMC, 2022).

To effectively prepare for large-scale flood displacements akin to those experienced in Batu Pahat, governments must anticipate and address a multitude of challenges, from ensuring that there are enough emergency shelters available to accommodate the displaced population to organising emergency logistics. An example of the logistics that need to be considered is the organising of transportation to safely move people from affected areas to emergency shelters, especially considering the potential for disrupted transportation routes. Such analysis can, thus, have real operational benefits that could not have been realised without having the right information in place. Further disaggregation of this data, such as in the demography of IDPs, can further assist in preparing targeted responses. Identifying potential language barriers in specific localities and in the share of vulnerable populations, such as the elderly, children, pregnant women, and people with disabilities, can be useful in mitigating the adverse effects of being displaced amongst these populations. This could further facilitate a smooth and swift return of IDPs back to their homes.

Case Study Three: Assessing Rate of Returns in Different Types of Shelters in the Philippines

While disasters tend to be common and frequent in the Philippines, their scale tends to vary quite considerably. Extreme storm situations have affected the country quite often, and with each experience, the country has learnt to strengthen its early warning action and system. The recurrence of storms and other weather-related hazards has prompted the Philippine authorities to strengthen their monitoring systems to produce more actionable data that has been used to inform policy and operations for disaster risk reduction and durable solutions to internal displacement.

In this case study, we considered the impacts of displacement in the Philippines following Super Typhoon Rai. It formed on 11 December 2021, and over the next ten days, it increased in intensity, reaching category five with sustained winds of 260 kilometres an hour. On its course across Palau, according to IDMC, Super Typhoon Rai was the disaster to trigger the largest number of disaster displacements globally in 2021 (IDMC & NRC, 2022). The overwhelming majority of the displacements were in the Philippines and, to a small extent, Viet Nam.

Super Typhoon Rai killed 405 people, caused 3.9 million displacements in the Philippines, destroyed around 435,000 homes, and partially damaged around 1.6 million across the archipelago (National Disaster Risk Reduction and Management Council [NDRRMC], 2022). Its effects were comparable to Haiyan, which was known as one of the deadliest storms in the Philippines on record. It killed at least 6,300 people in that country alone, displaced close to four million people, destroyed 551,000 houses, and partially damaged 589,000 homes (NDRRMC, 2013).

Looking at the evolution of IDPs, we estimated the pace of returns in the aftermath of the typhoon in both ECs and non-ECs (with friends and/or families). This analysis allowed us to gain insights into the duration of displacement, notably for how long people tend to be displaced and how the location or type of shelter affects the duration of their displacement.

Cumulative displacements triggered by Rai by Region

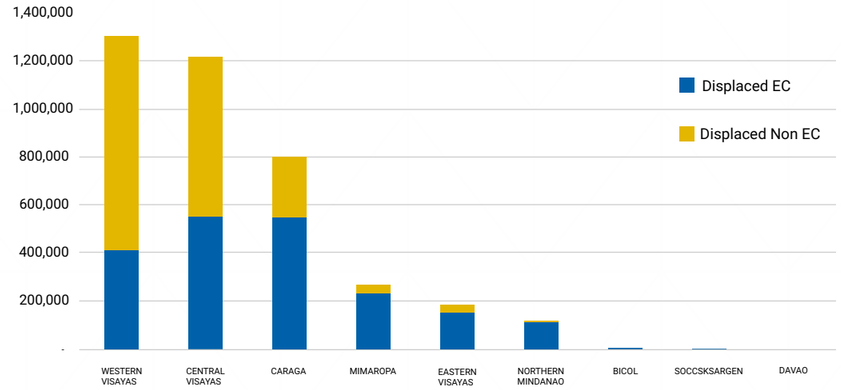

Figure 5.7: Internal displacements triggered by Rai disaggregated by region (Source: DROMIC, n.d.).

Displacements in camps versus non-campes from Rai

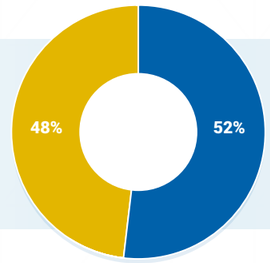

Figure 5.8 Share of internal displacement in camps versus non-camps (Source: DROMIC, n.d.).

Pace of returns since start of displacment

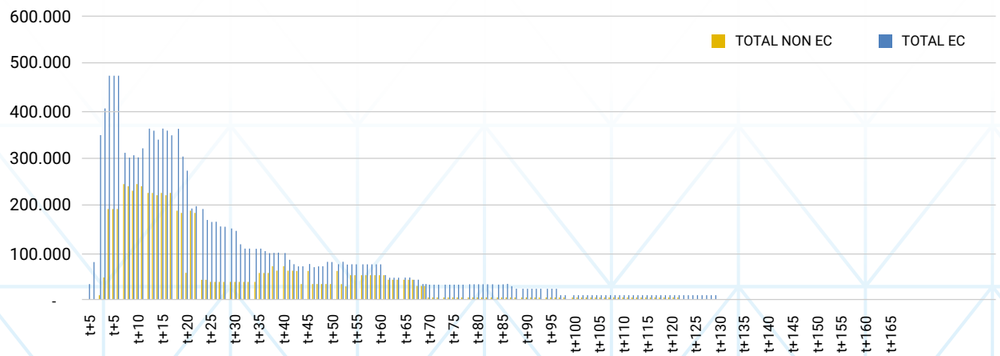

Figure 5.9: Pace of returns since the start of displacement (Source: IDMC, n.d.).

Super Typhoon Rai displaced 3.9 million people across 10 regions in the Philippines with the highest displacements reported in Western Visayas, Central Visayas, and Caraga. Slightly over 50% of the displaced sought shelter in ECs, while the other half were sheltered with family and/or friends (Figure 5.8). This implies that people have an equal preference to stay either in ECs or non-ECs after a large-scale disaster like Super Typhoon Rai.

In general, the pace of returns in ECs was lower than that of non-ECs (Figure 5.9). We define t as the day of the first IDP stock reported in ECs and non-ECs. We then plotted the days the IDP stock decreased since t. Based on IDMC's estimates, the first reports of displacements occurred between one and five days, while the peak IDP in ECs (the busiest day in ECs) was recorded on day 10 (i.e., 10 days after Rai entered the Philippine area of responsibility). It took almost a month for at least 80% of those displaced in ECs to leave these shelters — the pace being the fastest in Western Visayas, which was the most affected region. On the other hand, it took between one to 14 days for people to move to non-ECs, and people generally stayed for a shorter period of time: almost 80% of these people moved out within a week. It may be that these people shifted from non-camps to ECs as their homes were being rebuilt, though there was no information on where people went upon departure from these locations.

Understanding the pace of returns is important in disaster preparations, as it can reveal how long people would require shelters and how long these shelters need to be adequately equipped to host IDPs. Practically, the information on returns can determine, for example, how many individual beddings would be necessary to host the displaced population in shelters and that these need to be prepared for up to a month of use. It can also help to estimate the amount of food, water, medical supplies, or hygiene kits to distribute and the number of personnel to mobilise, as well as provide support services, such as psychosocial support, education, and health. This information can further reveal insights into the resilience of the displaced populations. People tend to seek shelters in ECs if they deem their displacement would last longer, while they may prefer to shelter with family and friends if they feel that they would be able to return to their homes more swiftly. Understanding where the centres are located compared to where non-camps are located can further help to understand if distance plays a crucial factor in IDPs seeking shelter.

Case Study Four: Analysing Impacts of Storms on Homes in Viet Nam

Like many of its Southeast Asian counterparts, Viet Nam is regularly affected by various disasters, notably storms (including regular storms, hailstorms, typhoons, and tornadoes), floods, and mass movements (landslides/wet mass movements). Our case study on Viet Nam focused on determining, first and foremost, the most impactful types of hazards in terms of structural damage, i.e., which hazard types are responsible for destroying the greatest number of houses and, hence, triggering the highest internal displacements. To do so, we relied on data from the Viet Nam Disaster Management Authority collected by IDMC on the number of homes destroyed from 2016 to 2022. Secondly, we analysed if standalone disasters were responsible for the most destruction to houses or whether repeated hazards of similar magnitude could be the reason for the most destruction and, therefore, displacements. This analysis would allow for a better understanding of how best to build resilience in homes to ensure better protection against storms that tend to trigger the most destruction and internal displacements.

For our first analysis, we determined which hazards caused the most destruction to houses in Viet Nam between 2016 and 2022. Based on Figure 5.10, the most significant hazard is storms, accounting for 73% of total homes. This was followed by floods, accounting for 17%, and then mass movements, representing 10% of the total. Upon further disaggregation, typhoons/cyclones/hurricanes were the most destructive, resulting in 56% of the housing destruction in Viet Nam between 2016 and 2022 (Figure 5.11). This is followed by regular storms at 40%. Combined, both large-scale typhoons/cyclones/hurricanes and smaller-scale (regular) storms destroyed almost 96% of houses between 2016 and 2022. The other subtypes accounted for a minimal share: storm surges and tornadoes were each at 2%.

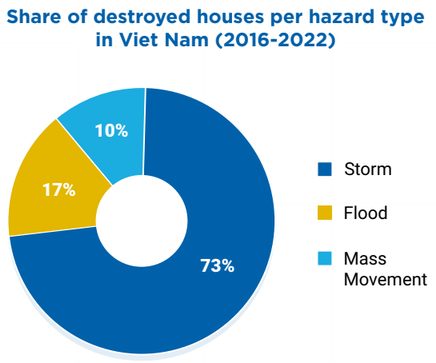

Figure 5.10 Share of total destroyed houses in Viet Nam by hazard type for the period of 2016 – 2022 (Source: Viet Nam Disaster and Dyke Management Authority [VDDMA], https://phongchongthientai.mard.gov.vn).

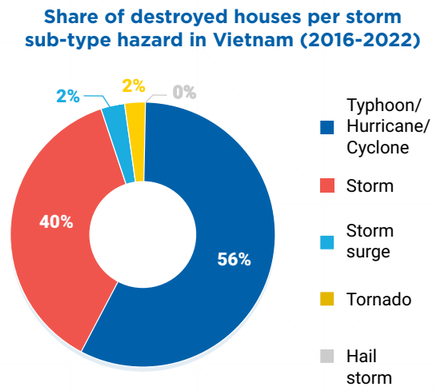

Figure 5.11 Share of total destroyed houses in Viet Nam by storm subtype for the period of 2016 – 2022 (Source: VDDMA, https://phongchongthientai.mard.gov.vn).

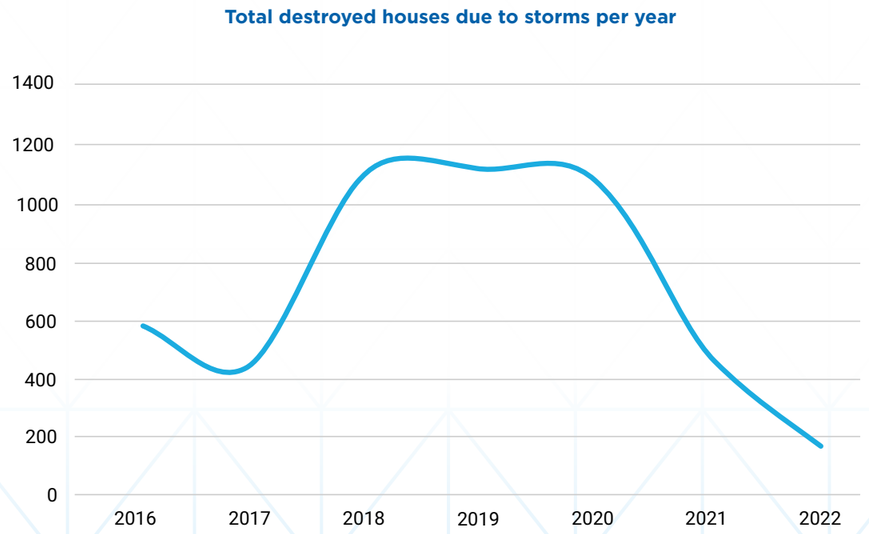

Figure 5.12: Share of total destroyed houses due to storms per year in Viet Nam for the period of 2016 – 2022 (Source: VDDMA, https://phongchongthientai.mard.gov.vn).

For the second part of our analysis, by performing a comparative analysis of the data, we found a high concentration of homes destroyed by storms for the years 2016, 2018, 2019, and 2020. Amongst these, the number of homes destroyed exceeded 1,000 for three consecutive years, with 1,094 in 2018, a peak of 1,112 in 2019, and 1,072 in 2020, marking the start of a downward trend. The latter is confirmed with a sharp drop in 2021 (463), returning to a level similar to 2017 (425), then finally a further decline in 2022 (162). These peaks can be explained in light of the various events that took place during these years. In 2016, Typhoon Nida destroyed 500 homes as it passed through Viet Nam. In 2018, Tropical Storm Son-Tinh caused heavy damage: 1,070 homes were destroyed, representing 98% of total storm damages that year. In 2019, Tropical Storm Podul battered the country, destroying 700 homes alone. In 2020, heavy storms affected the country in March (355 DH) and May (340 DH).

The downward trend may indicate that houses in Viet Nam are beginning to be rebuilt stronger and are more resilient to storm shocks, resulting in a marked decrease in housing destruction since 2020. We looked closer at the destruction incurred as a result of typhoons in the country (Figure 5.13).

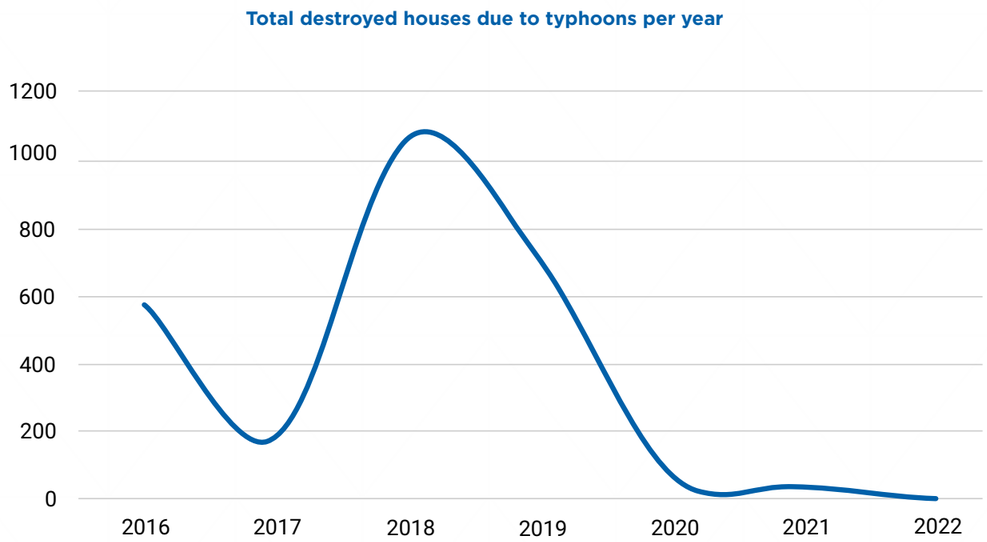

Figure 5.13: Share of total destroyed houses due to typhoons per year for the period of 2016 – 2022 (Source: VDDMA, https://phongchongthientai.mard.gov.vn).

Typhoons, which represent a sizeable proportion of storm-related destruction (56%), accounted for most of the destruction in 2016, 2018, and 2019. However, its impact was reduced to 6% in 2020, then to 7% in 2021, and then no housing was reported as destroyed by typhoons in 2022. This finding showed that while large-scale storms may be more destructive, their impact on housing is smaller than the smaller-scale storms that occur more often and, hence, trigger repeated destruction to homes. Thus, for homes to be more resilient to storm shocks, they need to resist not only the magnitude of storms, which may occur once in a while but also be resistant to repeated small-scale shocks that tend to occur.

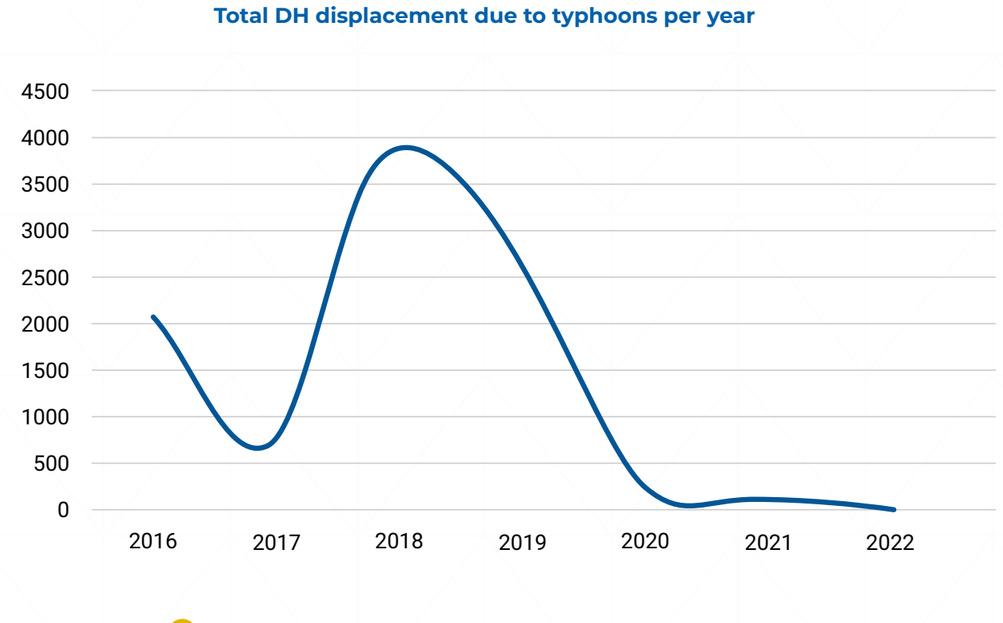

Figure 5.14: Share of total internal displacements due to typhoons per year in Viet Nam for the period of 2016 – 2022 (Source: IDMC, n.d.).

Translating the number of DH into internal displacements, we found that typhoons triggered up to 4,000 displacements during 2016 and 2022. Most typhoon displacements occurred in 2016 (2,100), 2018 (3,900), and 2019 (2,500). The period of 2018 – 2020 seems to be an outlier, which saw at least 1,000 homes destroyed annually compared to the entire period of 2016 – 2022 under study. This may primarily be explained by the typhoons that affected Viet Nam from 2018 to 2020, which were mostly large-scale and more destructive. Outside of this period, Viet Nam saw very few large-scale storms or typhoons.

While our historical data analysis has allowed us to identify certain trends, it is important to acknowledge that the occurrence of disasters remains unpredictable, and past data may not always accurately predict future events. Nevertheless, the insights gained from this data can aid in understanding the impact of disasters on infrastructure and the extent of internal displacement. It indicates the extent of damage to housing that can be incurred as a result of large-scale storms and, hence, the potential scale of displacement in these cases. It also further highlights the importance of multiple small-scale storm shocks on housing destruction and informs the need for rebuilding efforts to consider both the magnitude and the repeated nature of shocks for homes to be more resilient.

In general, all four case studies underscore the significance of collecting comprehensive information not only on climate-related aspects but also on displacement, vulnerability, and exposure to mitigate against the negative impacts of disasters on populations. Disaster management agencies play a pivotal role in consistent data collection, which, in turn, informs national-level decisions and policy development. By identifying trends based on this information, policymakers and relief organisations can optimise resource allocation and develop effective strategies to enhance resilience and disaster preparedness. Historical data on displacement trends, coupled with real-time data from weather and geological monitoring organisations, can contribute to the development and enhancement of early warning systems. These tools can then help predict potential disasters and allow authorities to take proactive measures to mitigate their impact, including pre-emptive evacuations.

5.3. Conclusion

In Southeast Asia, it is crucial for better anticipatory action if there is an enhanced understanding of not just the hazards but also the exposure of hazards to populations and the subsequent impact of hazards on populations, notably on displacement and housing destruction. Data is at the heart of any analysis. The first step toward improving efforts for better disaster preparation and resilience is to study the past.

The four case studies across Southeast Asia emphasise the benefits of data informing key aspects of resource mobilisation during periodical hazards, such as floods and storms. Additionally, they also identify key reflections that policymakers need to consider when planning for the next round of similar disasters, such as the organisation of available emergency shelters and estimation of duration of stay by evacuees, the establishment of effective communication channels, the organisation of transportation routes, the management of emergency supplies (food, water, medical supplies, and hygiene kits), the assessment on the human resources needed, the evaluation of psychosocial and educational needs, and the investment in long-term preparedness and measures (early warning systems and education). These studies revealed key insights on where frequent disasters tended to happen, how long people may remain displaced, where they tended to seek shelters, and how infrastructures can sustain damage during disasters.

These studies also mentioned some key considerations that are necessary to substantiate some of these findings. Notably, information on urban planning, population density, and the type of housing structures are some key elements that are necessary to improve the modelling of any impact-analytical model in predicting the future risk of displacement.

The availability of sex, age, and disability data also plays a significant role in understanding the complex dynamics of displacement and disaster response. With such disaggregated information, policymakers and humanitarian organisations can adapt their interventions and assistance to address specific needs. For instance, if data shows that older adults or individuals with disabilities are more susceptible to displacement, interventions can be designed to accommodate their requirements, such as accessibility or healthcare needs. In addition, it allows for the tracking of changes in the composition of displaced populations and assessing whether interventions are reaching all groups equally. As a result, disaster management agencies are increasingly offering demographically disaggregated data in their reports in order to bolster the accuracy and efficacy of their responses, as seen in the early efforts by BNPB and DROMIC.

IDMC is working closely with partners to monitor disaster displacements globally and in Southeast Asia specifically. The collection of timely data that is consistently reported allows IDMC to analyse past displacement trends and patterns to better inform disaster preparedness and mitigation policies. Such analysis and information, when shared across relevant decision-making officials, are the foundations for building sustainable and resilient disaster management solutions.

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Articles

ARMOR
ASEAN Risk Monitor and Disaster Management Review
4TH Edition
#6

Catalysing Adaptive Social Protection for Sustainable Resilience in Southeast Asia:

Gaps, Stakeholders, and Policy Mechanisms

Authors:
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#6

Catalysing Adaptive Social Protection for Sustainable Resilience in Southeast Asia: Gaps, Stakeholders, and Policy Mechanisms

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Abstract:

Ten years have passed since the Association of Southeast Asian Nations (ASEAN) declared its commitment to strengthen social protection: it should be adaptive towards multivarious risks — be it individual, social risk, or emerging and existing vulnerabilities. The stance was strengthened with the publication of the ASEAN Socio-Cultural Community Blueprint 2025, which specifically addressed the need for more adaptive social protection. To consolidate this knowledge, the ASEAN Secretariat issued Guidelines on Disaster Responsive Social Protection that entail disaster and climate risks as part of social protection. It discussed the adaptive social protection (ASP) concept in ASEAN — a combination of the traditional social protection concept with disaster and climate considerations — that increases the resilience of vulnerable communities. This article aims to identify the existing gaps and potential recommendations to achieve a resilient future. Regional findings indicate that national and local implementations have met multifaceted challenges that prevent optimal development of ASP: policies on the national and local level often exclude disaster and climate factors, do not target the right groups, and are not based on sufficient data. These inhibitions resulted in miscoordination with local stakeholders as well as inefficient and ineffective distribution mechanisms towards those in need. This research argues that current measures do not reflect the flexibility and adaptability of ASP; rather, they are rigid and inflexible. To enhance the adoption of ASP, we need to address gaps in policy frameworks, institutional capacities, and data availability at both the national and regional levels, promoting synchronised efforts, resource allocation, and collaborative initiatives for a sustainable, resilient ASEAN.

Keywords: ASEAN, Adaptive Social Protection, Sustainable Resilience

Introduction

In 2013, the Association of Southeast Asian Nations (ASEAN) Member States (AMS) pledged to enhance measures for social protection. Adaptive social protection (ASP) was developed from the idea of integrating social assistance and insurance programmes with disaster risk reduction and climate change adaptation strategies (Bowen et al., 2020; Davies et al., 2008). In the ASEAN region, the ASEAN *Socio-Cultural Community Blueprint 2025* serves as an important guide, particularly in addressing social protection (ASEAN Secretariat, 2016b). The *Blueprint* is relevant to the ASP concept, which articulates a social protection strategy that is agile and able to mitigate various risks and shocks across ASEAN countries, from the individual to the national level.

ASEAN released the *Guidelines on Disaster Responsive Social Protection* (DRSP) in 2021, which became a framework that integrates considerations of disaster and climate risks into the basic concept of social protection and pioneering ASP in Southeast Asia. This article provides insight into current gaps in ASP and the accumulated recommendations for policy mechanisms to achieve sustainable resilience in Southeast Asia through an extensive desk study using a qualitative approach. It is important to acknowledge that this article only compiles available open-access data from each AMS. Nevertheless, the result stated in this article remains credible and valuable for ASEAN and society.

The Concept and Framework of Adaptive Social Protection

ASP has been defined by various scholars and institutions and can be clustered into some perspectives:

Integrating Social Protection and Risk Management

- ASP integrates social assistance and insurance programmes with disaster risk reduction and climate change adaptation strategies (Bowen et al., 2020).
- It combines social protection systems with strategies to enhance resilience in the face of various risks (Arnall et al., 2010; Social Inclusion and Policy, 2019).
- It involves designing policies and programmes that provide support today while building the capacity to withstand future risks and uncertainties (Pelham et al., 2021).

Vulnerability Reduction Preparedness, and Learning

- ASP aims to reduce the exposure and vulnerability of individuals, families, and communities to shocks, stresses, and uncertain conditions (Social Inclusion and Policy, 2019).
- It focuses on building the capacity of vulnerable households to withstand future shocks and uncertainties (Food and Agriculture Organization [FAO], 2022).
- It allows countries to respond to immediate shocks while addressing longer-term vulnerabilities (Bowen et al., 2020).
- It emphasises flexibility and learning, with interventions regularly monitored and adjusted in response to changing circumstances (Tschakert & Shaffer, 2014).

Climate Change, Disaster Resilience, and Security

- ASP incorporates disaster risk reduction and climate change adaptation approaches into social protection measures(FAO, 2022).
- It is designed to enhance the resilience of vulnerable populations in the context of climate change and other evolving risks (Sengupta et al., 2023).
- It seeks to provide support and security for vulnerable households in the face of changing conditions (Davies et al., 2008; FAO, 2022).

Generally, the concept revolves around three main aspects — the core concept of social protection, disaster risk reduction, and climate change adaptation — to ensure resilience to shocks. As an emerging concept, the ASP framework is currently in a continuous development state. This framework consists of four main aspects, detailed through key variables, as shown in Figure 6.1 below.

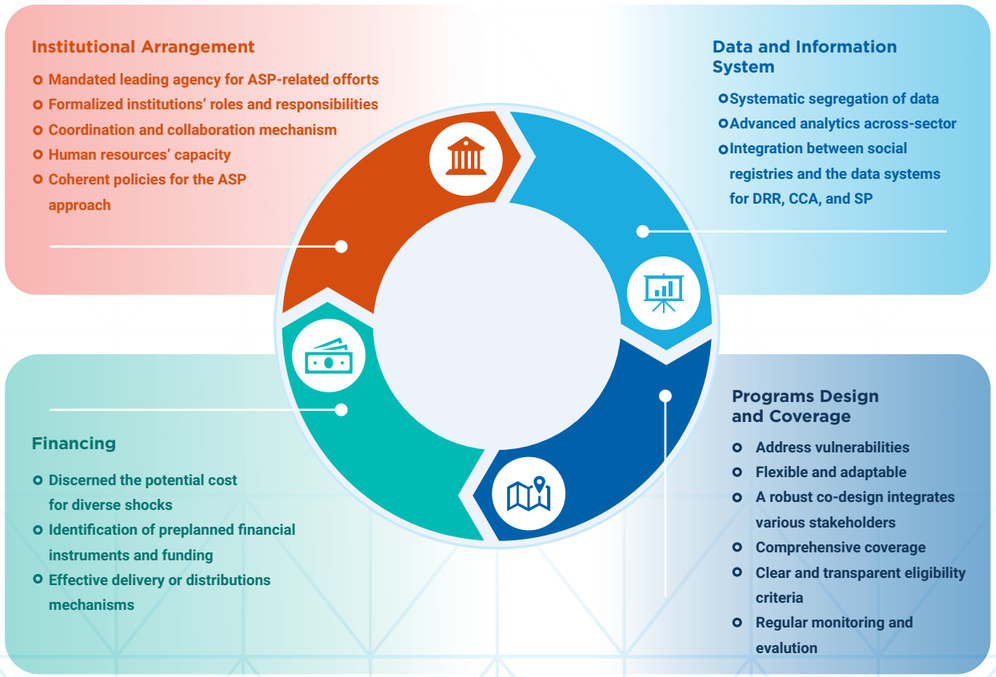

Figure 6.1. The ASP Building Blocks. *Source : Adapted from Bowen et al., 2020; BAPPENAS, 2022; Johnson & Walker, 2022*

Elements of ASP Framework and Building Blocks

Institutional Arrangements

The successful adaptation of the ASP framework demands commitment from multisectoral actors with clear and robust policies at all levels to promote effective institutional arrangements (Bappenas, 2022; Bowen et al., 2020; Johnson & Walker, 2022). This involvement is vital for enhancing capacities in preparedness, coping, and adaptation to shocks (Bowen et al., 2020). A central governing unit can enhance ASP-related efforts, facilitating effective collaboration between actors by making sure all initiatives synergise with one another and minimising redundancy. To do so, it is crucial to raise awareness to ensure ASP is well-defined and supported with the effective division of roles and responsibilities amongst different actors. This involves training, promotion, and discussion with various actors across levels.

Each country's government must formally include ASP as part of its social protection scheme, effectively defining it and laying the groundwork for its implementation. Other considerations for ASP policies and guidelines also include linkage between the country's disaster management, social protection, and the ASP approach. This consideration includes defining governing institutions to lead the implementations along with roles and responsibilities of related stakeholders, creating policy parameters for programme expansions, and creating formalised delivery service arrangements for ASP programmes (Johnson & Walker, 2022).

The successful adaptation of the ASP framework demands commitment from multisectoral actors with clear and robust policies at all levels, to promote effective institutional arrangements

Financing

In order to ensure the optimal functioning and success of ASP, securing readily available financing stands as a paramount imperative. Related actors must be able to facilitate efficient, responsive, and sustainable funding mechanisms in response to disaster and climate risks. One of the most discussed options to enable ASP efforts is by applying disaster risk financing (DRF), highlighting that shocks are foreseeable events; thus, strategies can be planned and implemented to mitigate and cope with the financial burden of shocks. This approach facilitates risk-sharing mechanisms, allowing financial burdens to be shared across different levels, ensuring financial resilience (Calcutt et al., 2022).

The DRF approach finances ASP using three main aspects (Bowen et al., 2020). The first one is done by identifying the potential costs required for diverse magnitudes of shocks. This estimation requires good quality data throughout the years to understand the ranges of the costs of different hazards, along with types of deployed social protection programmes and their scaling-up plans. Second, relevant actors must ensure the fund's availability in accordance with the DRF plan. This involves identifying pre-planned financial instruments and the necessary funding to be released promptly for timely responses. Timeliness can be achieved through identification and pre-arrangement of funding before shocks. Additionally, to ensure the accommodation of diverse ASP programmes for different levels of shocks, the implementation of a risk-layering approach can be done by identifying multiple financing options to address and mitigate risks and shocks in accordance with vulnerability levels. Lastly, effective DRF-distribution mechanisms must be designed by creating a new system or linking the DRF plan to existing delivery mechanisms. The mechanisms must also specify the government's responsibilities, along with the spectrum of financing strategies that will be modified according to the levels of shocks.

Data and Information Systems

An ASP system relies on robust data and information management to effectively address the evolving needs of vulnerable populations. To comprehensively understand the beneficiaries' circumstances, the system integrates the data from social protection, disaster risk reduction, and climate change adaptation from various sources, such as socioeconomic indicators, demographic data, and real-time monitoring. Moreover, the system requires systematic data segregation to accommodate different marginalised groups for social protection (Social Inclusion and Policy, 2019; United Nations Indonesia et al., 2020). Employing a context-specific analysis can accommodate a better understanding of the intersection of ASP between risk assessment, an early warning system, and social protection (Bappenas, 2022; Cornelius, 2018; Social Inclusion and Policy, 2019). Furthermore, enhancing seamless integration between social registries and data systems utilised by disaster risk reduction, climate change adaptation, and humanitarian sectors will heighten the social protection system's responsiveness and an early warning integrated system (Bowen et al., 2020). ASP's robust mechanism ensures that disaster and climate risk data are effectively managed in supporting responsive policy initiatives. Additionally, data sharing between actors from various sectors can potentially assist a rigorous information system. Research shows advanced analytics affects decisions for specific groups. Ultimately, the ability to harness information technology can foster flexibility and resilience, which is the cornerstone of ASP (Bowen et al., 2020; Sett et al., 2022).

Programs Design and Coverage

The core of ASP is a meticulously tailored programme design that intricately addresses vulnerabilities. This includes encouraging savings and employing flexible intervention strategies that underpin the programme's efficacy and responsiveness (Bappenas, 2022; Bowen et al., 2020). The design of ASP necessitates incorporating flexibility, allowing real-time adjustments as circumstances evolve. This adaptability is essential to address unforeseen changes and shocks (Sett et al., 2022; Social Inclusion and Policy, 2019). Ultimately, a meticulously crafted ASP programme design can ensure its dynamic potency to deliver customised and timely assistance to its beneficiaries.

A robust co-design integrates various stakeholders, such as government agencies, non-government organisations, and local communities, fostering collaboration and leveraging collective expertise (Cornelius, 2018). Simultaneously, achieving comprehensive coverage is essential. To do so, ASP requires precise demographic data, balanced geographic reach, and transparent eligibility criteria, preventing exclusion or undue inclusion of beneficiaries. Regular monitoring and evaluation would further refine programme coverage, assuring that ASP adeptly serves its intended beneficiaries while maintaining the agility to navigate unforeseen challenges by encouraging transformative investing to adapt (Bowen et al., 2020).

An ASP system relies on robust data and information management to effectively address the evolving needs of vulnerable populations. The core of ASP is a meticulously tailored programme design that intricately addresses vulnerabilities. This includes encouraging savings and employing flexible intervention strategies that underpin the program's efficacy and responsiveness

ASP in Southeast Asia

The economic impacts of natural hazards are severe. They could wipe out decades of human development investment, pushing numerous households into poverty. ASEAN needs to have an explicit focus on the poor and the most vulnerable to preserve previous investments and further reduce poverty (ASEAN Secretariat, 2021). At the regional level, several commitments related to cooperation on social protection systems in the context of disasters have been agreed upon by ASEAN, which include the following:

- The *ASEAN Declaration on Strengthening Social Protection* in 2013 and the *Regional Framework and Action Plan* in 2015 emphasise the necessity for social protection to be adaptive in responding to various hazards like disasters and climate change (ASEAN Secretariat, 2018).
- The AADMER [*ASEAN Agreement on Disaster Management and Emergency Response*] *Work Programme* 2016 – 2020 acknowledges the significance of social protection at all phases of disaster risk management (ASEAN Secretariat, 2016a)
- The 2016 *ASEAN Socio-Cultural Community Blueprint 2025* is ASEAN's commitment to strengthening social protection for those who live in climate-sensitive areas and reducing vulnerability in times of crises, disasters, and other environmental changes. It also discusses sustainable risk management financing mechanisms for social protection, particularly for disaster risk reduction and climate change adaptation (ASEAN Secretariat, 2016b).

To support these efforts, the ASEAN community has also started to develop disaster-responsive social protection systems at both the regional and national levels through direct programme experience, national policy development, and institutional mechanisms. The disaster responsive social protection systems were based on five building blocks, four principles, and approaches. The five building blocks include institutional capacity, information and data management systems, flexible programme design, flexible programme delivery, and flexible financing, which also form the core of traditional protection systems. What differentiates ASP from its conventional counterpart is the inclusion of disaster and climate risks in each of the components. In the ASEAN Guidelines on Disaster Responsive Social Protection, there are several key recommendations for each building block, such as ensuring clear mandates, roles, and responsibilities; strengthening the country's early warning and social protection information system; assessing relevant data to determine appropriate beneficiaries; simplifying the registration and enrolment process; and identifying multiple financing options to mitigate different levels of risk. Furthermore, the four principles and approaches of the disaster responsive social protection systems are do no harm, leave no one behind, flexibility and simplicity, and prepare and respond early (ASEAN Secretariat, 2021).

The Concept of Sustainable Resilience and ASP

The concept of sustainable resilience integrates three concepts: vulnerability, resilience, and sustainability. The synergy between the three allows sustainable resilience, the ability to respond to expected and unexpected outcomes over time. This concept is highly relevant for reference in the development of an integrated framework to guide informed risk-based decision-making for sustainable and resilient systems (Gillespie-Marthaler et al., 2019a).

In the 2022 Global Platform of Disaster Risk Reduction forum in Bali, the concept of sustainable resilience was introduced as the approach that ensures the existing properties of a system are maintained to respond to systemic risk challenges. During the 2023 ASEAN Summit in Jakarta, the ASEAN Leaders' Declaration on Sustainable Resilience was also highlighted as a strategy to enhance collaboration in strengthening climate and disaster resilience for sustainable development. Beyond resilient infrastructure planning, another crucial part of achieving sustainable resilience is the social capital aspect, as the core of achieving resilience revolves around people. Considerations of community resilience components are needed to ensure the achievement of community-focused sustainable resilience. This community level of sustainable resilience can be achieved by identifying the need to survive, achieving a certain level of well-being, and being prepared for emergency conditions as a form of preparation, response, and recovery from occasional shocks (Gillespie-Marthaler et al., 2019b). The implementation of ASP can contribute to the increase of adaptive capacity to achieve sustainable resilience.

Current conditions of ASP in AMS

Brunei Darussalam

Brunei Darussalam has a low disaster risk level based on the INFORM (Index for Risk Management) Risk Index ("INFORM Country Risk Profile," n.d.), such as thunderstorms, monsoon rains, smog, flash floods, landslides, and rising surface-level temperatures (Center for Excellence in Disaster Management and Humanitarian Assistance [CFE-DM], 2022). In response to these threats, the government aims to strengthen social protection through various actions, such as building public schools and providing access to health systems, affordable housing, retirement benefits, and pensions for the elderly and disabled. According to Hajah (2010), the budget for social protection can be obtained from the public sector, private firms, charities, and self-funding. Brunei Darussalam mainly relies on government coordination between actors to finance these services. While the Brunei Darussalam Government has yet to formally embrace ASP within its social protection policy, the measures it has undertaken via the National Disaster Council seamlessly integrate disaster risk protection (CFE-DM, 2022). This aligns with the ASP approach, underscoring their commitment to ensuring comprehensive protection for vulnerable groups, particularly those impacted by disasters.

Cambodia

Cambodia has a medium disaster risk level based on the INFORM Risk Index ("INFORM Country Risk Profile," n.d.). It is also projected to experience a rising surface temperature and other sudden-onset disasters, such as storms, floods, and droughts (CFE-DM, 2020; Phy et al., 2022). The government specifically addressed ASP in the Cambodian Climate Change Strategic Plan and implemented a national social protection policy called the Social Protection Policy Framework. The manifestation of ASP is seen through several aspects: the promotion of micro-financing that makes credits more accessible for local communities, the proliferation of insurance schemes for climate and disaster risks, the integration of gender aspects in climate change response plans, and the surge in collaboration with local institutions on climate adaptation (National Climate Change Committee, 2013).

Indonesia

Indonesia ranks 48th in the INFORM Risk Index for medium disaster risk (Badan Nasional Penanggulangan Bencana, 2022; "INFORM Country Risk Profile," n.d.), including floods, droughts, sea level rise, and others. Currently, Indonesia's social protection system is divided into contributory and non-contributory schemes. The former refers to health and employment insurance, while the latter refers to social assistance programmes from the government (Rahayu Kusumastuti et al., 2018). The government included the ASP concept in the National Medium- and Long-Term Development Plans (Maliki, 2021). Indonesia is currently developing a roadmap, which covers the four pillars of ASP: encompassing strong coordination and partnership, integrated data and information, programme enhancement and coordination, and financing (ILO, 2023). The Ministry of Social Affairs has previously designed an Adaptive Family Hope Programme/*Program Keluarga Harapan Adaptif* that specifically targets victims of "natural disasters, social disasters, and remote indigenous communities" (Ministry of Social Affairs, 2021). Other ministries, in tandem with the Ministry of Social Affairs, started ASP-related initiatives such as the Disaster Resilient Village/*Desa Tangguh Bencana*, a community-based disaster risk reduction programme run by the National Disaster Management Agency/*Badan Nasional Penanggulangan Bencana (BNPB)*, and the Climate Village Programme/*Program Komunitas Untuk Iklim*, a national programme to enhance local stakeholders' knowledge of climate change adaptation and mitigation (BNPB, 2012; Rijhwani & Singh, 2019).

Lao PDR

The country has low exposure and low risk of natural hazards. Nonetheless, climate change has increased the intensity of disasters, which makes the country extremely vulnerable due to Lao PDR's lack of coping capacity (CFE-DM, 2021; Farhat, 2019; "INFORM Country Risk Profile," n.d.). Lao PDR's social protection includes health insurance, social security, and social welfare, with a specific focus on access to healthcare, food, and education. The country has not formally adopted the ASP concept. However, its welfare schemes cover victims of disasters with additional clauses that protect marginal groups (Ministry of Labour and Social Welfare, 2020). One of the programmes, Community-Based Disaster Risk Reduction, provides opportunities for locals to restore their socioeconomic conditions and reduce the impact of hazards. Moreover, the government's projects, Village Disaster Prevention Units and Village Disaster Prevention and Control Committees, promote resilience with early warning systems and climate-friendly practices to cope with climate change (Ministry of Natural Resource and Environment, 2016). Unfortunately, Lao PDR's social protection is not fully mature because it focuses on short-term relief rather than prevention and recovery.

Malaysia

Malaysia is categorised as a low disaster risk country on the INFORM Risk Index ("INFORM Country Risk Profile," n.d.). This risk, along with other factors, has pushed part of the Malaysian population below the poverty line. Like most AMS, ASP has yet to be formally enshrined in Malaysian law. Currently, social protection policies range from contributory insurance schemes to non-contributory interventions to promote individuals' resilience and economic participation (Hamid et al., 2021). One of the most common problems caused by climate change is food scarcity. To address this, the government established the Agro-Food Takaful Insurance for farmers and other food industry sectors. During the implementation phase, the data that is used mostly comes from the Poverty Eradication Portal/Portal Pembasmian Kemiskinan. It supports the formulation of initiatives such as community-based disaster risk management that aims to raise awareness, skills, and knowledge on preparedness before, during, and after disasters (Mercy Malaysia, 2019). Unfortunately, several factors adversely affected Malaysia's social protection — preventing effective and efficient realisation. These include inaccurate and expired data, the lack of coverage for marginal groups, uncoordinated and fragmented social protection initiatives, and the lack of financing options and human resources (Hamid et al., 2021).

Myanmar

Myanmar is highly vulnerable to natural and human-caused hazards, having the highest hazard and exposure risk level based on the INFORM Risk Index ("INFORM Country Risk Profile," n.d.). It is estimated that 17.6 million people will require humanitarian assistance (Mangahas & Lynn, 2023). Myanmar has yet to create any policies specifically mentioning the ASP approach. Fortunately, several initiatives are aimed at improving resilience, such as the Myanmar Action Plan on Disaster Risk Reduction. An inter-agency task force was also established to ensure the AADMER's execution. To support implementation, the government created the Costed Social Protection Sector Plan, Myanmar Medium-Term 2018 – 2023 — policy structures that link social protection and disaster risk management (Social Protection Sub-Sector Coordination Group, 2018). A few examples of interventions to face climate change are the promotion of cash assistance for rehabilitation and reconstruction activities, provision of public works programmes to increase livelihoods in vulnerable areas, creation of resilient communities, and formulation of climate infrastructure plans and livelihood diversification plans (Dutta, 2015). However, Myanmar still faces issues in ensuring the availability of good quality data and effective information systems, fulfilling funding gaps, and creating more proactive programmes for resilience. Notably, the country is also faced with challenges derived from hierarchical and top-down policymaking approaches when dealing with disparities, underscoring the importance of expanding democracy through increased institutional involvement and strengthened consultative approaches. With no specific ASP approach strategy, disaster risk reduction and climate change adaptation must also be further mainstreamed into social protection efforts (Perwaiz et al., 2020a).

The Philippines

As an archipelagic country, the Philippines' risks of natural hazards are amongst the greatest in the world. The country ranks 29th on the INFORM Risk Index, in the high-risk category, and it is expected to increase due to climate change ("INFORM Country Risk Profile," n.d.; World Bank Group & Asian Development Bank, 2021). The country has not formally included ASP in its system. However, the concept can be seen from existing initiatives, which encompass emergency relief, rehabilitation services for disaster-affected individuals, assistance for children with special needs, support for persons with disabilities, and provisions for the elderly. For instance, the Conditional Cash Transfer Programme (Pantawid Pamilyang Pilipino Programme) has successfully supported the response and early recovery effort for Typhoon Haiyan in 2013 – 2014 (Cho et al., 2021). Despite no formal ASP scenario, the link between social protection with disaster and climate risk is well-developed in the Philippines (Bowen et al., 2020). There are several scenarios for funding, with the prime candidates being the National Disaster Risk Reduction and Management Fund and the Quick Response Fund, but the implementation is insufficient (Bowen, 2015).

Singapore

Singapore faces climate risks from its coastal geography and urban setting. The threat encompasses rising sea levels leading to erosion and flooding, heat stress from urban heat islands, intense rainfall causing flash floods, and other potential impacts from extreme weather (Climate Change Knowledge Portal, n.d.). The nation is equipped with comprehensive and universally available social protection mechanisms, ensuring access to healthcare, housing, education, and targeted assistance for marginal groups (Waring et al., 2022). Nevertheless, similar to other AMS, the concept of ASP is not explicitly enshrined in its laws, leading to a lack of well-defined policies that effectively address disaster risk reduction and climate change adaptation efforts (Perwaiz et al., 2020). The financial resources allocation for these endeavours and future funding for developments remain uncertain and unclear.

Thailand

Climate change will intensify Thailand's current risk, including other hazards such as rising sea levels (World Bank Group & Asian Development Bank, 2021). There is no explicit mention of ASP in the country's laws or policies, leading to challenges in the effective implementation of social protection related to disaster risk reduction and climate change adaptation. The combination of funding transfer issues and lack of reliable data give rise to crucial problems in Thailand's social protection landscape. The problems manifest from a lack of social protection expenditure and the suboptimal government capacity to respond to shock, amongst others. Financing can be challenging due to unclear budget allocation and transfer between different segments of financing. Lastly, inaccurate and hard-to-read data hinders community participation in disaster management. For example, Thailand's Department of Disaster Prevention and Mitigation website has scattered data, leading to difficulty in comprehension, be it for the public or experts alike.

Viet Nam

Viet Nam is one of the world's top five most vulnerable countries to climate change. It frequently threatens the country's 96 million people and economic assets concentrated along its long, densely populated coast (USAID, n.d.). Its low-lying coastal and river delta regions have very high vulnerability to rising sea levels (World Bank Group & Asian Development Bank, 2021). The research indicates that without effective adaptation, 6 – 12 million people will potentially be affected by coastal flooding by 2070 – 2100 (World Bank Group & Asian Development Bank, 2021). The country's social protection scheme does not put much emphasis on disaster risk reduction and climate change adaptation, which leads to challenges in ASP implementation. The primary challenge is institutional in nature; the lack of a central governing body creates fragmentation across different sectors to address disaster and climate risks (Nguyen & O'Keefe, 2019). Furthermore, the absence of a clear financial management system for disaster risk reduction and climate change adaptation leads to no effort nor budget for monitoring and evaluating social protection policies (Nguyen & O'Keefe, 2019).

ASEAN Member States	Institutional Arrangements					Financing			Data and Information System			programme Design and Coverage					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Brunei Darussalam	N/A	N/A	✓	N/A	X	N/A	✓	✓	N/A	N/A	N/A	✓	N/A	✓	✓	✓	✓
Cambodia	✓	N/A	✓	N/A	✓	✓	✓	✓	N/A	N/A	✓	✓	N/A	✓	✓	N/A	✓
Indonesia	✓	N/A	✓	✓	✓	N/A	✓	✓	✓	✓	N/A	✓	N/A	N/A	✓	✓	✓
Myanmar	✓	✓	N/A	X	X	✓	✓	X	X	X	N/A	✓	✓	X	X	N/A	✓
Lao PDR	N/A	N/A	✓	N/A	N/A	N/A	✓	N/A	N/A	N/A	N/A	✓	N/A	N/A	N/A	✓	N/A
Malaysia	✓	✓	N/A	X	X	✓	✓	X	X	N/A	X	✓	N/A	N/A	X	N/A	✓
Singapore	N/A	N/A	✓	✓	N/A	N/A	✓	✓	✓	✓	N/A	✓	N/A	N/A	✓	✓	✓
Thailand	✓	✓	✓	N/A	N/A	N/A	✓	N/A	X	X	N/A	✓	✓	✓	N/A	✓	N/A
The Philippines	N/A	N/A	N/A	✓	N/A	✓	✓	✓	N/A	✓	✓	✓	N/A	N/A	✓	✓	✓
Viet Nam	X	N/A	N/A	✓	N/A	✓	N/A	N/A	✓	N/A	N/A	✓	✓	N/A	✓	✓	N/A

Note: N/A: Not applicable/not available

Table 6.1. Summary of ASP Building Blocks Implementation in the AMS

Variables for each building blocks are as follow

- Institutional Arrangements: 1) Mandated leading agency for ASP-related efforts; 2) Formalised institutions' roles and responsibilities; 3) Coordination and collaboration pathway and mechanism; 4) Human resources' capacity for ASP implementation; 5) Coherent policies for the ASP approach
- Financing: 6) Spot the potential cost for diverse shocks; 7) Identification of pre-planned financial instruments and funding; 8) Effective delivery or distribution mechanisms
- Data and Information System: 9) Systematic data segregation; 10) Advanced analytics across the sector; 11) Integration between social registries and the data systems for disaster risk reduction, climate change adaptation, and social protection
- Programme Design and Coverage: 12) Address vulnerabilities; 13) Flexible and adaptable; 14) A robust co-design integrates various stakeholders; 15) Comprehensive coverage; 16) Clear and transparent eligibility criteria; 17) Regular monitoring and evaluation

Discussion: Catalysing ASP for Sustainable Resilience of Southeast Asia

AMS has varying levels of social protection. Some have sufficiently covered ASP, while others have not. While most have not formally used the concept, its manifestation can be seen from the inclusion of disaster risk reduction and climate change adaptation aspects in each Member State's social protection schemes. To further strengthen existing measures, it is important to support the development of a disaster responsive social protection system as a foundation required to enhance ASP systems. As a relatively new concept, it is important for ASEAN to promote regional cooperation, mainstream the ASP strategy concept, and engage in collaborative advocacy. These efforts will facilitate a deeper understanding of ASP and its place in the regular social protection scheme. Comprehensive ASP in each AMS facilitates effective implementations and allows the region to achieve sustainable resilience.

Institutional Arrangements

ASP requires well-built, institutionalised support involving each AMS's diverse government and non-governmental institutions. As mentioned in Table 6.1, some of the AMS (e.g., Indonesia, Thailand, and Cambodia) have appointed leading agencies for ASP-related efforts and developed collaborative mechanisms to implement them. This condition supports coordination and collaborative mechanisms as stated by Bowen (2015). Unfortunately, most AMS have not formally adopted the concept in their laws and policies. Furthermore, it is crucial to have clear guidelines in order to facilitate coherent policy (Johnson & Walker, 2022); however, most AMS are still lacking in this category. To respond to the problem, ASEAN could address this issue by developing a standardised ASP framework endorsed by ASEAN, which can be developed from the DRSP and ASEAN Framework and Action Plan on social protection. Those two existing documents could provide a common foundation and guidelines for AMS. This effort can then manifest into an ASEAN-level council dedicated to ASP in facilitating coordination and supporting collaboration amongst AMS.

Financing

Financing constitutes a pivotal yet challenging aspect in cultivating an enabling environment for the implementation of ASP in Southeast Asia. Most AMS schemes often have inadequate coverage, lacking quality and consideration for marginal groups due to limited budgetary allocations, inadequate resource mobilisation, and the absence of flexible funding mechanisms. Based on Table 6.1, all AMS have deployed or continue to improve diverse financial instruments to mitigate, cope, and recover from financial burdens resulting from disasters while also improving people's financial resilience. In Indonesia, for example, regulations are currently being implemented to strengthen the risk-layering approach. Additionally, most AMS have effective delivery mechanisms that also identify the potential costs of different shocks in an effort to maximise ASP programmes.

Nevertheless, the integration of a social protection, disaster risk reduction, and climate change adaptation financing strategy has yet to be undertaken by most AMS due to the complexity of integrating the existing system, lack of baseline regulation to support the ASP efforts, or lack of resources to implement the integration. Efficient financing for ASP involves not just securing funding but also establishing pre-arranged mechanisms for DRF, public financial management, and shock-responsive social protection (SRSP) (United Nations Children's Fund-Regional Office for East Asia and the Pacific, 2023). For instance, these mechanisms may involve upscaling of the forecast-based financing/early warning action and DRSP programmes by ASEAN that optimise the awareness for financing and incorporate the risk data for SRSP. By incorporating these pre-arranged mechanisms, exploring innovative financing aspects, and providing impetus for regional cooperation to enhance the national capacity in upscaling ASP, ASEAN could create a more holistic and integrated approach to addressing both the ASP needs and financial challenges associated with disasters and climate change in the region.

Data and Information System

ASP requires explicit integration between social registries and the data systems utilised by disaster risk reduction, climate change adaptation, and humanitarian sectors (Bowen et al., 2020). Nonetheless, AMS rarely successfully integrates social protection, disaster risk reduction, climate change adaptation, and humanitarian considerations in data and information systems. Further, data inequality is prevalent in the region. Most AMS suffer from systemic segregation and a lack of advanced analytics to support ASP policies. Thus, through the standardised framework by ASEAN and the current initiative for risk assessment and monitoring at the regional level from the AHA Centre — the ASEAN Disaster Information Net and Regional Risk and Vulnerability Assessment — AMS can be enhanced into the integration of social protection, climate change adaptation, disaster risk reduction, and humanitarian data at the regional level. That will promote interoperability amongst AMS.

Programme Design and Coverage

ASP proactively addresses vulnerability, agility, and adaptability for a better understanding of risks (Bappenas, 2022; Bowen et al., 2020). Most AMS show an understanding of vulnerability. However, the defining features of ASP — flexibility and adaptability — are often neglected, causing misunderstanding of the concept as rigid, ultimately hindering effective implementation (see Table 6.1). The concept requires robust co-design and integrates various stakeholders to foster collaboration and leverage collective expertise (Cornelius, 2018). Only Brunei Darussalam, Thailand, and Cambodia openly address the vitality of co-design for the ASP programme.

On the other hand, most AMS excel in monitoring and evaluating ASP schemes, which could potentially be a stepping stone for greater recognition of ASP. A robust ASEAN approach to programme design and coverage involves collaborative co-design, coordinated cross-border efforts, standardised monitoring, inclusive strategies, harmonised targeting, and adaptive learning networks. The alignment collaboration on risk assessment and monitoring at the regional level is also a big opportunity to ensure that ASP initiatives are well-designed and effectively address diverse regional needs.

Currently, there exist notable gaps in establishing an enabling environment for ASP, both regionally and nationally. At the AMS level, disparities in policy frameworks, institutional capacities, and data availability hinder seamless ASP implementation. Limited financial resources and varying levels of political commitment further impede progress. At the regional level, the organisation struggles to ensure effective collaboration. Even though it provides a platform for dialogue, it is plagued by the lack of a standardised ASP framework, harmonised guidelines, and a dedicated mechanism for knowledge. Bridging these gaps requires synchronised policy efforts, capacity-building initiatives, and resource allocation within each AMS and through intensified regional cooperation facilitated by ASEAN.

Conclusion and Recommendation

In response to the diverse risks in Southeast Asia, ASEAN countries have established tailored social protection systems that cater to vulnerable groups. These systems are backed by structured coordination and well-planned financing. While only a few nations explicitly use the term ASP, countries like Cambodia, Indonesia, Malaysia, and Myanmar have innovatively combined social protection, disaster risk reduction, and climate change adaptation strategies. Although not using the ASP term, others possess responsive social protection systems for emergencies, which is crucial for inclusivity.

To amplify ASP's adoption nationally and regionally, addressing gaps in policy frameworks, institutional capacities, and data availability is paramount for seamless ASP implementation. At the national level, AMS need to allocate adequate resources and demonstrate political commitment. Additionally, AMS must augment budgetary allocations, mobilise resources, and implement flexible funding mechanisms for ASP, including DRF and SRSP. Prioritising the successful integration of social protection, disaster risk reduction, climate change adaptation, and humanitarian considerations in data systems is essential, along with addressing data inequality.

Regionally, ASEAN should intensify efforts to provide a standardised ASP framework, harmonised guidelines, and a dedicated knowledge-sharing mechanism. This endeavour requires synchronised policy efforts, capacity-building initiatives, and resource allocation, fostering enhanced regional cooperation facilitated by ASEAN. Then, ASEAN's commitment to regional cooperation can facilitate best practices, policies, and expertise sharing amongst AMS. By fostering collaboration amongst governments, international organisations, and civil society, ASEAN aids in designing effective ASP frameworks that address evolving challenges. This design involves anchoring strategies on the four ASP pillars, connecting social protection, disaster risk reduction, and climate change adaptation for coherent policies. Engaging multisector stakeholders in programme design and planning, alongside robust socioeconomic data, enhances targeted initiatives. Collective exploration of innovative financing mechanisms and potentially establishing a regional fund should be encouraged. A resilient financing approach like DRF ensures sustained impact, while a monitoring system ensures communities adapt to shocks. ASP stands as a key driver in bolstering social capital for sustainable resilience in ASEAN. Synchronised policy efforts should be promoted through dialogues amongst AMS to address existing gaps and facilitate regular policy reviews. These recommendations aim to create a more unified and collaborative approach to achieve sustainable resilience across the ASEAN region.

Further discussion also requires ensuring that ASP-defining features — flexibility and adaptability — can be extended beyond the climate change and disaster aspect. For example, this expansion can be done by integrating other hazard issues, such as outbreaks and social conflict. Exploring additional collaborations between related institutions at the national and regional levels (e.g., the AHA Centre, national governments related to social affairs, disaster management, and climate change mitigation) could further bolster efforts to support the ASEAN region, fostering a collective initiative and facilitating cooperation in implementing ASP.

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Articles

ARMOR
ASEAN Risk Monitor and Disaster Management Review
4TH Edition
#7

Unveiling the ASEAN-Civil Society Partnership:

Navigating Disaster Resilience through Collaboration

Authors:
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#7

Unveiling the ASEAN-Civil Society Partnership: Navigating Disaster Resilience through Collaboration

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Abstract:

This article examines the Association of Southeast Asian Nations (ASEAN) and civil society organisation (CSO) engagements in disaster risk reduction (DRR) and management. More specifically, it seeks to understand the foundations, existing collaborative practices, and potential paths to strengthening the collaboration between ASEAN and CSOs in building disaster resilience in the region. Our data is primarily based on analysis of over 20 key ASEAN documents, which uncovered different strategic components in existing ASEAN work plans where the expertise of CSOs was heavily drawn on and areas where there were less explicit roles for CSOs. This research aims to provide a valuable tool to aid ASEAN and CSOs in enhancing the foundation of proven practices and partnerships, laying the groundwork for future endeavours in the area of DRR and management. Despite a prevailing narrative of adversarial ASEAN and CSO relations in the broader literature, with recent positive developments, the study highlights promising practices and their strengths and gaps, which can serve as a foundation for further development and collaboration.

Keywords: civil society organisation, disaster risk reduction

Introduction

Achieving a safe, sustainable, and resilient future is one of the top priorities of the Association of Southeast Asian Nations (ASEAN) (ASEAN, n.d.). In particular, one of the main components of key ASEAN frameworks, such as the ASEAN Community Vision 2025, ASEAN Socio-Cultural Blueprint 2025, and the ASEAN Vision 2025 on Disaster Management, is enhancing the capacity to collectively respond and adapt to current challenges and emerging threats, including disasters (ASEAN, 2015a, 2016; ASEAN Secretariat, 2016a). In order to achieve this, ASEAN recognises that multistakeholder partnerships are paramount (ASEAN, 2016; ASEAN Secretariat, 2016a). To this end, it has instituted a number of declarations and mechanisms to gather relevant ASEAN partners, including civil society organisations (CSOs). One example is the ASEAN Declaration on Action to Strengthen Emergency Relief (ASEAN, 2012, 2013, 2015b; ASEAN Secretariat, 2017, 2020, 2022).

This article examines ASEAN-CSO relations and engagements in the specific area of disaster risk reduction and management (DRRM). The necessity to act collectively and draw on the strengths of CSOs has been demonstrated by recent disaster events in the region (Charter for Change, 2019; Office for the Coordination of Humanitarian Affairs [OCHA], 2023; Philippines Humanitarian Country Team, 2022). To understand their role in disaster contexts, we bring together in this article insights from a review of relevant ASEAN documents supplemented with in-depth interviews with two experienced CSO leaders in the region, particularly from the Philippines and Indonesia. CSO representatives from these two countries were chosen because of their experiences, particularly in engaging with ASEAN, as well as their context in relation to disaster risk and civil society presence.

After the introduction, the article is divided into three main sections:

- Section 2 examines the existing literature on ASEAN-CSO relations to understand the histories and trends that situate the current study.
- Section 3 lays the foundations for ASEAN-CSO work on DRRM by analysing key ASEAN documents, uncovering different strategic components (e.g., preparedness and mitigation) in existing work plans where the expertise of CSOs was heavily drawn on and in areas where there were less explicit roles for CSOs (e.g., early warning and monitoring).
- Section 4 outlines how these visions and plans translated into action and what has been achieved as a result of ASEAN-CSO engagements on DRRM. Here, we highlight promising practices in three areas: institutionalised mechanisms for ASEAN-CSO partnerships, platforms for capacity and knowledge exchange, and other entry points for engagements and advocacies. In outlining these practices and results, the article includes perspectives and recommendations from CSO leaders on how these existing relations can be further leveraged to create an enabling space for ASEAN-CSOs to work together.

In the conclusion, we highlight how these existing ASEAN-CSO visions and collaborations on DRRM can be leveraged when identifying the region's priorities on sustainable resilience. We identify some key recommendations in strengthening the path forward for ASEAN-CSO collaborations to support a sustainable and resilient future in the region. We hope this piece provides a valuable tool to aid ASEAN and CSOs in enhancing the foundation of proven practices and partnerships, laying the groundwork for future endeavours in the area of DRRM.

Understanding the Broader ASEAN-CSO relations

There is a broad body of work that examines the general state of ASEAN-CSO relations (e.g., Chong & Elies, 2015; Gerard, 2014; Nogra, 2023). This literature helped this study gain a historical and more expansive view of ASEAN and CSO engagements (as will be discussed below). Some of the existing work provided analysis on the different spaces of engagements between ASEAN and CSOs, its opportunities and limitations (e.g., Chandra et al., 2017; Chong & Elies, 2015; Gerard, 2014; Nogra, 2023). Others explored the ASEAN-CSO working relationships on specific thematic areas such as human rights (Shigemasa, 2013) or gender (Carmel et al., 2018). While the evidence of ASEAN and CSO work is growing, there is limited focus in relation to their collaborations in DRRM thus far, which is the focus of this study.

ASEAN began its engagement with CSOs when the accreditation system was established in 1979, and the official guidelines were released in 1986 (Anwar, 1994, p. 246, as cited by Chandra et al., 2017; Gerard, 2014, p. 83; Thi Ha 2016). In the Guidelines on Accreditation of Civil Society Organisations (CSOs), which is also reflected in the ASEAN Engagement with Entities (ASEAN Secretariat, 2016b, p. 4), ASEAN defines CSO as a "non-profit organisation of ASEAN entities, natural or juridical, that promotes, strengthens, and helps realise the aims and objectives of the ASEAN Community and its three Pillars – the ASEAN Political-Security Community, the ASEAN Economic Community and the ASEAN Socio-Cultural Community."

The formal systems established in this period have evolved but remain characterised by a limited conception of the types of CSOs that might contribute to ASEAN-led forums and the roles they can play (Anwar, 1994, p. 246, as cited by Chandra et al., 2017). It was only during the period of the late 1990s to the early 2000s that the engagement between ASEAN and CSOs saw a steady increase both in terms of the nature of participation and the thematic issues covered (Gerard, 2014). Several ASEAN pronouncements released during this period paved the way for the organisation's recognition of CSOs' role in achieving a stable and peaceful region. The ASEAN Vision 2020, released in December 1997, for example, stated that:

> **"We envision a socially cohesive and caring ASEAN where hunger, malnutrition, deprivation and poverty are no longer basic problems, where strong families as the basic units of society tend to their members, particularly the children, youth, women and elderly, and where the civil society is empowered and gives special attention to the disadvantaged, disabled and marginalized and where social justice and the rule of law reign [emphasis added]" (ASEAN, 1997).**

Since then, more spaces and mechanisms have been opened to encourage more engagements between ASEAN and civil society to address different issues in the region. Aside from the established CSO accreditation system, there were informal consultations organised by various ASEAN bodies and annual sectoral dialogues between government officials, CSOs, and other concerned stakeholders. The ASEAN People's Assembly, ASEAN Civil Society Conference, the Regional Tripartite Social Dialogue, the ASEAN-ISIS [Institutes of Strategic and International Studies] Colloquium on Human Rights, the Dialogue on Democracy and ASEAN Integration, and the AADMER [ASEAN Agreement on Disaster Management and Emergency Response] Partnership Group (APG) are amongst ASEAN-recognised spaces where ASEAN officials and CSOs interact (ASEAN Civil Society Conference/ASEAN Peoples' Forum, n.d.; ASEAN Intergovernmental Commission on Human Rights, n.d.; ASEAN Secretariat, 2020).

Thematic platforms for issue-based discussions were also built over the years, which function well to consolidate CSO efforts to consult, organise events and campaigns, and submit recommendations for ASEAN Secretary consideration. CSOs themselves also organise "a variety of official events, including workshops, forums and even the drafting of agreements," which had wider CSO participation with less direct engagement from ASEAN. (Gerard, 2014a, p. 138, as cited by Nogra, 2023)[1] The political scientist and scholar of international relations Kelly Gerard (2014) categorised these "sites of participation" as shown in the figure below.

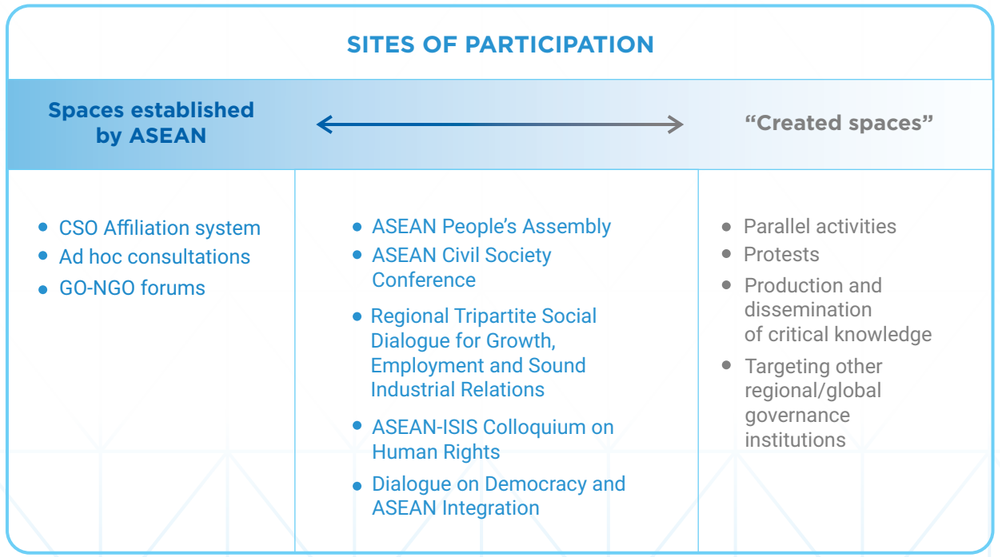

Figure 7.1. Modes of participation for CSOs in ASEAN (Source: Gerard, 2014).

[1] For example: https://www.civicus.org/documents/ASEAN-EU-CSO-Statement-Oct2022.pdf

ASEAN and CSO engagements resulted in different impacts. For example, the scholar Consuela Lopa (2015) noted that "One of the most tangible policy achievements of civil society is the enshrinement of human rights, as understood by international norms and standards, in the ASEAN Charter. This represents a major policy change for ASEAN and has potentially significant implications" (p. 153). The achievement was enabled by the extended engagement of Track Two actors (ASEAN ISIS) and the Regional Working Group for an ASEAN Human Rights Mechanism, an upward push from the civil society Solidary for Asian People's Advocacy Task Force on ASEAN and Human Rights and coupled with pressure from Western dialogue partners like the European Union (Chong and Elies, 2015; Lopa, 2015). Influencing institutional change within ASEAN through the creation of ASEAN mechanisms, such as the ASEAN Intergovernmental Commission on Human Rights, the ASEAN Commission on the Promotion and Protection of Women and Children, and the ASEAN Development Fund, was also seen as a key contribution from CSOs. In particular, Chong and Elies (2015) saw that the "establishment of the AICHR [ASEAN Intergovernmental Commission on Human Rights] in 2009 … would not have been possible without the sustained voices of ASEAN CSOs, and the coordinated efforts of ASEAN officials, individual governments and policymakers" (p. 27).

Despite the steady increase in the level of interactions between CSOs, ASEAN, and their achievements when working together, there is also a scholarly consensus pointing to the limitations of ASEAN-CSO relations. Nogra (2023) examined this literature and categorised the factors that limited engagements between ASEAN and CSOs: (1) the inherent limitations imposed by ASEAN in the engagement spaces, (2) the lack of institutionalisation of the engagements, (3) the hesitancy of the ASEAN Member States, and (4) civil society fragmentation in the region. This literature also highlighted key areas of improvement for both ASEAN and CSOs if they are to work together, including the need for ASEAN to develop its own competencies and structures in order to enhance processes for consultations with CSOs and for CSOs to improve their regional advocacy capacities (Chong and Elies, 2015; Lim, 2015).

At present, there is limited understanding of whether the trends observed on general ASEAN-CSO engagements, as described above, apply to the specific area of ASEAN's efforts on disaster risk reduction (DRR) to support sustainable resilience. This article seeks to contribute to this gap by identifying existing engagements between ASEAN and different types of CSOs in the area of DRRM. More specifically, we explore these questions in the following sections: Does the overall architecture of ASEAN — which scholars describe as placing limits on CSOs' participation in its governance and decision-making — influence the extent to which CSOs in the region can meaningfully contribute to disaster management? Or is it that in the area of disaster management, there are more opportunities for CSO participation in ASEAN as compared to other thematic issues? If so, what could potentially explain this, and how can this be replicated across different issues?

Laying the Foundation: CSOs' Inclusion in Key ASEAN Plans, Policies, and Frameworks on DRRM

Increasing and broadening stakeholder support is one of the key defining features of ASEAN's efforts to enhance disaster management in order to contribute to resilience in the region (ASEAN, 2015b; ASEAN Secretariat, 2016a). Below, we map the specific ways ASEAN envisions the role of CSOs in the space of DRRM by examining key ASEAN plans, policies, and frameworks. This provides an important entry point and context in which ASEAN sees the work and contribution of CSOs. We end the discussion with a snapshot of DRRM policies in the Philippines and Indonesia to situate CSOs' role at the national level and how this influences their role at the regional level.

ASEAN Vision on Disaster Management and Resilience

Statements and declarations are expected to be succinct and are focused on overall visions and directions from the perspective of ASEAN Member States compared to frameworks for implementation (ASEAN, 2004). These documents are not expected to provide detailed operationalisation of different actors' roles (including that of CSOs). Nonetheless, these documents are important precisely as they are "issued or adopted by ASEAN Member States that appear to reflect their aspirations and/or political will" (ASEAN, 2004).

Overall, the five key ASEAN declarations and vision documents[2] highlight the importance of "collectiveness" and multistakeholder engagements in the implementation of DRRM in the region. For example, the ASEAN Declaration on Institutionalising the Resilience of ASEAN and its Communities and Peoples to Disasters and Climate Change, adopted in April 2015, encourages:

> "… all stakeholders to participate in planning and implementation of the institutionalisation of disaster risk management and climate change adaptation at the local, national and regional levels and monitor the progress and outcomes in terms of reducing disaster risk and adapting to climate change through multistakeholder means and mechanisms." (ASEAN, 2015b, p. 3)

The ASEAN Declaration on One ASEAN, One Response: ASEAN Responding to Disasters as One in the Region and Outside the Region also highlights Member States' political commitment to harnessing the individual and collective strengths of different sectors and stakeholders in ASEAN to respond effectively to disasters. The declaration in itself does not explicitly include the role of civil society, but the operationalisation of the vision outlines the role of CSOs in areas such as standby arrangements (this will be discussed further in the next section below).

These documents, the ASEAN Vision 2025 on Disaster Management and the ASEAN Declaration on Action to Strengthen Emergency Relief, are unique in explicitly and repeatedly acknowledging the roles of CSOs in DRRM. Table 7.1 below summarises how these roles have been envisaged.[3] Aside from acknowledging their contribution to disaster management and emergency relief efforts, the ASEAN vision and declaration documents pinpoint the role of CSOs in providing local knowledge and capacity, amplifying the voices of communities, and mainstreaming social protection. These CSO roles are clearly aligned with and are a vehicle for achieving ASEAN's priority of ensuring a people-centred and inclusive approach to DRRM efforts.

Civil society provides the local knowledge and capacity	"In particular this strategic element determines the importance of drawing on the local knowledge and capacity of civil society organisations" (ASEAN Vision 2025 on Disaster Management, p. 3).
Civil society's has contribution in disaster management and emergency response efforts	"As civil society organisations are at the forefront of disaster management and emergency response efforts, it is critical that the strategy for the next ten years identifies, consults with and integrates civil society more sensitively as part of the effort to effectively engage the people sector" (ASEAN Vision 2025 on Disaster Management, p. 18) "We deeply appreciate the generous contribution and assistance offered by many countries and the overwhelming expressions of support and assistance from governments, non-governmental organizations and citizens of the world at large' (ASEAN Declaration on Action to Strengthen Emergency Relief, p. 2).
Civil society 'are enablers, consolidators and amplifiers of the voice of communities'	"Civil society organisations are enablers, consolidators and amplifiers of the voice of the communities. The strategic issues in the next ten years would be on how to deepen and leverage ASEAN's relationship with ASEAN home-grown civil society organisations to meaningfully engage the local communities" (ASEAN Vision 2025 on Disaster Management, p. 19).
Civil society's role in mainstreaming social protection on disaster management and disaster risk management	"Moreover, given the proximity of civil society organisations to the communities, they can contribute immensely in the development, establishment, and mainstreaming of social protection on disaster management and disaster risk management in the next ten years" (ASEAN Vision 2025 on Disaster Management, p. 19).

Table 7.1. CSOs inclusion in key ASEAN declarations and vision documents (Source: Authors, based on works as cited).

[2] ASEAN Declaration on Action to Strengthen Emergency Relief, Rehabilitation, Reconstruction and Prevention on the Aftermath of Earthquake and Tsunami Disaster of 26 December 2004 (adopted in December 2004); ASEAN Declaration on Enhancing Cooperation in Disaster Management (October 2013); ASEAN Declaration on Institutionalising the Resilience of ASEAN and its Communities and Peoples to Disasters and Climate Change (April 2015); ASEAN Declaration on One ASEAN, One Response: ASEAN Responding to Disasters as One in the Region and Outside the Region (September 2016); and ASEAN Vision 2025 on Disaster Management (December 2015).

[3] The ASEAN Vision 2025, adopted in 2015, charts the strategic direction of ASEAN and identifies the key areas to move the implementation of AADMER (ASEAN Agreement on Disaster Management and Response) forward to a people-centred, people-oriented, financially sustainable, and networked approach by 2025. The ASEAN Declaration on Action to Strengthen Emergency Relief was adopted by Member States following the aftermath of the 2004 Indian Ocean earthquake and tsunami.

ASEAN Agreement on Disaster Management and Response (AADMER)

For ASEAN frameworks for implementation and action plans, we examined the different iterations of the *ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme* from 2010 to 2025. AADMER is the first legally binding and comprehensive regional agreement on disaster management in the world. It was endorsed in 2009 and has been revised and renewed every five years. In this process, we also looked at the *ASEAN Joint Disaster Plan* (AJDRP) as the subset document included in the *AADMER Work Programme*.

The different iterations of the AADMER Work Programme contributed to the establishment of regional and multistakeholder mechanisms involving ASEAN Member States and a wide range of partners and stakeholders, including ASEAN Dialogue Partners, development partners, CSOs, United Nations agencies, and International Red Cross and Red Crescent Movement, as well as other national agencies and local governments in the ASEAN Member States (ASEAN Secretariat, 2017). AADMER is underpinned by three mutually inclusive strategic elements and guiding principles: "institutionalisations and communications," "finance and resource mobilisation," and "partnerships and innovations." The "partnerships and innovations" strategic element, in particular, is focused on the importance of drawing on local knowledge and the capacity of CSOs. This means that partnerships and collaborations with CSOs are central to AADMER implementation. In Table 7.2 below, we map how the partnership with CSOs is spelt out in the work plans in the different iterations of AADMER across four strategic components (e.g., risk assessment, prevention) and other thematic areas.

	AADMER Work Programme 2010-2015	AADMER Work Programme 2013-2015 (Phase II)	AADMER Work Programme 2016-2020	AADMER Work Programme 2021-2025
Risk Assessment, Early Warning and Monitoring	Not explicitly mentioned in work plans	Not explicitly mentioned in work plans	Not explicitly mentioned in work plans; but 'inclusion of CSO voices' acknowledged as important[4]	Not explicitly mentioned in work plans
Prevention and Mitigation	Strengthened partnership with CSOs as expected outcome in the workplan for activities Community-Based Disaster Risk Reduction[5]	Target stakeholder in the development of Comprehensive School Safety Framework[6] Target stakeholder in the ASEAN Urban Resilience Forum[7] Target stakeholder in the DRR-CCA roundtable dialogues[8]	Target stakeholder in the Safe Schools Initiative[9] Target stakeholder in the ASEAN Training Programme for DRR and CCA[10] and recognition system for exemplary communities in DRR and CCA[11] Target stakeholder in the Building ASEAN Youth Leadership in DRR and CCA[12]	Target stakeholder on social inclusion in disaster engagement[13] Target stakeholder in the development of regional mechanisms to identify priority areas on social inclusion[14] Target stakeholder in the strengthening of roles and functions of AADMER Partnership Group (APG) and operationalization of ACDM-CSM Partnership[15]
Preparedness and Response	Target stakeholder in the ERAT[16] Target stakeholder in the activity on needs assessment strategy development activity[17]	Not explicitly mentioned in work plans	Target stakeholder in the TOR development of RACER[18] Target stakeholder in the Joint Development Action Plan on CSO mobilization during regional response[19]	Target stakeholder in the development of a platform for dialogue for the implementation of One ASEAN One Response[20] Target stakeholder in the standby arrangements in the AJDRP[21]
Recovery	Target stakeholder in the activity on joint damage and loss assessment Target stakeholder in the activity on resource mobilisation[22] Target stakeholder in the stakeholder mapping activity during recovery phase[23]	Not explicitly mentioned in work plans	Not explicitly mentioned in work plans	Not explicitly mentioned in work plans
Other thematic areas	Target stakeholder in the outreach and mainstreaming of AADMER[24] Targeted stakeholder in the training and knowledge management activities[25] Targeted stakeholder in the training and knowledge management activities[26]	Target stakeholder in the institutionalization of AADMER[27] Target stakeholder in the AADMER training courses[28] Targeted stakeholder in the development of AADMER communication strategy[29]	Not explicitly mentioned in work plans on other thematic areas	No other thematic areas mentioned

Table 7.2. CSOs inclusion in the AADMER Work Programme activities

[4] AADMER Work Programme 2016-2020, p. 31
[5] AADMER Work Programme 2010-2015, p. 40
[6] AADMER Work Programme Strategic Priorities 2013-2015, p. 141
[7] AADMER Work Programme Strategic Priorities 2013-2015, p. 173
[8] AADMER Work Programme Strategic Priorities 2013-2015, p. 189
[9] AADMER Work Programme 2016-2020, p. 56
[10] AADMER Work Programme 2016-2020, p. 71
[11] AADMER Work Programme 2016-2020, p. 75
[12] AADMER Work Programme 2016-2020, p. 73
[13] AADMER Work Programme 2021-2025, p. 48
[14] AADMER Work Programme 2021-2025, p. 48
[15] AADMER Work Programme 2021-2025, p. 48-49
[16] AADMER Work Programme 2010-2015, p. 81
[17] AADMER Work Programme 2010-2015, p. 64
[18] AADMER Work Programme 2016-2020, p. 116
[19] AADMER Work Programme 2016-2020, p. 116
[20] AADMER Work Programme 2021-2025, p. 57
[21] AADMER Work Programme 2021-2025, p. 57
[22] AADMER Work Programme 2010-2015, p. 69
[23] AADMER Work Programme 2010-2015, P. 81
[24] AADMER Work Programme 2010-2015, p. 84
[25] AADMER Work Programme 2010-2015, p. 85
[26] AADMER Work Programme 2010-2015, p. 85
[27] AADMER Work Programme Strategic Priorities 2013-2015, p. 64
[28] AADMER Work Programme Strategic Priorities 2013-2015, p. 104
[29] AADMER Work Programme Strategic Priorities 2013-2015, p. 115

Overall, since the inception of the AADMER Work Programme in 2010, most of the activities and plans for collaboration with CSOs are in the "prevention and mitigation" thematic area (or priority programme). They are included in the activities in relation to community-based disaster risk reduction, school safety, urban resilience, DRR and CCA, and social inclusion. In particular, under the social inclusion activities for 2021 – 2025, there is a specific key-performance indicator focused on tracking the "number of collaborations and partnerships between multisectoral groups and ASEAN to collaborate on concrete CCA-DRR, gender and social inclusion related actions" (ASEAN Secretariat, 2020, p. 96).

Under "preparedness and response," there is an explicit role for CSOs in the implementation of the One ASEAN, One Response vision in the AJDRP, particularly in the development of standby arrangements and their inclusion in the ASEAN Emergency Response and Assessment Team (ERAT). Under AJDRP, there were plans to form the Regional Alliance for Collective Emergency Response (RACER) to complement ASEAN response during disasters from ASEAN-born institutions, particularly grassroots and national non-government organisations based in ASEAN. This initiative also aimed to provide a single platform for the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre) to coordinate a collective response from the CSO sector, which is in line with the Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations (SASOP) principle of identifying a single point of contact (AHA Centre, 2017, p. 34).

Since the inception of the Work Programme in 2010, there have been no explicit roles for CSOs in the joint damage and loss assessments as well as resource mobilisation in the recovery phase. Collaborations with CSOs were also included in the activities related to the institutionalisation of AADMER during its inception, including the development of training and knowledge materials in relation to AADMER. Although CSO voices were acknowledged as critical in the Risk Assessment, Early Warning and Monitoring for the 2016 -2020 Work Programme (ASEAN Secretariat, 2016c, p. 31), there were no other activities in this strategic component that identified the role of CSOs.

National-Level Policies on Disaster Risk Reduction and Management

An integral component of ASEAN's operations is the respect of national laws and regulations. In the context of the Philippines and Indonesia, policies and legal frameworks on DRRM are also clear on the importance of CSO engagement. Disaster management and mitigation in the Philippines is governed by Republic Act 10121, or the Philippine Disaster Risk Reduction and Management Act of 2010, which includes a provision on the importance of civil society participation in the government's DRRM. In practice, this means CSOs can submit their intent for membership in the National Disaster Risk Reduction and Management Council alongside different government agencies and the private sector.

Indonesia, on the other hand, has formulated Law Number 24 of 2007 Concerning Disaster Management, which lays out the foundational principles, division of roles and responsibilities, organisational framework, and implementation strategies for national disaster management with disaster risk as one of the components. Although this law does not conceive of the specific role of CSOs, Law Number 21 of 2008 Concerning Disaster Management outlines the role and participation of CSOs in disaster management, particularly in reconstruction efforts. This regulation explicitly outlines that the role of CSOs is important to support the accelerating recovery of community life in the post-disaster phase as well as identifying risk and disaster-prone areas. As CSOs primarily interact within the national frameworks in the countries where they operate, these national frameworks provide a primary basis for CSOs' engagement with Member States and are also aligned with the provisions identified at the ASEAN level.

In Action: ASEAN-CSO Relations in Disaster Risk Reduction and Management

Building on the visions, action plans, and national legal frameworks, this section maps how ASEAN-CSO relations have been translated into action. We draw on Gerard's (2014) work in mapping the sites of participation for CSOs. However, we find that it is important to expand on the typologies and contextualise them in relation to what has been achieved in the specific area of DRRM.

Institutionalising Mechanisms for ASEAN-CSO Partnerships

Collaboration through institutionalised mechanisms within the ASEAN structure has supported CSOs' participation in identifying priorities under the implementation of AADMER. An example of this is the APG, a consortium of seven international organisations that was perceived to be instrumental in facilitating the engagement of CSOs within ASEAN. APG has become an important platform for CSOs to participate in AADMER activities, including providing input and advice to the work of the ASEAN Committee on Disaster Management (ACDM) and the ASEAN Secretariat. They also supported the promotion and awareness of AADMER amongst diverse stakeholders at the national level. Some of the key activities to support this included the translation of the agreement into several local languages and the organisation of AADMER orientation workshops in most ASEAN countries in cooperation with national disaster management offices (Petz, 2014).

Furthermore, APG, in partnership with the AHA Centre, "has implemented a number of flagship projects, including the Regional Training and Knowledge Needs Assessment in September 2011, and the delivery of training activities, such as the Exercise Design Workshop, in preparation for the ASEAN Regional Disaster Emergency Response Simulation Exercise (ARDEX)" (ASEAN, 2013, p. 95). At the national level, the APG also helped to carry out projects through consultations and partnerships with national disaster management offices and national CSOs. The outcome of this collaboration then informed the AADMER Work Programme on partnership, resource mobilisation, training, and knowledge management.

However, the ASEAN Strategic Policy Dialogue on Disaster Management (SPDDM), held in 2019, recognised that existing mechanisms such as the APG can be strengthened by including homegrown CSOs in the partnership aligned with the localisation discussions in the region (Cook et al. 2019, p. 17–27). Homegrown CSOs are local and, with national non-state actors, are broadly identified as those organisations that are headquartered and operating in their own countries and not affiliated with an international non-government organisation (see the relevant definition from IASC Humanitarian Financing Task Team, 2018).

Aside from APG, another mechanism is the ACDM-CSO Partnership Framework (ACPF), which was adopted by the ACDM in May 2013. The APG played a pivotal role in facilitating a consultative process, which led to the formulation of the ACPF. ACPF was initiated to strengthen the engagement between the ACDM and CSOs at the national level on disaster management. This body consists of civil society groups committed to supporting the ACDM in the AADMER implementation. The members of the ACPF are the Brunei Council on Social Welfare, Cambodia Humanitarian Forum, National Platform for DRR of Indonesia, Learning House of Laos, Mercy Malaysia, Myanmar Consortium for DRR, the Philippines CSO Constituency, Mercy Relief of Singapore, Foundation for Older Persons for Development of Thailand, and Disaster Management Working Group of Viet Nam (AHA Centre, 2017). One of the priority programmes of the ACPF was to form RACER to complement ASEAN response during disasters from ASEAN-born institutions, particularly grassroots and national non-government organisations based in ASEAN.

Platforms for Capacity and Knowledge Exchange

Creating hubs and platforms for accessible capacity and learning exchange is another site of participation for CSOs. Collaboration here leverages the contextual knowledge and technical capacity of CSOs, particularly their strong presence in different communities and their experience in implementing community-based DRRM. One example of this is the implementation of the ASEAN Safe School Initiative, which aimed to integrate DRR into the education sector through a comprehensive approach. The implementing partners of this initiative included Plan International, Save the Children, World Vision, and Mercy Malaysia (Bisri, 2019). Through this collaboration, CSOs contributed to the realisation of DRR at the community level. Some of the key results were the developed common framework for school safety, a manual for operationalisation, guidelines, and a compilation of case studies (Bisri, 2019). This also showed that pre-established partnerships with CSOs and dedicated resources could enable collaboration at the implementation level.

CSOs have also supported ASEAN in building hubs and networks of specialists on DRRM. For example, the Training and Knowledge Management Systems is one of the building blocks under the AADMER Work Programme 2010-2015 tasked with capacity building in the areas of knowledge transfer, knowledge sharing, and training needs of AADMER. One of its flagship initiatives was the ASEAN network of Disaster Management Training Institutes (DMTIs). A mapping of existing DMTIs in the ASEAN region was undertaken in 2013, which was validated in a regional workshop for setting up the DMTI network in February of the same year (ASEAN, 2013). Seeing its importance, "participants from ASEAN Member States…and civil society further agreed to push through with the network, recognising the benefits in terms of systematising the sharing of experiences, training materials, sound practices, and lessons learned" (ASEAN, 2013, p. 95).

The ASEAN ERAT, where CSOs have both been participants and resource specialists, is another key example through which CSOs have supported capacity and knowledge exchange in ASEAN. Based on the learnings from Typhoon Haiyan (2013) in the Philippines, ASEAN introduced three different levels of training and team membership with representatives of CSOs amongst the expertise team (ASEAN Secretariat, 2014). In 2015, ERAT training was conducted in Indonesia with 29 participants, comprising AHA Centre Executives from ASEAN Member States, representatives of the ASEAN Secretariat, and representatives from CSOs (ASEAN, 2015c).

More recently, the ASEAN Strategic Policy Dialogue on Disaster Management, initiated in 2017, provided a platform to explore innovative ideas from different stakeholders, including CSOs, in relation to enhancing disaster resilience in the region, emphasising the urgency of proactive action and investment. The event encompassed various discussions and presentations, summarising key insights. In 2023, the launch of the ASEAN Disaster Resilience Forum reinforced the commitment of ASEAN to facilitate a multistakeholder knowledge exchange in the context of disaster management.

Other Entry Points for Engagement and Advocacy

Outside existing institutionalised mechanisms and platforms in relation to DRRM, CSOs also build on their existing networks within ASEAN. A CSO representative shared that they had opportunities to participate in both formal and informal dialogues conducted by the ASEAN Secretariat. Not only does this help in information exchanges, but it allows CSOs and ASEAN to gain familiarity with each other's respective structures and mechanisms, including knowing the key focal points from both sides.[30] A conversation with a local CSO representative in Indonesia identified that these engagements, albeit ad hoc, help foster trust and openness, which are critical in strengthening ASEAN-CSO relations. This is particularly important for CSOs with interests in the extent of ASEAN's ability to create joint efforts on disaster reduction in the region. Government agency representatives from Member States, such as the case of the Philippines and Indonesia, have also been critical in bridging CSOs and ASEAN. There were cases where these agencies organised consultations amongst CSO representatives (Ibrahim, 2015; Lim, 2015). Previous research has highlighted perceptions amongst CSO leaders saying that regional actors "have huge potential to be a game changer" but that to realise this potential, "they need to see diversity of CSOs as a strength rather than a threat," suggesting that mutual understanding still has some way to go (local CSO representative as cited in Humanitarian Advisory Group, 2021).

CSO-led efforts have also been made to facilitate discussion on DRR in the ASEAN region but through other regional platform networks. For example, a representative of a national CSO shared his experience of a joint initiative of CSOs from the ASEAN Member States to build a discussion about strengthening DRR efforts in the region using the momentum of the Regional Humanitarian Partnership Week Dialogue in 2022. During these discussions, CSOs brought to the fore the issue of disaster risks amidst ASEAN's pursuit of growth and economic stability in the region. To sum up, CSO and ASEAN relations could also be fostered through alternative platform networks both at the regional and global levels.

[32] Interview 1
[33] Interview 1; Interview 2
[34] Interview 1; Interview 2
[35] Interview 1
[36] Interview 1

Conclusion: Paving Paths Forward

This study offers a resource to support the work of ASEAN and CSOs in building the evidence base of existing practices and collaborations to move forward. While the broader literature paints an often-adversarial picture when discussing ASEAN and CSO relations, softened by some more positive recent developments, this study presented some areas of good practices that can be leveraged further, particularly in the context of DRRM. We offer below the potential path forward with applications to existing policies and practices:

Potential path forward: ASEAN has created platforms and institutionalised mechanisms as such in the APG that demonstrate its people-centred approach, but there is an opportunity to expand the partnership. As mentioned above, there were discussions regarding the importance of including more homegrown CSOs, particularly women-led organisations, organisations of persons with disabilities, and faith-based organisations (Carmel et al., 2018).[31] Both in the Philippines and Indonesia, consistent findings underscore the positive contribution of homegrown CSOs, such as faith-based organisations, organisations of persons with disabilities, and women-led organisations, in disaster management (Fiddian-Qasmiyeh, 2013; Grech, 2022; Koopman, 2023; McCommon et al., 2021; Rokib, 2012). Our study also found evidence that current engagements through institutionalised mechanisms mostly include international non-governmental organisations, and there is scope to extend partnerships to local non-governmental organisations that are rooted in different contexts, which is already recognised in recent policy discussions within ASEAN (Cook et al., 2019). This path forward can provide a more holistic understanding of what sustainable resilience means for communities affected by crises, as local CSOs, in particular, can bring to the fore their intersectional and locally rooted lens in the priority setting.

Potential path forward: Already, ASEAN and CSOs are partnering in various ways to support the implementation of AADMER. Engaging with the correct agency with the right mandate is important. However, our study found evidence that some areas have had fewer chances to benefit from CSO engagement, notably in the area of risk assessment and, to some extent, recovery, although some good plans are outlined in the AADMER Work Programme for 2021-2025. Lessons learnt from the Typhon Rai recovery process documented the value added from CSOs in supporting the recovery, particularly in bringing back a sense of normalcy to the community (OCHA, 2022). Furthermore, a study on the early warning system in Indonesian coastal cities also found that CSOs play an important role in the public dissemination of warning messages (Rahayu et al., 2020)

It is important for ASEAN to assess where and how homegrown CSOs can support strategic components of AADMER to sustain the gains already made since its inception in 2010. In turn, this will also allow CSOs to have comprehensive knowledge of the ASEAN agenda and its social consequences, as well as the ability to articulate policy gaps and propose alternatives through education, consultation, and consensus building (Lopa 2015, p. 152).

To conclude, this article sought to provide evidence of existing practices and areas for strengthening in relation to CSO engagements in the area of DRRM. For ASEAN Member States, this article identifies areas where they can collaborate with CSOs, particularly in the implementation of AADMER. For CSOs, the study can support them in identifying these entry points for engagements and potentially scaling-up where feasible. For both ASEAN and CSOs, it is critical to ask what lessons can be learnt from these existing visions and practices on DRR when developing the priorities for sustainable resilience, a policy priority that has been emphasised in the *ASEAN Socio-Cultural Community Blueprint 2025.*

[31] This recommendation is also reflected in the Guidelines for Operationalising the ASEAN Regional Framework on Protection, Gender and Inclusion in Disaster Management: A Planning and Prioritization Toolkit, see pages 30 – 31.

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Articles

ARMOR ASEAN Risk Monitor and Disaster Management Review 4TH Edition
#8

Community-based Disaster Risk Reduction in Rakhine State, Myanmar

Authors:
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#8

Community-Based Disaster Risk Reduction in Rakhine State, Myanmar

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Abstract:

This article examines the effectiveness of community-based disaster risk reduction (CBDRR) strategies in enhancing sustainable resilience in the flood-prone areas of Rakhine State, Myanmar. The study investigates the current CBDRR strategies in place, as well as vulnerability, challenges, and best practices and lessons learnt from successful CBDRR programmes. The article also explores the integration of traditional knowledge and practices into CBDRR strategies and the role of government and stakeholders in supporting their implementation and sustainability. Additionally, it highlights the important role that the Association of Southeast Asian Nations (ASEAN) can play in promoting CBDRR strategies in the flood-prone areas of Rakhine State in Myanmar. Specifically, ASEAN can facilitate regional knowledge sharing and exchange on best practices and lessons learnt from other Member States, which can help to identify effective approaches to enhancing sustainable resilience in the region. The findings suggest that effective CBDRR strategies that incorporate traditional knowledge and practices can enhance sustainable resilience in flood-prone areas. However, challenges related to funding, capacity building, and community engagement need to be addressed to ensure the success and sustainability of these strategies.

Keywords: Community-based disaster risk reduction (CBDRR), Rakhine Myanmar, Sustainable resilience, flood-prone areas, natural hazards, vulnerability factors, ASEAN strategies, Disaster Risk Reduction,

Introduction

Rakhine State is in the western region of Myanmar and is highly susceptible to floods, cyclones, and other natural hazards. These disasters often result in significant loss of life, damage to infrastructure, and disruption of livelihoods, particularly for vulnerable communities living in flood-prone areas. Floods are a recurrent disaster in Rakhine State, Myanmar, with devastating consequences for the population living in flood-prone areas (Relief International, 2016). In recent years, there has been a growing recognition of the importance of community-based disaster risk reduction (CBDRR) strategies (Food and Agriculture Organization of the United Nations, 2016) in enhancing sustainable resilience in these vulnerable areas. CBDRR strategies are designed to empower local communities to identify and manage their risks, reduce their exposure to natural hazards, and enhance their capacity to cope with and recover from disasters.

The vulnerability of Myanmar to natural hazards, particularly in the flood-prone areas of Rakhine State, highlights the importance of CBDRR in enhancing sustainable resilience. Because Myanmar is a Member State of the Association of Southeast Asian Nations (ASEAN), the region's cooperation and prioritisation of disaster risk reduction further emphasises the significance of this topic in the ASEAN regional context. Moreover, the international discourse on disaster risk reduction and sustainable development underscores the need for investment in community-based approaches to reduce the impact of disasters.

Socioeconomic and Environmental Factors of Rakhine

Several socioeconomic and environmental factors contribute to the vulnerability of communities in flood-prone areas of Rakhine State in Myanmar. The state faces numerous challenges that contribute to its vulnerability to floods. Firstly, its location in a flood-prone region means that it is regularly affected by monsoonal floods (Noor & Tawsif, 2020). Additionally, a significant proportion of the population in Rakhine State lives in poverty, limiting its capacity to cope with and recover from disasters. Many communities also lack basic infrastructure such as drainage systems, bridges, and roads, making them more vulnerable to flooding. Low-quality housing is prevalent in many communities, further increasing their vulnerability to flood damage. Deforestation in upstream areas can also increase the likelihood of floods by reducing soil stability and increasing runoff (Tun et al., 2019). Moreover, the impacts of climate change may exacerbate flood risk in Rakhine State, as changes in rainfall patterns and increased frequency and intensity of extreme weather events may occur (Oo & Win, 2021). The ongoing conflict and displacement in Rakhine State can exacerbate vulnerability to floods, as communities may lack the resources and support needed to prepare for and recover from disasters. Finally, limited access to information about floods, weather patterns, and disaster preparedness measures can make it difficult for communities to plan and respond effectively to flood events.

The effectiveness of CBDRR in enhancing sustainable resilience in flood-prone areas of Rakhine State in Myanmar varies depending on several factors, such as the specific strategies implemented, the level of community participation and engagement, and the resources available for implementation and monitoring. CBDRR strategies in Rakhine State have shown promising results in enhancing sustainable resilience in flood-prone areas.

Early warning systems, community evacuation plans, and infrastructure development have significantly reduced loss of life and property damage during floods. Education and awareness programmes, community-led disaster management committees, and livelihood diversification programmes have also improved community preparedness and resilience.

CBDRR involves empowering local communities to take ownership of their own disaster preparedness and response, as well as promoting collaboration between different stakeholders such as government agencies, non-governmental organisations (NGOs), and local communities. CBDRR strategies in Rakhine State include the development of early warning systems, disaster risk assessments, training and capacity building for community members, and infrastructure development such as the construction of flood shelters and raised housing. These strategies aim to reduce the impact of floods and other natural hazards and to improve the ability of communities to cope and recover from them. The effectiveness of CBDRR strategies in Rakhine State has been evaluated through studies and assessments, with many showing positive outcomes in terms of improved disaster preparedness, reduced loss of life and property, and increased community resilience (Care Myanmar, 2019; Myanmar Red Cross Society, 2013). However, ongoing support and investment are needed to ensure the sustainability and long-term impact of these strategies.

This article examines the effectiveness of CBDRR in enhancing sustainable resilience in the flood-prone areas of Rakhine State. The study investigates the current CBDRR strategies in place, the factors contributing to vulnerability, the effectiveness of the strategies, the challenges to successful implementation, and best practices and lessons learnt from successful CBDRR programmes. Additionally, the article explores best practices and lessons learnt from successful CBDRR programmes in other flood-prone areas and how the integration of traditional knowledge and practices can enhance their effectiveness. The implementation of CBDRR strategies in Rakhine State can serve as a model for other ASEAN Member States facing similar challenges. By studying and adapting these strategies, ASEAN Member States can enhance their own disaster resilience and contribute to the wider goal of sustainable development in Southeast Asia. By addressing these questions, this article aims to contribute to a better understanding of the potential of CBDRR to enhance sustainable resilience in the flood-prone areas of Rakhine State and to identify opportunities for further research and action.

This study employed a qualitative approach to examine the effectiveness of CBDRR in enhancing sustainable resilience in flood-prone areas of Rakhine State. To explore the current CBDRR strategies in place, a comprehensive review of existing literature, reports, and policy documents related to disaster risk reduction and resilience in Rakhine State was conducted. This desk-based research helped identify the key CBDRR strategies and initiatives implemented by relevant stakeholders, such as government agencies, NGOs, and community-based organisations. To investigate the factors that contribute to community vulnerability, qualitative data was collected through in-depth interviews and focus group discussions with key informants, including community members, local leaders, and experts in disaster risk reduction.

Literature Review

Natural hazards, particularly floods, pose a significant threat to the sustainable development of Myanmar, specifically in the Rakhine State, which has a history of recurring floods. While the government and international aid organisations have previously implemented strategies to reduce disaster risks, there is a growing recognition of the importance of adopting community-based approaches for disaster risk reduction. CBDRR is an approach that empowers communities to actively engage in identifying and mitigating their vulnerability to natural hazards through the development of local capacity and the enhancement of resilience, for example, a study conducted in Bangladesh found that community-based flood management programmes improved community awareness and preparedness, reduced the impact of floods, and enhanced community resilience (Brammer, 2010). Similarly, a study conducted in Indonesia found that CBDRR programmes reduced the vulnerability of communities to natural hazards and contributed to sustainable development (Yusuf, 2010).

In Myanmar, a study conducted in the Ayeyarwady Delta found that community-based disaster management programmes had a positive impact on disaster preparedness and response (Win et al., 2018). Another study conducted in Chin State found that local communities had developed their own traditional risk reduction strategies that were effective in reducing their vulnerability to natural hazards (Karnsundar, 2018). The studies mentioned above aim to evaluate the effectiveness of CBDRR in enhancing sustainable resilience in the flood-prone areas of Rakhine State, Myanmar. The recognition of the CBDRR efforts in Rakhine State demonstrates the importance of community-based approaches and the potential for this experience to contribute to wider efforts in ASEAN.

Aung and Aye (2020) conducted a study that examined the effectiveness of CBDRR strategies in enhancing sustainable resilience in the flood-prone areas of Rakhine State by assessing the level of community participation and the impact of CBDRR initiatives on disaster preparedness. They also specifically examined the role of women in disaster preparedness and evaluated the effectiveness of CBDRR strategies in Kyauktaw Township by examining the level of community participation and the impact of CBDRR initiatives on disaster preparedness. Hlaing (2019) conducted a case study in Mrauk-U Township to assess the effectiveness of CBDRR strategies in enhancing sustainable resilience in flood-prone areas. The study examined the level of community participation and the impact of CBDRR initiatives on disaster preparedness. Tun and Aung (2018) conducted a case study in Maungdaw Township to evaluate the effectiveness of CBDRR strategies in enhancing sustainable resilience in flood-prone areas. The study examined the level of community participation and the impact of CBDRR initiatives on disaster preparedness. Win et al. (2018) conducted a study that examined the overall effectiveness of CBDRR strategies in enhancing sustainable resilience in the flood-prone areas of Rakhine State. The study evaluated the level of community participation and the impact of CBDRR initiatives on disaster preparedness.

The findings of studies from Aung and Aye (2020), Hlaing (2019), and Tun and Aung (2018) can help guide policymakers and practitioners in designing and implementing strategies that can increase community participation and engagement, which are essential for building sustainable resilience to natural hazards. However, there are also challenges to the implementation of CBDRR strategies in Myanmar. For example, the lack of resources, limited participation of women and marginalised groups, and inadequate coordination between local government authorities and communities have been identified as barriers to effective CBDRR (Barnett et al., 2018). The literature suggests that CBDRR strategies enhance sustainable resilience in the flood-prone areas of Rakhine State in Myanmar, but further research is needed to evaluate the effectiveness of these strategies in the local context and to identify the barriers and opportunities for successful implementation.

Local Participation in CBDRR

Several local organisations in Rakhine State play a crucial role in enhancing the effectiveness of CBDRR strategies and building sustainable resilience in flood-prone areas. The Rakhine State Local Civil Society collaborates to advance CBDRR and resilience-building through various initiatives, including awareness campaigns, training programmes, and disaster response activities (Care Myanmar, 2019). The Rakhine Women Network conducts gender-sensitive disaster risk reduction and resilience-building in the region (Rakhine Women Network, 2023). Additionally, the Rakhine Coastal Region Conservation Association contributes to environmental sustainability and resilience-building by engaging in community-based natural resource management and climate change adaptation practices (Rakhine Coastal Region Conservation Association, 2023).

The Youth and Community Development Network promotes sustainable development and resilience-building through infrastructure development, livelihood support, and CBDRR. Youth and Community Development Network's collaboration with the Child's Dream Foundation showcases its commitment to rural development in Rakhine State. By implementing water and sanitation activities and focusing on sustainable agriculture, its project aimed to improve livelihoods and enhance the capacity of young farmers (Youth and Community Development Network, 2023). These organisations play a crucial role in promoting community participation and ownership in disaster risk reduction programmes and in ensuring that the needs and perspectives of the local communities are taken into account in programme design and implementation. By involving local organisations in the implementation and evaluation of CBDRR strategies, their effectiveness can be enhanced, and they can contribute to sustainable resilience-building in the flood-prone areas of Rakhine State.

National Developments in CBDRR

The Government of Myanmar has recognised the importance of CBDRR in enhancing sustainable resilience in flood-prone areas of Rakhine State and included CBDRR as a key priority in its national policies and strategies. The Myanmar National Disaster Management Plan for 2017–2021 prioritised the implementation of CBDRR activities to enhance disaster resilience at the community level. It also aimed to build the capacity of communities to prepare for, respond to, and recover from disasters and to promote community participation in disaster risk reduction efforts. Additionally, the government established the Myanmar Climate Change Alliance, which is a partnership between the government, civil society organisations, and the United Nations, with the aim of building climate resilience in Myanmar (Department of Disaster Management, 2017). The Myanmar Climate Change Alliance focuses on community-based adaptation and disaster risk reduction and aims to enhance the capacity of communities to cope with the impacts of climate change and natural hazards. Furthermore, the government worked to improve the institutional capacity of its disaster management agencies, including the Department of Disaster Management, to better support CBDRR efforts in the country (Department of Disaster Management, 2017).

Unfortunately, it is difficult to provide a definitive analysis of the effectiveness of CBDRR in enhancing sustainable resilience in the flood-prone areas of Rakhine State in Myanmar after the coup d'état and civil war after 2021, as the situation in the region has been complex and rapidly evolving in recent years. Hlaing K. H. (2022) highlighted that the conflict and instability in the region have disrupted community cohesion and hindered the ability of community members to participate in disaster risk reduction activities. Additionally, the political and economic turmoil caused by the coup d'état and civil war has limited the resources available to support disaster risk reduction efforts, both at the community level and within government agencies.

Despite these challenges, there have been ongoing efforts to implement CBDRR in Rakhine State, even in the midst of conflict and political upheaval (United Nations Office for the Coordination of Humanitarian Affairs, 2021). Some local organisations have continued to work with communities to develop early warning systems, conduct risk assessments, and improve disaster preparedness and response. The United Nations and other international organisations have also continued to provide support for disaster risk reduction activities in the region (United Nations Office for Disaster Risk Reduction, 2018). While the coup d'état and civil war in Myanmar have undoubtedly posed significant challenges to the implementation and sustainability of CBDRR, there remain efforts to build resilience and enhance disaster preparedness in the region.

The instability and insecurity in the region make it difficult to implement and sustain effective community-based programmes. Additionally, the humanitarian crisis and displacement caused by the conflict make it harder for vulnerable communities to access resources and support. However, it is worth noting that CBDRR was effective in building resilience and reducing the impact of natural hazards in the past, and there is still a need for these programmes in Rakhine State. It is important for humanitarian organisations and governments to work together to ensure that these programmes can be implemented in a safe and sustainable way, considering the unique challenges of the current situation.

ASEAN in CBDRR

ASEAN has prioritised disaster risk reduction as a key area of cooperation amongst Member States. The ASEAN Agreement on Disaster Management and Emergency Response, signed in 2005, provides the framework for regional cooperation in disaster management and response. Subsequently, the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management was established in 2011 as the operational agency for the agreement (ASEAN, 2011). CBDRR is a key component of this framework, and its implementation is crucial to building resilience and reducing the impact of disasters in ASEAN Member States. The United Nations' Sendai Framework for Disaster Risk Reduction 2015–2030 further emphasises the importance and highlights the need for greater investment in CBDRR.

In the case of Rakhine State, ASEAN could provide technical assistance and capacity building to support the development and implementation of CBDRR. This could include training on disaster preparedness and response, as well as support for community-based organisations and local government agencies in developing risk assessments and disaster management plans. By developing and implementing effective strategies, Myanmar can reduce the impact of floods and enhance the resilience of communities in Rakhine State (Government of Myanmar, 2019). This will contribute to sustainable development and disaster risk reduction efforts not only in Myanmar but also in the wider ASEAN region and internationally. At the Global Platform for Disaster Risk Reduction Forum, Kurt Kunz, the Swiss Ambassador to Indonesia, Timor-Leste, and ASEAN, highlighted the significance of integrated risk management as a holistic approach that involves the entire society. This approach aims to identify, evaluate, and mitigate risks, taking into account different types of hazards and engaging all relevant sectors in the process (United Nations Office for Disaster Risk Reduction, 2022).

International Organisations and CBDRR

Assessments of the effectiveness of CBDRR in enhancing sustainable resilience in the flood-prone areas of Rakhine State in Myanmar have been conducted by various organisations. The following case studies highlight their efforts to support CBDRR in Myanmar, especially in Rakhine State. The United Nations Development Programme (UNDP) case study provides examples of successful initiatives and lessons learnt. It emphasises the significance of involving communities in decision-making and the importance of long-term sustainable solutions (UNDP, 2019). This approach recognises that communities are the best experts on their needs and context and that involving them in the decision-making process leads to more effective and sustainable solutions. Plan International's case study highlights the importance of building trust with communities (Plan International, 2017), addressing social and cultural barriers to participation, and collaborating with local authorities. These factors are crucial for ensuring that CBDRR programmes are effective and sustainable in the long term.

These organisations have implemented CBDRR programmes in Rakhine State and conducted assessments to evaluate their effectiveness. The assessments typically involve collecting data on various indicators such as community engagement, disaster preparedness, infrastructure development, and community resilience. These case studies demonstrate that incorporating community participation into the assessment of the effectiveness of CBDRR strategies is essential to ensure that the needs and perspectives of the community are considered in the programme design and implementation. By involving community members in the data collection process, these assessments can provide valuable insights into the impact of these interventions and can help to identify areas for improvement. The following section provides case studies where a participatory approach has been incorporated into CBDRR assessments in Rakhine State.

Mercy Corps emphasises community ownership and sustainability in its approach to disaster risk reduction (Mercy Corps, 2016). It recognises that communities must be empowered to take ownership of disaster risk reduction efforts to ensure their sustainability. Oxfam's focus is on capacity building and empowering local communities while working in a complex political and social context (Oxfam, 2015). This approach recognises the importance of building the capacity of local actors to lead and sustain disaster risk reduction efforts. Save the Children emphasises the importance of involving children and youth in disaster risk reduction efforts and the need for sustainable solutions that address underlying vulnerabilities (Save the Children, 2016). It recognises that children and youth are often the most vulnerable to the impacts of disasters and should be involved in the decision-making process. However, challenges in involving children and youth in disaster risk reduction initiatives include the perception that they lack sufficient knowledge and understanding, limited recognition of their importance as stakeholders, and social and cultural barriers that impede their participation.

Challenges to CBDRR

CBDRR strategies that involve a participatory approach are more effective in enhancing sustainable resilience as they build trust and ownership and can better address local needs and challenges. Strong partnerships between community organisations, local authorities, and NGOs have also been crucial in improving the implementation and sustainability of CBDRR strategies, increasing their effectiveness. Despite these successes, ongoing challenges such as limited infrastructure, poverty, conflict, and displacement in Rakhine State must be addressed to further enhance sustainable resilience to floods. Therefore, while CBDRR strategies have shown positive results in enhancing sustainable resilience in flood-prone areas of Rakhine State, there is still room for improvement in terms of addressing the root causes of vulnerability, such as poverty and limited access to resources. Continued monitoring and evaluation are needed to ensure the effectiveness and sustainability of these strategies.

However, there are several challenges and barriers to the successful implementation of CBDRR in the flood-prone areas of Rakhine State in Myanmar. One of the most significant challenges is the limited resources available for CBDRR implementation, including financial, technical, and human resources (UNDP, 2020). These factors are particularly relevant in areas with high poverty rates and limited government support. Low community participation and engagement also pose a challenge to the effectiveness of CBDRR, as these strategies rely on community ownership and involvement to be successful, and low participation rates can limit their impact. Limited access to information about floods, disaster preparedness measures, and early warning systems can also hinder their implementation and effectiveness.

Limited capacity and technical expertise are also significant barriers to the success of CBDRR, particularly in areas with limited access to training and technical support. Limited coordination and collaboration between community organisations, local authorities, and NGOs can also hinder the implementation and sustainability of CBDRR. Ongoing conflict and displacement in Rakhine State (Hlaing, 2022) further exacerbate the challenges of implementing CBDRR, particularly in areas with high levels of insecurity and limited access to resources. Environmental degradation, such as deforestation and soil erosion, also limits the effectiveness of CBDRR by increasing the risk of floods. To address these challenges and barriers, a multistakeholder approach involving community organisations, local authorities, NGOs, and other relevant actors is necessary. Adequate resources, capacity building, and effective coordination and collaboration between all stakeholders involved will also be crucial to the successful implementation of CBDRR strategies in the flood-prone areas of Rakhine State in Myanmar.

Conclusion

This article has identified that a participatory approach to CBDRR can be effective in enhancing sustainable resilience in the flood-prone areas of Rakhine State in Myanmar. These strategies involve empowering communities to take ownership of their own disaster preparedness and response, as well as promoting collaboration between different stakeholders, such as government agencies, NGOs, and local communities. Some effective strategies include early warning systems, disaster risk assessments, training and capacity building for community members, and infrastructure development. These strategies can help reduce the impact of floods and other natural hazards and can improve the ability of communities to cope and recover from them. However, the effectiveness of CBDRR is often dependent on various factors, such as the level of community engagement, availability of resources, and political will. Therefore, there is a need for continued support and investment in these strategies to ensure their sustainability and long-term impact.

ASEAN could facilitate regional knowledge sharing and exchange on CBDRR strategies, drawing on best practices and lessons learnt from other Member States. This could help to identify effective approaches to enhancing sustainable resilience in the flood-prone areas of Rakhine State and contribute to the broader regional efforts to reduce the impact of disasters. ASEAN can play a crucial role in promoting CBDRR in Rakhine State and supporting sustainable resilience in flood-prone areas. By providing technical assistance, capacity building, and knowledge sharing, ASEAN can help enhance disaster preparedness and response in the region and contribute to the wider goal of sustainable development in Southeast Asia.

The recent coup d'état and civil war in Myanmar have created a volatile and unpredictable situation, making it difficult to predict CBDRR's effectiveness in enhancing sustainable resilience in flood-prone areas. The instability and insecurity in the region make it challenging to implement and sustain effective programmes, and the humanitarian crisis and displacement caused by the conflict make it harder for vulnerable communities to access resources and support. However, despite these challenges, CBDRR has been effective in building resilience and reducing the impact of natural hazards in the past. Therefore, there is still a need for these programmes in Rakhine State, and it will be important for all stakeholders to work together to ensure that they can be implemented in a safe and sustainable way. By considering the unique challenges of the current situation, it may be possible to mitigate some of the negative impacts of the recent conflict and build greater resilience in vulnerable communities in Rakhine State.

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ARMOR
ASEAN Risk Monitor and Disaster Management Review
4TH Edition
#9

Anticipatory Action for Disaster Management and Sustainable Resilience:

Lessons from ASEAN Countries

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#9

Anticipatory Action for Disaster Management and Sustainable Resilience: Lessons from ASEAN Countries.

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Abstract:

Anticipatory action (AA) has become a key element of sustainable resilience by enabling communities and governments to anticipate disasters, reducing vulnerability, and increasing the capacity to cope. AA strengthens national and local disaster risk management (DRM) systems by linking short-term to long-term disaster risk reduction (DRR) approaches and ensuring that the gains in reducing disaster risks are maintained. Based on the experience of the members of the Asia-Pacific Technical Working Group on Anticipatory Action, this article provides evidence and the lessons learnt about how different stakeholders could contribute to DRM, promote sustainable resilience in Association of Southeast Asian Nations (ASEAN) countries, and, in particular, contribute to the ASEAN Framework on Anticipatory Action in Disaster Management. This article is organised into five sections. Section one summarises the advances in the ASEAN region that address climate change impacts by helping communities and governments invest in climate-resilient practices and support early warning systems, including impact-based forecasting. Case studies from the Philippines, Indonesia, and Cambodia are included. Section two provides evidence of the potential of AA to promote inclusive resilience and reduce the need for emergency response through the adoption of Gender Equality and Social Inclusion (GESI) Responsive Anticipatory Action and the promotion of shock-responsive social protection systems. It discusses the strength of the linkages between AA, longer-term DRR practices, and social protection programmes with a case study from the Philippines. Section three shows how local and national partnerships for disaster preparedness might increase the effectiveness and sustainability of DRM efforts, using experiences from the Philippines and Cambodia as examples. Section four focuses on disaster risk financing, analysing the reliance of ASEAN countries on risk retention instruments, the trends on pre-arranged finance and international assistance, and the enabling policies that facilitate AA funding at the national and local levels. Finally, section five provides conclusions and recommendations for programmatic work and local and national policy design.

Keywords: Anticipatory Action, Forecast-based Financing, ASEAN, Climate Change, Resilience

Introduction: Anticipatory Action and Long-Term Disaster Risk Reduction

Typhoons, floods, droughts, earthquakes — the list of natural hazards affecting the Association of Southeast Asian Nations (ASEAN) region is extensive, and with each passing year, the frequency and intensity of these hazards grow in the face of climate change (ASEAN, 2021). However, there is a strong opportunity to reduce the risk of these hazards across the region and limit their impacts on the population when applying the anticipatory action (AA) approach. This will require building on the efforts around disaster risk reduction (DRR) in the ASEAN region and strengthening their ties to AA. Across the ASEAN region, these activities have been implemented, and bridges are drawn between them. Thus, the key is to build on this foundation so that the local population is able to increase their resilience.

At the heart of both long-term DRR and AA stands risk knowledge. In order to enhance communities' ability to protect themselves, there must be a strong understanding of what hazards they are exposed to, their vulnerability to those hazards, and their adaptive capacity to respond to them. While this information is collected in some countries, there are often challenges in bringing it together and having the capacity to utilise it for decision-making. This is particularly the case when it comes to lost and damaged data. It is crucial to understand how hazards have historically affected populations so as to inform the most effective actions for DRR and AA. Where possible, it is recommended that countries develop and maintain data platforms that collate the available risk information (United Nations Office for Disaster Risk Reduction [UNDRR], 2024) while also identifying gaps in that understanding and addressing them with new risk assessments done in line with the Global Risk Assessment Framework (UNDRR, 2024). Moreover, capacity-building programmes covering the ways to utilise that data for decision-making would greatly increase action and save lives. Lastly, countries would benefit from the laws and policies that establish data-sharing practices across ministries to assist in the collation and use of data for both AA and DRR more broadly.

Beyond risk information, AA and DRR efforts also require a strong collaboration between international, national, and local actors. Those at the local level are the most aware of the challenges they face and their need to address those challenges during disaster events. Therefore, they must be included in the identification of AA for natural hazards. This is increasingly important for communities at risk. The only way to ensure actions save lives and reduce risk is to confirm that DRR and AA are inclusive of those at-risk and that local community voices are included from the planning phase through the implementation phase. Therefore, local inclusion needs to be at the centre of DRR and AA through dialogue with local community leaders, civil societies, non-governmental organisations (NGOs), and others. Similarly, national governments need to create inclusive processes to ensure that local knowledge is reflected when implementing AA. Further, it is recommended that international organisations utilise the best practices of engaging local communities and creating inclusive DRR and AA to build further support for these efforts on the regional and global levels.

As AA strengthens national and local disaster risk management (DRM) systems by linking short-term to long-term DRR approaches, it also ensures that the gains in reducing disaster risks are maintained. In the context of ASEAN, two key documents shape AA and its implementation in the region: the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2021-2025 (ASEAN, 2020) and the ASEAN Framework on Anticipatory Action in Disaster Management (ASEAN, 2022). Incorporating AA into ASEAN's disaster management documents represents an expansion of ASEAN's enduring commitments to revolutionise and enhance disaster management practices across the region. These steadfast commitments find expression in various key documents, such as the 2015 Declaration on Institutionalising the Resilience of ASEAN and Its Communities and Peoples to Disasters and Climate Change (ASEAN, 2015), the ASEAN Vision 2025 on Disaster Management, the ASEAN Agreement on Disaster Management and Emergency Response Work Programme 2021–2025, and the ICT [Information and Communications Technology] Roadmap on Disaster Management for 2025 and Beyond (AHA Centre, 2019), amongst others. Moreover, these principles are embodied in the One ASEAN, One Response declaration (AHA Centre, 2018), which seeks to achieve a more rapid response (speed), mobilise greater resources (scale), and establish stronger coordination to ensure a united ASEAN response to disasters (solidarity).

By embracing AA, ASEAN Member States (AMS) can effectively translate these commitments into tangible actions and showcase their global leadership in disaster management by effectively mitigating the impact of disasters on vulnerable populations. This becomes even more relevant as the challenges of the climate crisis increase with frequent and more intense hazards affecting the region, and thus, the AA approach provides an effective tool in the disaster management arsenal of ASEAN. AA is strongest when it is paired with ASEAN's ongoing efforts in DRR, including in the areas of risk knowledge, local engagement, and inclusive action. Yet, with ASEAN's long history in addressing disaster events, there is ample opportunity and experience to build from and continue protecting the people in the ASEAN region.

Section One: Anticipatory Action to Address the Climate Crisis

Embracing AA is paramount in confronting the escalating challenges posed by the climate crisis. By proactively identifying and implementing strategic measures, we can mitigate its impacts, safeguard communities, and cultivate a sustainable future for generations to come. One example of AA that addresses the increasing climate change impacts is in the Philippines. Here, AA enables the government to invest in climate-resilient practices to protect farmers and fisherfolk. The recurring shocks of droughts, floods, and typhoons have devastating consequences, especially when combined with population growth and climate change. The increasing costs of disasters, along with existing vulnerabilities, make it increasingly difficult for communities to recover when disaster strikes (ASEAN, 2022).

In 2018–19, the Philippines became the site of one of ASEAN's pioneering AA tests when it launched one of the first pilots for drought AA. The Food and Agriculture Organisation (FAO), in collaboration with the Government of the Philippines, established an early warning monitoring and trigger system across the island of Mindanao. This system tracked a range of indices, including El Niño, rainfall, and vegetation and soil moisture through remote-sensing data (FAO, 2020).

By November 2018, the early warning system alerted authorities to a high probability of drought in Cotabato and Maguindanao provinces, posing a threat to the food security of at-risk families. With solid evidence in hand (FAO, 2020), FAO activated its Anticipatory Action Fund and quickly mobilised resources. Leveraging an existing AA protocol for Mindanao, FAO designed interventions tailored to the local context. The project targeted 1,500 households in Pigcawayan, Cotabato, and Datu Saudi Ampatuan, Maguindanao. Various measures were implemented to safeguard livelihoods and food security, including cash-for-work programmes to clear irrigation canals, small-scale irrigation systems for water management, and the distribution of drought-tolerant rice and vegetable seeds, along with fertilisers (FAO, 2020).

The benefit of acting on early warnings did not only reduce the drought impact but was also cost effective. For every dollar invested, families obtained USD 4.40 worth of avoided losses and other benefits. These benefits included a significant reduction in crop failures and higher yields of vegetables compared to families without access to drought-tolerant seeds and training (FAO, 2020). The project also enabled families to cultivate larger plots of land and grow a diverse range of vegetables, ensuring improved nutrition and food security. On average, each family harvested approximately 182 kilograms of vegetables during the project. The success of this initiative highlights the transformative power of anticipatory measures in building resilience amongst farming communities.

By combining early warning systems, targeted interventions, and timely financing, the pilot demonstrated the potential for AA to yield substantial benefits and contribute to sustainable agricultural practices in the face of climate-related challenges.

The AA approach in Mindanao shows that setting up tailored systems that pick up specific climatic data from local and international sources makes it possible to see trends unfold and start planning actions months before a drought. The drought-monitoring system was successful because it offered a clear step-by-step guide for different actions to take in response to pre-defined early warning triggers. The drought-triggering model is being refined and trialled, and the critical next step is to work with the Department of Agriculture and the Philippine Atmospheric, Geophysical and Astronomical Services Administration on how such triggers can be integrated into agro-meteorological practices and processes.

Alongside these developments, AA is also gaining a lot of interest amongst government and humanitarian actors in Cambodia. Elements of early warning systems, risk analytics and visualisation, contingency planning, and social protection systems can be brought together to enable risk-informed decision-making and the implementation of AA. The World Food Programme (WFP), in coordination with other humanitarian partners, will support the National Committee for Disaster Management to develop protocols and implement AA for climate hazards (WFP, 2023a).

Anticipatory Action to Strengthen the Disaster Risk Management Continuum

AA can build the resilience of affected populations, as the example from the drought AA pilot project in the Philippines showed (WFP, 2023b). At the same time, it can also have beneficial effects on post-event response activities, as at-risk communities are better prepared to deal with the shock (WFP, 2023b). However, in order to realise the potential of AA in reducing the need for emergency response and underpinning longer-term DRR and resilience building, governments in the ASEAN region need to invest in the foundational social protection systems upon which AA can be added. Strengthening nascent social protection systems by investing in their preparedness and adaptation is essential (United Nations Children's Fund [UNICEF], 2023).

Shock-responsive social protection needs a better connection to early warning systems and climate data. In some cases, it also needs a more humanitarian approach to be able to activate and respond timely, reaching the right people at the right time (UNICEF & WFP, 2023). Conversely, AA can benefit from the outreach of social protection programmes and structures to assist populations in a more scalable and sustainable way. By connecting them both, climate risks can be proactively managed to reduce humanitarian needs and prevent climate shocks from becoming major humanitarian crises.

In previous years, AMS have not only taken important steps towards risk proofing and adapting their social protection systems but also in building them from the ground up. In Cambodia and the Philippines, for example, where disaster and climate risks are high but where the social protection systems are under accelerated development, United Nations agencies have supported governments in developing their shock-responsive social protection frameworks and initiated the work on AA, connecting these with risk-monitoring tools for decision-making processes. After an initial phase of concept proofing and piloting, its institutionalisation and integration into regular DRR are the next steps (Hobson & Villanueva, 2024).

Countries like Indonesia, on the other hand, with more advanced social protection systems but currently very limited in their ability to respond to disasters, are strengthening their adaptive social protection capacity. Since 2019, the Indonesian Ministry of Planning has been developing a roadmap to guide the development and implementation of adaptive social protection. Nonetheless, government capacity at the subnational level remains too limited to expand its adaptive social protection and has requested technical support to facilitate the development of the corresponding action plan at the national and subnational levels (Hobson & Villanueva, 2024). United Nations and development partners are, therefore, supporting the government through the deployment of tools and training and the operationalisation of financing frameworks, including pre-arranged financing, to make timely and risk-informed decisions to manage risks and address multidimensional vulnerabilities.

Section Two:
Integrating Gender Equality and Social Inclusion

Central to the success of anticipatory action interventions is also the meaningful engagement of community members most exposed to risks, as well as networks representing women, children, persons with disabilities and other marginalised groups. Their experiences of past hazard events are the starting point for any identification of effective anticipatory actions. Appropriately reflecting the makeup of at-risk communities is key in the development of inclusive anticipatory action interventions.

The gender equality and social inclusion (GESI) approach provides a useful tool to support national governments in creating inclusive processes and ensuring that local knowledge is reflected when implementing AA. From June 2021 to March 2023, CARE International, Plan International, and World Vision collaborated in a consortium to implement a project focused on enhancing inclusive and gender-responsible forecast-based early actions for effective disaster preparedness, particularly in Viet Nam (CARE International et al., 2021).

The project focused on GESI in the context of AA by raising awareness, building capacity, and enhancing resilience amongst local communities and actors. Engaging them in policy processes through evidence-based advocacy and learning is crucial. Integrating a GESI lens into AA helps identify gender inequality gaps and addresses access to rights, ensuring that women, girls, people living with disabilities, and other marginalised groups do not suffer disproportionately from climate change and future disasters. The GESI lens promotes human transformation by reaching the most vulnerable people and challenging the root causes of vulnerability that sustain gender inequality and social exclusion. World Vision's toolkit for integrating GESI in design, monitoring, and evaluation was adopted. There are four steps to applying a GESI lens to the AA approach:

- **Step 1:** GESI objectives. How does your AA project align GESI objectives with the government's national strategy on disaster management?
- **Step 2:** GESI targeting. How does your AA project identify and target the most vulnerable?
- **Step 3:** GESI theory of change. Does your AA project include a theory of change to promote the change desired by the intervention and guide its outcome?
- **Step 4:** GESI Indicators. How does your AA project capture data for a specific GESI group or characteristic? These indicators often reflect the GESI inequalities amongst women, men, persons with disabilities, and other vulnerable groups. They also indicate what is needed to close the GESI gaps, can help track changes in the GESI-responsive programme implementation, and enrich understanding of the unique issues that affect a specific social group.

To achieve this, it is essential to continually review formal AA policies, plans, strategies, and tools through a GESI lens. The success of AA plans relies on incorporating GESI-focused and GESI-tailored activities, along with specific GESI indicators that are intended to measure programme-driven change (World Vision, 2023) and are backed by adequate budgets. Similarly, AA programmes should proactively address discriminatory social norms and exclusionary practices that prevail in crisis locations. Another fundamental aspect is promoting and nurturing women's leadership and the leadership of vulnerable groups in all AA decisions by giving prominence to their involvement in design, implementation, monitoring, evaluation, and budgeting. Having a GESI focal point in each AMS and allocating sufficient budgets are essential for building pre-positioned stakeholder networks ready to respond even before a disaster strikes.

Activating GESI-responsive AA makes disaster management more comprehensive, accessible, and participative, employing both top-down and bottom-up approaches working alongside governments, stakeholders, and communities.

In Viet Nam, the successful piloting of GESI integration in AA resulted in targeted early actions, such as providing hygiene kits, milk, and medicines to vulnerable groups, including women, girls, and persons with disabilities. Community satisfaction with the cash assistance during the activation of AA in 2022 was over 90%, leading to increased awareness about the importance of AA in disaster risk prevention, improved understanding of gender roles in decision-making, and recognition of vulnerable people's needs (CARE International et al., 2023).

GESI Challenges and Recommendations

Despite the potential benefits, several challenges hinder the integration of gender equality, social inclusion, and AA. These include a lack of understanding of the concept and terminologies, inability to develop reliable early warning systems and ensure a timely resource delivery, the need to bridge the gap between vulnerable groups and the humanitarian sector, the failure to address social and cultural barriers, and the lack of sufficient evidence and practical models to convince governments.

Educating decision-makers on the importance of GESI in AA and building technical capacity at all levels within AMS is crucial. Standardised GESI indicators should be developed and shared, and financial support for GESI tools, studies, research, and implementation should be sought. GESI indicators that address the needs and challenges of a diverse, marginalised group will also increase gender equality and social inclusion. Governments need to invest in upgrading technical capacity, securing service delivery, and adjusting financial legislation to enable pre-disaster fund release. Integrating GESI requires institutionalising it within government structures; collecting and using sex, age, and disability disaggregated data; providing capacity-building opportunities; and allocating resources in finance, human resources, and technology.

Pilot projects integrating GESI into community-based disaster management programmes can provide valuable insights on how to strengthen the capacity of marginalised groups in AA. NGOs like CARE International, Plan International, and World Vision have played a significant role in supporting GESI integration into AA in Southeast Asia. Their participation helped establish GESI focal points and capacity-building initiatives, strengthen community engagement, and develop standardised GESI indicators and evaluation tools.

To enhance awareness, knowledge, and skills on GESI in AA, training is crucial. The consortium partners have developed the GESI Responsive Anticipatory Action Training Module in partnership with ASEAN. This module aims to strengthen the capacity of AMS to ensure equal and inclusive participation of vulnerable groups within the ASEAN Anticipatory Action Framework in Disaster Management. It provides guidance on how to assess, analyse, and remove barriers for vulnerable populations, enabling them to access, participate, and contribute to decision-making and capacity building (ASEAN, 2023).

As ASEAN continues its journey towards enhanced disaster resilience, the collective efforts of communities, governments, NGOs, and stakeholders become increasingly crucial. Integrating GESI and AA in disaster management practices can help protect vulnerable communities, uphold human dignity, and build a stronger, more resilient, and future-ready ASEAN region for generations to come.

Section Three:
Local and National Partnerships for Coordinated Anticipatory Action

As AA is gaining momentum in the ASEAN region and the number of AA protocols is increasing, the need for a coordinated approach becomes more prominent. In the Philippines, the success of the AA approach led to a high number of actors and protocols, resulting in a call to reinforce not only the coordination mechanisms from the national to the subnational level (vertical coordination) but also between government stakeholders and humanitarian actors (horizontal coordination). Tapping into appropriate technical expertise within government partners is required — for example, on the harmonisation of triggers for priority hazards, such as typhoons and droughts, or on the selection of AAs that are most relevant in the local context — to support a scaled intervention with national, local government, and humanitarian partners.

The Philippines Anticipatory Action Technical Working Group (TWG) supports the Government of the Philippines to make sure that the existing AA protocols are aligned with national DRR priorities, and that social protection policies and plans, where applicable, can be used in anticipation. FAO is currently co-chairing the AA TWG together with the National Department of Social Welfare and Development (DSWD) and the National Disaster Risk Reduction and Management Council, which can play a key coordination role in scaling up AA at the national level.

Key AA partners, including the Philippine Red Cross, the Start Network, and the WFP, remain the core members of TWG, together with their co-leads from the national government agencies. The Philippines' Office of Civil Defense raised the need for mapping all the ongoing interventions in June 2022 to increase the synergies between the various projects and initiatives. This is being coordinated by FAO, the Start Network, and Humanity & Inclusion.

At the subnational level, FAO has supported the establishment of the AA TWG in the Bangsamoro Autonomous Region in Muslim Mindanao under the joint Sustainable Development Goals project. Relevant ministries are the co-chairs and members of TWG, as well as local authorities who serve as collaborating partners, like the Mindanao Development Authority, Philippine Atmospheric, Geophysical and Astronomical Services Administration, and the Regional Service Division.

Section Four:
Strengthened Disaster Risk Financing

Currently, AA is largely financed by international humanitarian actors and pooled funds, such as the United Nation's Central Emergency Response Fund, the International Federation of Red Cross and Red Crescent Societies' Disaster Response Emergency Fund, the Start Network's Start Fund Anticipation Window, and internal funds in United Nations agencies. Although AA has the potential to be financed through various existing sources, in many cases, this requires changes in policies and procedures to enable access to financing ahead of an emergency, particularly from national contingency funds and budgets.

Under the AA TWG in the Philippines, the Thematic Sub-Working Group on Policy, Financing and Institutionalisation, which is co-led by the WFP and the Philippines' Office of Civil Defense as well as the Department of Budget and Management, facilitated technical discussions and coordination with the government and humanitarian partners (FAO, Philippine Red Cross, and Start Network). The aim was to support the institutionalisation of AA in the national DRM system, which includes the development of the policy on the "Declaration of a State of Imminent Disaster" and related operational guidelines (National Disaster Risk Reduction and Management Council, 2022). The policy will allow local government units to access DRM funding, particularly from the Quick Response Fund and National Disaster Risk Reduction and Management Fund, to implement AA based on forecast triggers. Pending its approval, technical details of the policy's operationalisation will be developed. The draft policy is expected to be presented to the Congress and Senate by the end of 2023.

Besides humanitarian funds, a strong and well-financed social protection system can equally enable governments to act proactively and protect households and livelihoods before the main hazard reaches impact. However, there is a growing disparity between budgeted funds and actual spending for disaster response in Southeast Asia. As a result, governments in the ASEAN region are increasingly exploring alternative financial instruments and mechanisms to address different risks and funding needs associated with disasters. For instance, some countries are opting for new disaster risk financing (DRF) policies and mechanisms that encompass a broader range of agencies, allowing for more efficient access to additional funding. By adopting these innovative approaches, governments aim to enhance their disaster response capabilities and better protect their populations.

While the opportunities for linking DRF with shock-responsive social protection are becoming more recognised, comparatively little is known about the factors that enable or hinder such financing to reach those who need it the most in a quick, transparent, and efficient way (UNICEF, 2023). Risk financing enables governments to understand how much the scale-up mechanism — social protection systems in this case — could cost and develop appropriate strategies, with clarity on who pays to finance the response, i.e., how to position funding in advance so as to trigger assistance quickly.

When aiming at maximising the effectiveness of risk financing mechanisms for social protection, countries and stakeholders should consider two critical elements:

- **Understanding the benefits and operational considerations when matching DRF instruments with social protection systems in a given context/country.**
- **Having a policy framework in place and linking public finance management (PFM), DRM, and social protection thematic areas.**

When considering DRF instruments for social protection, five elements and questions should guide and inform decisions and policies, as outlined in the figure below (Figure 9.1).

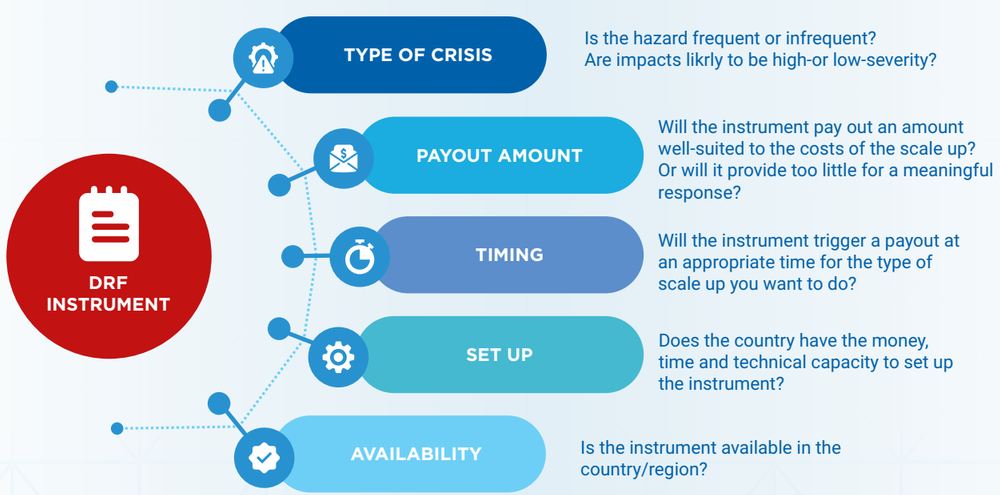

Figure 9.1. Criteria for considering the suitability of DRF instruments for social protection (Source: WFP, 2023b).

In ASEAN, Indonesia and the Philippines have considerably improved their capacity to integrate early warning systems and risk and vulnerability analysis into emergency decision-making. Ongoing efforts to link vulnerability analysis to existing social protection programmes have laid the foundations for strengthening pre-arranged financing. Current efforts include the United Nations-supported work for strengthening Indonesia's disaster early warning system, E-SIMBA. It has interoperability and connectivity with other risk information systems for enhanced decision-making on shock-responsive social protection interventions (UNICEF & WFP, 2023). In relation to DRF's adequacy and timing, the design of the risk financing instruments will determine their capacity to adequately address the essential needs of the poorest and most vulnerable in the aftermath (or anticipation) of disasters. Pre-arranged financing can facilitate the distribution of assistance in a timely manner, but ASEAN countries should not forget about their PFM systems. Finally, given Indonesia's and the Philippines' advanced stage of development in their respective DRF strategies as compared to their Southeast Asian peers, risk financing that is ready to be leveraged for financing shock-responsive social protection can be created and available in those two countries (Hobson & Villanueva, 2024).

According to the latest evidence available (UNICEF, 2023), the main source of funding for disaster response in Southeast Asia so far has been domestic finance. There are significant differences in the development of dedicated DRF instruments across the region, but overall, there is reliance on risk retention instruments (e.g., contingency loans and budgetary reserves and mechanisms) and international assistance, with limited use of market-based risk transfer mechanisms (UNICEF, 2023). The Philippines has the most comprehensive system in ASEAN and is the only country that has successfully transferred disaster risks to insurance markets. Regional efforts seem to be focused on the development of risk transfer instruments and risk pooling. However, findings from a recent regional study (UNICEF, 2023) point to these instruments only being useful because they are part of a comprehensive set of risk financing instruments that includes improvements on how risk retention instruments and PFM arrangements work. The Southeast Asia Disaster Risk Insurance Facility aims to assist governments that wish to develop their financing strategies for disasters as well as develop risk pooling mechanisms. But so far, its members (Myanmar, Lao PDR, and Cambodia) have yet to introduce such measures.

In general, evidence suggests that there is insufficient and inflexible financing for shock-responsive social protection (Hobson & Villanueva, 2024). Shock-responsive social protection relies on domestic and international development assistance in lower-middle- and low-income countries, in particular, for supporting system strengthening and the provision of non-contributory social assistance (Hobson & Villanueva, 2024). However, shock-responsive social protection and DRM sectors are chronically underfunded compared to actual need (Longhurst et al., 2021). As a result, there is still a (very) long way to go before finance is pre-arranged as much as it could be — studies suggest only 2 – 3% of crisis financing is arranged in advance (Plichta & Poole, 2023).

Conclusion and Recommendations

AA offers an effective, efficient, and more dignified way of providing humanitarian assistance for AMS while also providing at-risk communities the opportunity to strengthen their resilience. ASEAN has made considerable efforts in advancing the AA agenda with two key documents: the ASEAN Framework on Anticipatory Action in Disaster Management and the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2021-2025. These regional documents provide the backbone for the national-level implementation of AA and ensure strengthened resilience across the DRM spectrum. Based on experience and evidence from national- and local-level implementation, the following recommendations can be made:

- **Risk awareness:** AMS would benefit from data platforms that collate available risk information. Such platforms should allow data sharing across ministries to ensure use for both AA and DRR.

- **Local and national coordination:** National and subnational TWGs provide AMS with an effective way of ensuring coherence and alignment when setting up and implementing AA. Strengthened collaboration across humanitarian and development TWGs will ensure coherency.

- **Gender equality and social inclusion:** Educating decision-makers on the importance of GESI in AA and building technical capacity at all levels within AMS is crucial. Standardised GESI indicators should be developed and shared.

- **Shock-responsive social protection:** Investments in foundational social protection systems upon which AA can be added will provide AMS with a more resilient structure to address multidimensional vulnerabilities.

- **Disaster risk financing:** AMS should continue to advocate for ex-ante financing, which allows for timely AA implementation, while also exploring market-based risk transfer mechanisms.

Continuing on its path to institutionalise and streamline AA, ASEAN has become a leading example not only to its Member States but also to other intergovernmental organisations beyond the ASEAN region. As a global leader in AA, ASEAN safeguards and enhances the resilience of its communities and, in turn, of the whole ASEAN region.

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#10

Policy Research for Policy Proposal for the People:

Drought Modelling for Post Disaster Needs Assessment in Thailand

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#10

Policy Research for Policy Proposal for the People: Drought Modelling for Post-Disaster Needs Assessment in Thailand

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Abstract:

In Thailand, drought stands out as a recurrent and economically burdensome disaster, posing challenges in its early detection due to the complex nature of its physical indicators. Consequently, once drought manifests, it often proves too late to mitigate its detrimental effects. This study endeavours to construct a drought assessment model tailored for application within the context of Post-Disaster Needs Assessments (PDNA). The Thai National Research Council supported this research as a pilot project in four northeastern provinces: Buriram, Chaiyaphum, Nakhon Ratchasima, and Surin. The study's core concept involves the development of a drought model that harnesses satellite imagery and indices in conjunction with in-depth interviews to extract socioeconomic factors, thereby enhancing the quality of outcomes for policymaking. The research employed a triangulation approach to identify and assess recurring drought-affected regions, combining physical evidence with oral testimony from local people. The outcome of this effort includes creating drought risk maps generated from Landsat satellite imagery and validated through the Analytic Hierarchy Process (AHP). The project holds significant value for the PDNA organisation and local communities in areas prone to repeated droughts. Additionally, local authorities can utilise the findings to explore water storage solutions in severely affected regions, contributing to long-term drought prevention efforts.

Keywords: Policy Research, Drought, Geographic Information System, Analytic Hierarchy Process, Remote Sensing, Post-Disaster Needs Assessments

Introduction

In the Handbook of Drought Indicators and Indices, the World Meteorological Organization and Global Water Partnership define drought as a slow-onset natural disaster and not merely a lack of rain; it is a gnawing scarcity of water that infiltrates the arteries of human life, impacting economies, societies, and environments with a subtle yet devastating force. Historically, detecting and analysing droughts proved akin to chasing shadows, leaving communities and policymakers at the mercy of their unpredictable wrath. However, advanced technology, such as remote sensing, has brought forth a ray of hope. This powerful technology acts as a vigilant sentinel, scanning vast landscapes from space. Like a meticulous cartographer, it paints a picture of the drought's footprint, measuring the parched earth's thirst and mapping the severity of its grip. Satellite imagery, once a futuristic notion, has become a crucial tool in the fight against drought. By analysing vegetation cover changes, soil moisture, and land surface temperature, researchers can pinpoint areas experiencing water stress with unprecedented accuracy. This newfound clarity empowers policymakers to transition from reactive to proactive measures. Armed with insights gleaned from remote sensing, they can embark on a crucial mission — policy research — a quest to understand the insidious spread of drought and build resilience against its future attacks (World Meteorological Organization & Global Water Partnership, 2016).

This research takes a two-pronged approach. Firstly, a "drought simulation framework" is constructed, a digital tapestry woven from satellite data and expert insights. This framework becomes a virtual battlefield, allowing policymakers to strategise against the drought's potential moves. Rainfall patterns, soil characteristics, and historical data are incorporated to create a dynamic model predicting future droughts' likelihood and severity. Additionally, a "drought indicator," crafted by regional experts, whispers the severity of the drought's touch in each corner of the land. Often quantified using metrics like the Normalised Difference Vegetation Index, this indicator becomes the battle cry, urging immediate action and targeted interventions. Policymakers can prioritise resource allocation and optimise drought relief efforts by pinpointing areas facing the most critical water shortages. However, understanding the enemy's tactics is not enough. The scars of drought need to be seen. This is where the geographic information system, a mighty warrior armed with maps and data, comes into play. It meticulously scans the ravaged land, quantifying the drought's toll — from withered crops to empty reservoirs, it paints a stark picture of the disaster's aftermath. By overlaying satellite imagery with data on infrastructure damage, agricultural losses, and population displacement, the geographic information system comprehensively assesses the situation on the ground.

With this knowledge, policymakers can finally shift their gaze to the future. They envision communities bouncing back and public utilities rising anew, stronger, and more resilient. Their recommendations become a beacon of hope, a blueprint for rebuilding a land ravaged by thirst. This might include investments in drought-resistant crops, improved water management infrastructure, and early warning systems to alert communities of impending water shortages. The story of drought transcends national borders, demanding a united front. In Southeast Asia, the Association of Southeast Asian Nations (ASEAN) has risen to the challenge, spearheading regional cooperation through the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Programme 2021–2025. Additionally, "Priority Programme 4" emphasises developing policies, planning for recovery, and establishing institutional frameworks for post-disaster assessment and resource mobilisation.

Thailand, an ASEAN Member State, actively adopts these global frameworks into the National Plan for Disaster Prevention and Mitigation (2021–2027). This plan prioritises timely, fair, and impartial assistance to disaster victims based on individual needs. Ultimately, the highest goal in drought prevention is to achieve rapid recovery and long-term sustainability.

Literature Review

Drought is characterised by prolonged periods of insufficient rainfall, either out of sync with the usual seasonal patterns or in regions distant from water sources, resulting in aridity in the land surface and underground aquifers. This phenomenon can manifest at any time of the year and affect a wide range of geographical landscapes, with its duration being inherently uncertain. Drought can impact a minority or even the majority of a nation's population and exert adverse effects on ecosystems and natural resources, ultimately influencing the well-being of all living organisms (Chankaew, 2008; Thai Meteorological Department, 2012); World Bank, 2006). Drought is typically categorised into four distinct types, contingent on the underlying causes of its occurrence: meteorological drought, agricultural drought, hydrological drought, and economic and social drought (Wilhite & Glantz, 1985).

Drought in Southeast Asia

Southeast Asia is in the clutches of a relentless drought, a slow-burning disaster with far-reaching consequences. Unlike sudden floods or earthquakes, droughts creep up insidiously, their cumulative impacts devastating, particularly for the region's most vulnerable populations. Inequality widens, and the land itself bears the scars of this unfolding crisis. Recent droughts, most notably those of 2015–2016 and 2018–2020, stand out as the most severe and destructive disasters in the ASEAN region (ASEAN, 2021). These dry spells are intricately linked to large-scale oceanic and atmospheric factors like El Niño, Pacific sea surface temperatures, and Indian Ocean patterns. These forces wreak havoc in both mainland Southeast Asia and the Maritime Continent.

Drought in Thailand

Zooming in on mainland Southeast Asia, Thailand emerges as one of the most affected Member States by drought, according to data from EM-DAT (United Nations Economic and Social Commission for Asia and the Pacific [UNESCAP], 2019). The reports show that over 4.8 million people in the ASEAN region's reaches were parched by drought in the third quarter of 2018 alone (UNESCAP, 2019). The Royal Netherlands Meteorological Institute's study, "Projected drought severity changes in Southeast Asia under medium and extreme climate change," paints a concerning future (UNESCAP, 2019). The study analyses seven subregions across three time frames — historical, near future, and far future — to build two scenarios: a less severe El Niño and a more severe one. Both scenarios predict moderate-to-extreme droughts gripping Cambodia, Lao PDR, northern Viet Nam, and Thailand, including the northeast region of Thailand, in the far future under the 15/30-year return period.

Drought and Relations to the AADMER Work Programme 2025

The AADMER Work Programme 2021–2025 highlights the importance of the ASEAN Regional Plan of Action for Adaptation to Droughts 2021-2025 in developing Priority Programmes 1 and 2. ASEAN Regional Plan of Action for Adaptation to Droughts 2021-2025 outlines actions that will be taken to respond to the impact of drought on livelihoods, natural resources, and economic development, amongst others. These actions include adapting to future drought risks in a changing climate, strengthening collaboration and coordination with relevant actors, and enhancing capacity to deal with drought. "Action 1, Risk, impact, and vulnerability assessment" is particularly important for conducting national drought risk, impact, and vulnerability assessments. The implementation of this policy is also related to the AADMER Work Programme 2025 at the national policy level, particularly on Priority Programmes 1 and 2. These programmes highlight the development and utilisation of tools for risk assessment, as well as the strengthening of climate modelling and forecasting capacity, especially for slow-onset disasters such as droughts. Additionally, this policy research contributes to the implementation of Priority Programme 4, which focuses on developing policies, planning for potential recovery, establishing institutional frameworks, conducting post-disaster assessments, and improving resource mobilisation for recovery.

Drought Characteristics

Droughts, characterised by a sustained period of abnormally low precipitation, are not singular events confined to specific regions. Their occurrence intricately aligns with diverse climatic patterns, painting a complex picture of global water scarcity. This article delves into the interplay between climate patterns and droughts, focusing on the influence of atmospheric moisture, high-pressure systems, and prominent ocean-atmosphere oscillations like El Niño and La Niña. Additionally, it explores the multifaceted nature of droughts through the lens of three distinct types: meteorological, hydrological, and agricultural. The delicate balance of water vapour in the atmosphere lies at the heart of drought formation. Precipitation suffers when this vital component dips below average levels, paving the way for dry spells. High-pressure systems further exacerbate the situation by hindering evaporation and suppressing atmospheric moisture. These systems act like atmospheric lids, trapping warm air aloft and preventing it from rising and condensing into rain clouds. The dynamic duo of El Niño and La Niña, oceanic oscillations in the Pacific Ocean, play a significant role in disrupting global precipitation patterns. El Niño, characterised by warmer-than-average surface temperatures, alters storm tracks, leading to droughts in regions like Indonesia and Australia. Conversely, La Niña, marked by cooler sea surface temperatures, shifts precipitation patterns, increasing the likelihood of droughts in North and South America.

Recognising that droughts manifest in a spectrum of intensities is crucial. Meteorological drought, the simplest form, arises from a precipitation deficit compared to historical averages. Hydrological drought, however, takes this deficit a step further, highlighting its impact on water resources like streamflow, soil moisture, and reservoir levels. Finally, agricultural drought bridges the gap between physical water scarcity and its tangible consequences. When the types of droughts mentioned above impinge upon agricultural activities, limiting soil moisture or impacting irrigation availability, agricultural drought takes hold. Understanding the intricate relationship between climate patterns and droughts is paramount in effectively mitigating their impacts. We gain valuable insights into drought triggers and potential forecasting avenues by acknowledging the influence of atmospheric moisture, high-pressure systems, and oceanic oscillations. Recognising the different types of droughts allows for tailored interventions — meteorological droughts might prompt water conservation campaigns, while agricultural droughts might necessitate alternative irrigation strategies.

The severity of drought Is characterised by its distinctiveness in terms of duration and geographical boundaries. To evaluate drought severity effectively, employing drought severity indices is a widely recognised approach (World Bank, 2019). Notably, indices such as the Standardized Precipitation Index and vulnerability, which encompasses a range of physical, social, economic, and environmental factors and processes that increase susceptibility at the individual, community, asset, and sectoral levels, have been employed (World Bank, 2019). Economic factors encompass indicators like the gross domestic product index, agricultural product values, and poverty levels, while social factors include population demographics and age distribution. Structural factors include agricultural coverage within irrigation areas, road and street density, and water recycling systems. Consequently, assessing regions at risk of drought provides essential information for water management and lays the groundwork for drought preparedness efforts in the future. In the context of existing literature, methods for assessing and analysing drought-prone areas involve information overlap analysis, hierarchical analysis, proficiency assessment by region, and vulnerability analysis, amongst others.

Assessment

The Post-Disaster Needs Assessment (PDNA) serves as a crucial evaluation tool following disasters, enabling the identification of immediate mitigation measures. This assessment considers the multifaceted impact of disasters on human, societal, cultural, economic, and environmental dimensions. Collaboration amongst esteemed entities such as the World Bank, the European Union, and the United Nations is pivotal in pursuing comprehensive methodologies that unite analytical approaches, tools, and specialised techniques tailored to assist disaster-affected populations. These strategies must be devised with a comprehensive understanding of damages, losses, rehabilitation requirements, and the imperative need to restore normalcy.

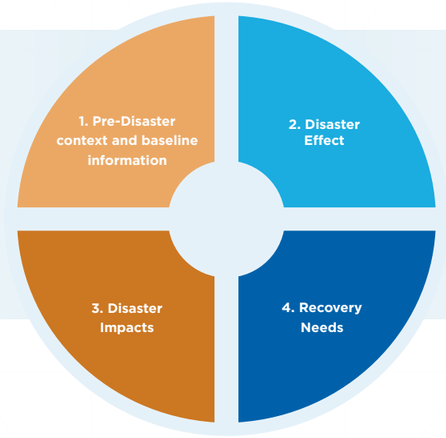

Figure 10.1 The core elements of Post-Disaster Need Assessments (PDNA) (Source: United Nations, 2013)..

The assessments can be described as follows:

Damage and loss assessment (DaLA) entails a quantitative evaluation of the repercussions following disasters. It relies on data gathered from secondary sources within disaster-affected areas and is primarily employed to rectify infrastructure damage. DaLA comprises three key components: damage assessment, loss assessment, and the computation of the losses' monetary value, which has an overarching impact on the overall macroeconomic indicators.

Damage and needs assessment, on the other hand, appraises the impact of disasters and analyses the requirements of disaster-affected individuals. This assessment evaluates individual" emergency management capabilities and their needs for assistance from affiliated organisations, encompassing aspects such as dietary needs, access to potable water, healthcare, hygiene, waste management, shelter, and other essential resources. Damage and needs assessment is a crucial step in safeguarding human survival and can be executed in various forms, including rapid assessment, comprehensive assessment, and continuous monitoring.

Methodology

Study area

In this study, a drought simulation framework has been devised to evaluate post-disaster requirements in four regions of Thailand: (1) Chaiyaphum province, (2) Nakhon Ratchasima province, (3) Surin province, and (4) Buriram province, spanning from 2017 to 2021.

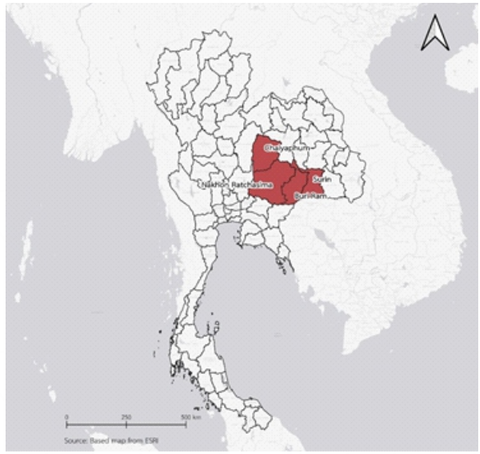

Figure 10.2 Map of study area (Source: GISTDA, 2023 processed by Authors).

Methods

1. Policy research: This research aims to solve the root cause of the yearly repetitive drought in Thailand. The research team collected the data from many key stakeholders as primary and secondary data, with the technical analysis combining science, technology, and economic and social perspectives. The result of policy research as a policy proposal served and supported policymakers at a high level, which covered the recommendation and communication of policy research to policymakers.

2. Mixed-methods research consists of quantitative research and qualitative research: The many kinds of drought severity methodologies were analysed by satellite imagery and the engineers on the research team who worked with the on-the-ground data to calibrate it for the high precision and accuracy needed for the drought modelling that was developed in this research.

3. In-depth interviews of high-level policymakers for drought management at the provincial level: The province governor, agricultural provincial officer, head of the provincial Office of Disaster Prevention and Mitigation, district chief, and village headman were crucial key people to interview in-depth, along with the farmers and villagers who were affected by the repetitive droughts in the study areas.

4. Spatial analysis to determine drought vulnerability index: The drought vulnerability index was analysed by rating scores and evaluations by specialists, using the Analytic Hierarchy Process (AHP).

5. Defining the scope: The construction of this framework relies upon four key factors: meteorological drought, which was assessed based on rainfall levels in a given area; agricultural drought, which was evaluated through the growth and development of vegetation; hydrological drought, which was analysed with respect to available water sources; and economic and social drought, which was examined through the resources and resource needs of the local population in each area.

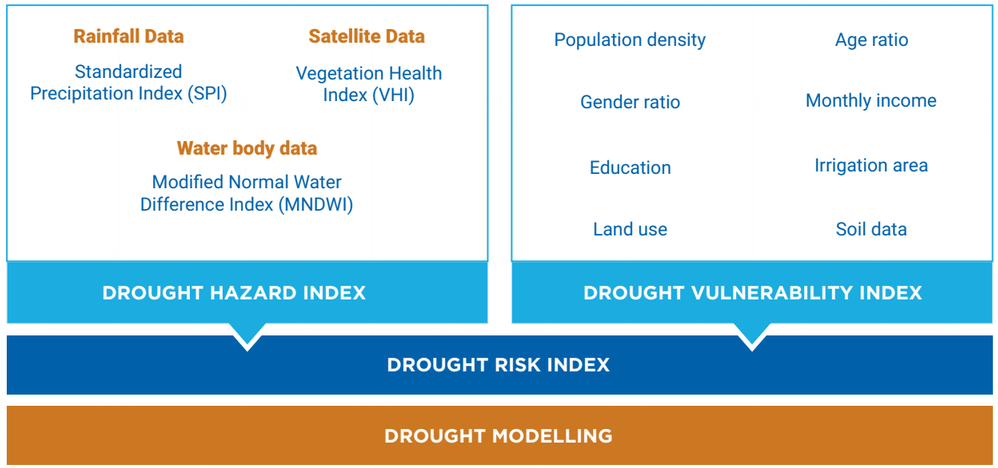

Figure 10.3 Research methodology.

Results and Discussion

The fight against drought demands accurate and timely data to inform effective mitigation strategies. Unfortunately, traditional bottom-up data collection methods, reliant on ground-level reports from affected communities, often fall short due to inherent limitations. This study explores the inefficiencies of a solely bottom-up approach. It proposes a novel two-way system, encompassing ground-level data and satellite imagery analysis, to empower high-level policymakers with robust information for informed drought management decisions. The in-depth interviews with high-level policymakers in drought-prone provinces revealed a stark reality. The existing bottom-up method, where community reports traverse a layered chain of command, proves vulnerable to delays and distortions. Policy considerations can hinder the flow of information, resulting in a fragmented picture of the drought's true extent and impact.

Consequently, root causes remain unaddressed, perpetuating an unfortunate cycle of recurring droughts. The research team proposed a two-pronged approach to break free from this cycle. Building upon the existing community reports, the first prong leverages satellite imagery analysis. This technology offers a bird's-eye view, providing valuable insights into vegetation health, surface temperature patterns, and precipitation data within vulnerable regions. These insights and on-the-ground reports paint a more comprehensive picture of the drought's severity and distribution. The second prong of the proposed system employs the AHP to analyse the multifaceted nature of drought vulnerability. This method facilitates the integration of diverse factors, such as socioeconomic conditions, infrastructure availability, and environmental sensitivity, into a single quantitative score. By applying AHP to data gleaned from satellite imagery and community reports, the research team categorised high-risk regions into five distinct levels of drought severity: very low, low, moderate, high, and very high.

This categorisation system, visualised in Figures 10.4 and 10.5, empowers policymakers to prioritise interventions according to the unique needs of each region. Water conservation initiatives might suffice for areas experiencing mild drought, while moderate drought zones might require additional support, such as improved irrigation systems or drought-resistant crop varieties. Emergency response measures and long-term infrastructure development efforts become crucial in regions classified as high-risk or extreme. By transitioning from a solely bottom-up approach to a comprehensive system that incorporates both ground-level reports and satellite-driven insights, this research paves the way for a paradigm shift in drought management. By equipping policymakers with accurate and multifaceted data, this two-way system can break the cycle of recurring droughts, build resilience, and safeguard communities from the devastating impacts of water scarcity.

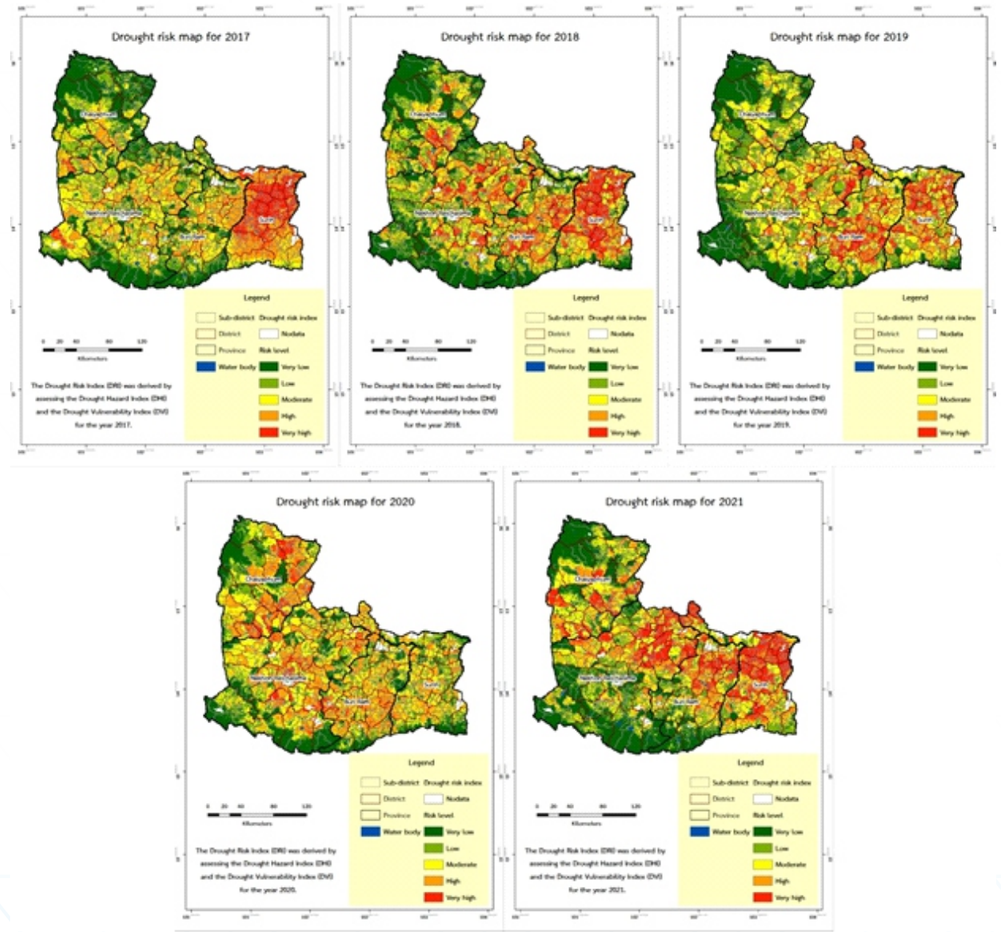

Figure 10.4 Drought risk maps (Source: DDPM), based on research field assessment in January 2022 with calibration to drought modelling from 2017–2021, as shown in Figure 10.3).

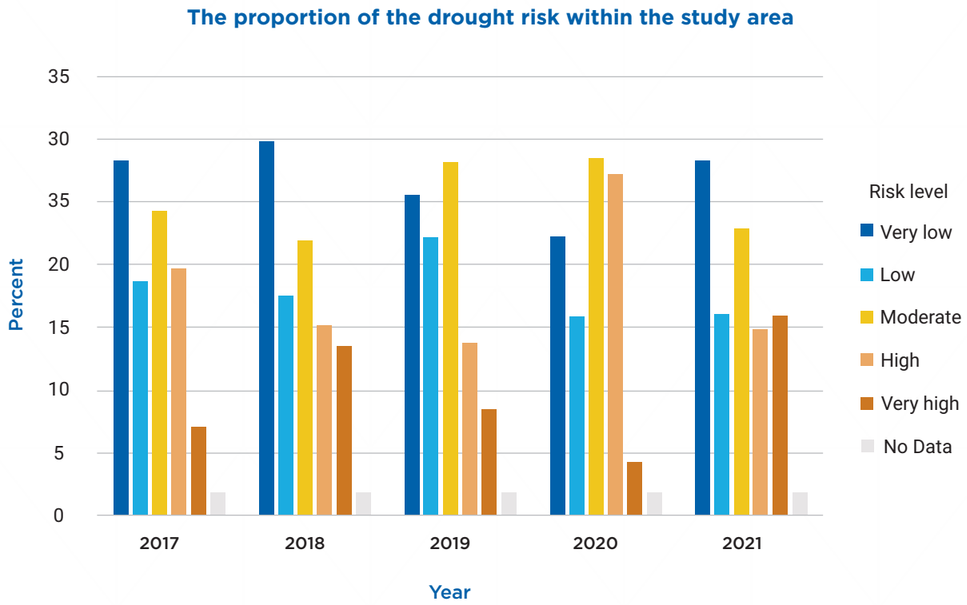

Figure 10.5 Proportion of drought risk in each level (Source: DDPM, based on research field assessment in January 2022 by using in-depth interviews and AHP).

This study delves into the findings of a study that utilised the Drought Risk Index (DRI) to categorise drought-prone regions in Thailand across five distinct severity levels, revealing compelling insights into the spatial distribution and temporal trends of drought risk. The DRI analysis paints a nuanced picture of drought vulnerability across the country. As depicted in Figure 10.4, mountainous and forested areas, represented by dark and light green hues, exhibit the lowest levels of risk. However, a concerning trend emerges — these very areas are experiencing a decline in size due to deforestation and development. This shrinking buffer zone potentially exposes adjacent regions to heightened drought vulnerability.

Conversely, areas marked by yellow, orange, and red, signifying moderate, high, and severe drought risk levels, respectively, showcase an alarming upward trajectory in Figure 10.6. This expansion of high-risk zones underscores the increasing urgency of proactive drought management strategies. The study cross-referenced them with official drought notifications issued by various organisations. Notably, Thailand's Department of Disaster Prevention and Mitigation's (DDPM's) records indicate a surge in notifications during 2019 and 2020, further validating the DRI's assessment of heightened drought risk during these years. A particularly stark example comes from Nakhon Ratchasima province. In 2019, the frequency of drought events experienced a 64-fold increase, impacting 29 districts and causing economic losses exceeding THB 200 million. This stark illustration underscores the devastating economic consequences of severe drought events.

The analysis reveals valuable insights into Thailand's spatiotemporal dynamics of drought risk. While mountainous regions currently boast lower risk levels, their diminishing expanse raises concerns about potential spillover effects on surrounding areas. The alarming expansion of high-risk zones emphasises the need for immediate action to build resilience and implement proactive mitigation strategies. Furthermore, the cross-referencing with official drought notifications strengthens the validity of the DRI analysis and highlights the severity of recent drought events, as exemplified by the case of Nakhon Ratchasima. By unveiling spatial trends and severity levels, this study equipped policymakers and stakeholders with crucial data to inform evidence-based drought management strategies. By tailoring interventions to the specific needs of each risk zone, from water conservation initiatives in mildly affected areas to infrastructure development in high-risk zones, proactive approaches can be implemented to combat drought's devastating impacts.

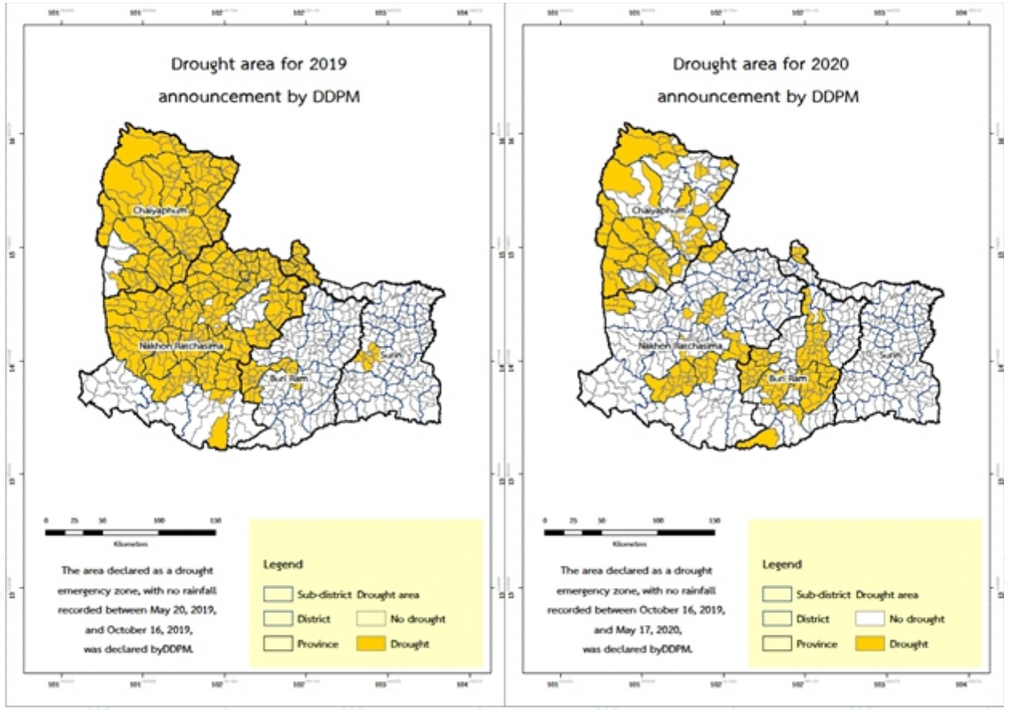

Figure 10.6 Drought area announcements by DDPM (Source: DDPM).

Drought	Year			
	2017	2018	2019	2020
Number of Drought Events (Times)	1	26	64	31
Number of Affected Areas (Sub district)	1	22	29	14
Number of Affected Household (Household)	172	30,769	473,975	138,688
Affected Area (Square KM)	3.04	1,441.50	5,440.16	217.41
Loss Assessment (THB)	-	4,987,872	245,966,096	100,661,709

Table 10.1 Drought and damage statistics of Nakhon Ratchasima (Source: DDPM Nakhon Ratchasima, 2021).

As a DaLA for drought occurrence in four provinces in 2020, the study showed that the affected people lost a total of THB 1,100,244,150 in agricultural products. However, the government subsidised the financial amount, which was only THB 468,372,079. Therefore, the lack of replenishment caused a decrease in economic growth and social degradation.

Province	The affected area (data by DDPM and DOAE)			Damage and loss analysis (THB) (data by researcher)	Subsidisation by Government (THB) (data by DOAE)
	Rice (square km)	Field Crop (square km)	Horticulture (square km)		
Buriram	527	-	-	817,207,595	367,207,595
Chaiyaphum	-	-	0.5	1,215,000	502,775
Nakhon Ratchasima	44	43	-	281,821,555	100,661,709
Surin	No Drought Announcement by Government			-	-
Total	571	43	0.5	1,100,244,150	468,372,079

Table 10.2 Drought and damage analysis in comparison with government subsidisation (Source: DDPM, Department of Agricultural Extension (DOAE), and Ministry of Agriculture and Cooperatives, based on research field assessment in January 2022 with DaLA).

From the data on lack of replenishment, the study of recovery framework is listed in three perspectives as follows:

1 Encourage better recovery and create a safer environment by risk reduction and prevention.

- The government shall provide a suitable location for water storage and investment in public infrastructure.
- The government shall use and develop science and technology to analyse the damage and loss of agricultural products. Moreover, it shall implement forecasting and early warning for prevention and mitigation measures.

2 Enhance the capacity of communities.

- The government shall promote the concept of "smart farming," where farms use technology, sensors for observation, and crop data analysis to optimise farming activities.
- The government shall promote the concept of "self-sufficient farming" in case the government-provided infrastructure is lacking. Some small farming businesses and activities could still proceed during the dry season.

3 Strengthen the structure of the economy.

- The government shall invest in the infrastructure for water irrigation and agricultural issues and provide the long-term budget in the provincial plan.
- The government shall introduce side jobs for farmers when drought forces them to abandon farming activities.
- The farmers shall create value for the agricultural product, such as by telling the brand story, to build the connection between the emotional and functional needs of the customers.

Conclusions and Recommendations

This research initiative comprehensively investigated and synthesised a simulation framework aimed at drought assessment. This framework is based on remote-sensing technology and employs drought indices to quantify drought severity while concurrently evaluating the vulnerability of affected regions. It addresses crucial post-disaster requirements. It is imperative to underscore that drought, marked by its gradual onset, eludes visual detection, thereby engendering challenges in demarcating high-risk zones and facilitating post-disaster relief efforts. The retrospective analysis in this study spans from the village to the district and provincial levels, encompassing a statistical retrospective assessment of drought occurrences. It is noteworthy, however, that data collection and comprehensive analysis at the village level during field investigations have not been uniformly executed. This deficiency has resulted in an incomplete problem-solving system and the unfortunate recurrence of disasters in these areas.

The researchers have formulated and put forth a set of policy recommendations to assess drought severity, as outlined below:

1. The DDPM and its affiliated organisations should establish methods for detecting and evaluating drought severity through remote-sensing techniques. The information obtained should be cross-referenced with reports from local communities to enable leaders to delineate drought boundaries accurately. This approach ensures comprehensiveness and equity in government assistance.

2. The DDPM and its affiliated organisations should allocate responsibilities amongst their personnel for assessing damages, losses, and post-disaster needs. The gathered information should be systematically compiled for further analysis.

3. The DDPM and its affiliated organisations should actively promote awareness and knowledge regarding preparing and using water storage equipment for households and agricultural purposes.

4. To address drought-related challenges in the long term, the DDPM, academic institutions, and the public organisation Geo-Informatics and Space Technology Development Agency (GISTDA) should collaborate on water resource management initiatives. This collaborative effort will support sustainable water distribution systems, benefitting both economic and agricultural sectors.

5. To progress towards concrete drought mitigation and management policies, considering the ongoing reality, necessitates cooperation from all relevant organisations. Therefore, it is recommended that a formal agreement be proposed with the DDPM to streamline and expedite the assessment of mitigation plans, including early warning systems, for all stakeholders involved.

In due course, the researchers have formulated a data analysis system aimed at delineating regions susceptible to drought to facilitate comprehensive disaster management. Concurrently, they have contributed to establishing drought alert stations overseen by the DDPM and its affiliated organisations. This system offers several advantages, including the capacity to promptly notify drought alert platforms, streamline responsibilities associated with repetitive tasks, and expedite the data analysis process.

Acknowledgements from the Research Team

The research project to develop a drought model for PDNA was jointly driven by a research team under the DDPM, Suranaree University of Technology, and Naresuan University, Thailand. This research project was funded by the National Research Council of Thailand. It has been successfully carried out due to the great support and kindness from executives of the DDPM and experts from the National Research Council of Thailand, who have kindly advised the framework recommendations and adjustments in various issues until this research was successfully completed.

The researchers would like to express our deepest gratitude, here in particular, to Mr Lee Yam Ming, Executive Director of the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre); Dr Sithu Pe Thein, AHA Centre's Director of Operations, and Mr Sadhu Zukhuruf Janottama, Disaster Monitoring and Analysis Officer at the AHA Centre, who visited the disaster-affected areas to collect field data and assess the drought-affected areas in the study area. The AHA Centre also supported the field data collection system and online platform results, linking the data with the ASEAN region.

Finally, the team hopes that the research presented in this article will drive policy proposals to develop a drought assessment system and lead to problem-solving at the policy level, which is a guideline for sustainable development in the future.

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Appendix

Documentation from the field assessment:

Image 10.1 Field Interviews in the assessment areas, 22 – 29 January 2023




Image 10.2 Key informant interviews in the assessment areas 22 – 29 January 2023






Image 10.3 Field observation in the assessment areas 22 – 29 January 2023



Profiles of the Authors

#1 Building Sustainable Resilience: Navigating Systemic Risks, Enhancing Resilience

Dr. Raditya Jati has served as Deputy Minister of System and Strategy at the National Disaster Management Authority of Indonesia (BNPB) since 2021. Prior to joining BNPB in 2014, he cultivated his expertise through academic and research positions at prestigious institutions like the University of Gadjah Mada and the Agency for the Assessment and Application of Technology for Indonesia. His distinguished career is marked by numerous international accolades, including awards from the German Academic Exchange Service (DAAD) and Ritsumeikan University (Japan). He holds a Doctoral Degree in Environmental Science from a joint programme between the University of Gadjah Mada and Utrecht University. He has authored publications like the annual Disaster Risk Index of Indonesia and participated in various national and international training programmes. His long-standing collaboration with United Nations bodies and agencies is evident through his frequent invitations as a resource person and chairperson in their meetings.

Oktavi Andaresta is a Disaster Analyst at BNPB Indonesia. She is a former awardee of the German Academic Exchange Service (DAAD) scholarship. Her journey started at the University of Gadjah Mada as a student volunteer for the Disaster Emergency Response Unit (DERU), a research assistant for the Program on Humanitarian Action – Institute of International Studies (PoHA IIS), and a translator for the IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters. Her combined background in international relations and public policy has equipped her to represent the Indonesian delegation in various regional and international forums.

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Theophilus Yanuarto is a Public Information Officer at BNPB Indonesia. He has been working with the ministry since 2010. Before joining BNPB Indonesia, he worked with an international NGO based in West Timor and Buru that focused on refugees and IDPs. He has international experience conducting emergency responses for international assistance under missions of the Government of Indonesia and ASEAN-ERAT. He holds a Master's Degree from the University of Gadjah Mada and is actively writing for publications, articles, and books.

Fitriatun Hidayati joined BNPB Indonesia in 2016 and has served as a dedicated Secretary to the Deputy Ministry for Systems and Strategy since 2021. She previously honed her professional skills in the dynamic world of communications, working within the creative media of the private sector. She spent some time living and working in Germany, which broadened her cultural perspective and allowed her to develop fluency in the German language. This experience has proven invaluable in her role in facilitating communication with international partners. She holds a degree in Information Systems from Raharja University, further solidifying her organisational and problem-solving skills, which she now effectively utilises in BNPB.

#2 ASEAN Disaster Risk Sustainable Resilience: Incorporating Sustainable Development Goals into ASEAN Riskscape

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Dr. Joseph Green is an expert in the fields of risk information, social vulnerability, health outcomes, and disaster resilience. He has supported humanitarian initiatives in ASEAN since 2016. His background includes over two decades of analytical work, a position as a research fellow at the Centers for Disease Control and Prevention, a Doctorate in Epidemiology from the State University of New York at Buffalo, and a Master's in Medical Geography from the University of South Florida..

Lawrence Anthony Dimailig is the Assistant Director for Disaster Monitoring and Analysis of the AHA Centre. He has over nine years of experience in disaster information management, including field deployment to several emergency response operations in Indonesia, Lao PDR, and the Philippines. He is trained in both the ASEAN Emergency Response and Assessment Team (ASEAN-ERAT) and the United Nations Disaster Assessment and Coordination (UNDAC) methodologies. He graduated cum laude with a Bachelor of Science in Geography and completed academic units in a Master of Science in Geomatics Engineering (Geoinformatics) programme at the University of the Philippines Diliman.

Dr. Erin Hughey is the Director of Global Operations for the Pacific Disaster Center. A recognised leader in global disaster management and disaster risk reduction, she developed the only operationalised approach to the United Nations Sendai Framework for Disaster Risk Reduction. Known as the National Disaster Preparedness Baseline Assessment (NDPBA), this programme has been implemented by more than 20 countries worldwide and aids national, regional, and international disaster risk reduction initiatives. With a PhD in Geography, she has dedicated her life's work to the innovation and the application of new science and technology for disaster management — empowering practitioners and senior leadership alike with the tools and information needed to support data-driven decision-making.

Jasmine Alviar is a geographer with a decade of experience in geospatial technologies for disaster risk reduction and management. She specialised in airborne topographic and bathymetric surveys of disaster-prone areas to produce accurate baseline information for simulation of disaster scenarios and potential impacts, which are used to generate early warnings and inform plans and policies. In her years as a public servant, she advocated for the use of geospatial tools and technologies, data sharing and collaboration amongst agencies, and inclusive digitalisation towards transformative disaster risk reduction and management.

Mohammad Fadli currently serves as Pacific Disaster Centre (PDC) Liaison for the AHA Centre and is involved in the development of the PDC's National Disaster Preparedness Baseline Assessment (NDPBA) for Indonesia. He has experience as a Climate Information Services Advisor who is involved in mainstreaming climate change adaptation and disaster risk reduction in Indonesia. He has developed tools for catastrophe risk analytics, damage and loss assessment, and land-use planning, as well as being involved and leading various implementations of early warning systems and information systems in the geosciences, environmental and disaster fields.

#3 The Disaster-Threat Passivity Phenomenon: A Concept Analysis

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#4 Towards Better Information for Climate Resilience in Southeast Asian Informal Settlements

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#5 Enhancing Sustainable Disaster Management Solutions on Displacement in Southeast Asia Using Data-Driven Approaches

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#6 Catalysing Adaptive Social Protection for Sustainable Resilience in Southeast Asia: Gaps, Stakeholders, and Policy Mechanisms

Danang Azhari is a resilience and sustainability enthusiast with exposure to climate and disaster risk, risk governance, disaster and climate displacement, and environmental justice. He has worked as Deputy Program Manager of Resilience Development Initiative on various research and consultancies with various funders and clients, ranging from international to local level.

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Medhiansyah Putra is PIC for the Resilience Development Initiative's Disaster and Climate Resilience Cluster. He has been working in the field of disaster risk reduction, social protection, nature-based solutions, community resilience, and urban planning for the last 10 years and has worked together with various international and national institutions.

Eri Krismiyaningsih is a Research Officer of the Resilience Development Initiative. She has experience in the field of climate change adaptation and implementation of adaptive social protection at the sub-national level in Indonesia. She has a Master's Degree of Urban and Regional Planning, with research focus on disaster resilience planning for entrepreneurial groups.

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Fadilah Fitri Arsy is a Research Officer of the Resilience Development Initiative. Her experiences encapsulate developing implementation strategies for adaptive social protection at the sub-national level in Indonesia, working together with UNICEF and the Indonesian Government. She has a degree in Public Health, specialising in health system management.

#7 Unveiling the ASEAN-Civil Society Partnership: Navigating Disaster Resilience through Collaboration

Pamela Combinido is a Leader at the Humanitarian Advisory Group with over 10 years of combined research and evaluation experience. Her work spans a range of thematic areas including localisation, disaster risk reduction, diversity and inclusion, child protection, and gender equality. She earned her Master's in Sociology from University of Cambridge and is a recipient of the British Government's Chevening Scholarship in 2018.

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#8 Community-Based Disaster Risk Reduction in Rakhine State, Myanmar

Tin Maung Htwe is a dedicated sustainable development specialist with a strong focus on promoting sustainable development practices. With over five years of experience in Rakhine State, Myanmar, he has actively contributed to driving sustainable development initiatives. Currently affiliated as a Research Fellow at the Regional Center for Social Science and Sustainable Development at Chiang Mai University, he brings valuable expertise in designing and implementing sustainable development strategies. His work encompasses areas such as community-based disaster risk reduction, capacity building, and knowledge sharing. With a Master's Degree in Social Science in Development Studies, he has made significant contributions to academic publications, demonstrating his commitment to advancing sustainable development principles.

#9 Anticipatory Action for Disaster Management and Sustainable Resilience: Lessons from ASEAN Countries

Raymond Zingg is the Regional Anticipatory Action Coordinator at the Asia Pacific Regional Office of the International Federation of Red Cross and Red Crescent Societies (IFRC) and co-leads the Asia-Pacific Technical Working Group on Anticipatory Action. He has over 10 years of experience in disaster risk management, community-based early warning early action, and climate change.

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Sama Shrestha is the Programme Specialist at United Nations Women Nepal, leading humanitarian, disaster risk reduction and climate programmes. She has more than 18 years of experience working in different countries in complex conflict, post-conflict, development, and crisis continuum. Most of her experiences have been in providing leadership in managing different programmes in advancing gender equality and social inclusion in diverse thematic programmes.

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Vanda Lengkong is the Regional Head of Disaster Risk Management for Plan International Asia Pacific. She is a professional humanitarian worker and an active member of the AADMER Partnership Group (APG), which supports ASEAN work through the Disaster Management and Humanitarian Assistance (DMHA) division and the AHA Centre.

Additional contributions by CARE and the United Nations Office for Disaster Risk Reduction (UNDRR).

#10 Policy Research for Policy Proposal for the People: Drought Modelling for Post-Disaster Needs Assessment in Thailand

The Department of Disaster Prevention and Mitigation (DDPM) is a central government organisation of Thailand under the Ministry of Interior with a mandate to coordinate activities with all disaster risk management. It also formulates policies, guidelines, and measures to reduce disaster risk, as well as uses technology and innovation to support decision-making. DDPM is working under four main missions, which are (1) developing the system of disaster management to meet the standards by using technology and innovation, (2) developing the disaster database system to support the decision makers for disaster management, (3) developing resource management as human resources and equipment, and (4) building a strong network amongst disaster management agencies in all levels.

Palida Puapun is a Plan and Policy Analyst for the Department of Disaster Prevention and Mitigation of the Ministry of Interior, Thailand. Her work includes advocacy for all government levels of policy and involvement in disaster events at the fieldwork and policy levels. She devotes her time to implementing research-based policy, which supports solving the problems of socio-economic impact by using science and technology. She holds a Bachelor's Degree in Survey Engineering from Chulalongkorn University, Thailand and a Master's Degree in Civil Engineering from Leibniz University, Hannover, Germany.

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ISSN 1144-875X