INDONESIA

NATIONAL DISASTER PREPAREDNESS BASELINE ASSESSMENT

A DATA-DRIVEN TOOL FOR ASSESSING RISK AND BUILDING LASTING RESILIENCE

PDC | GLOBAL

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ACKNOWLEDGEMENTS

Pacific Disaster Center (PDC) would like to acknowledge all of the agencies and organizations who provided insightful input and guidance leading to the completion of this report, including all of the representatives who contributed to the National Disaster Preparedness Baseline Assessment (NDPBA) workshops, surveys, interviews, data validation, and analyses. We offer a special thanks to former Chief Doni Monardo, Chief Ganip Warsito, and their colleagues at Badan Nasional Penanggulangan Bencana (BNPB, or National Disaster Management Agency) for exemplary leadership throughout the project, as well as their remarkable commitment to saving lives, reducing losses, and building a safer, more disaster-resilient Indonesia. Lastly, terima kasih to Executive Director Lee Yam Ming, Former Executive Director Ibu Adelina Kamal, and the AHA Centre team for their strategic contributions to the NDPBA.

STATE MINISTRIES AND AGENCIES

- Kementerian Dalam Negeri (Ministry of Home Affairs)
- Kementerian Kesehatan (Ministry of Health)
- Kementerian Lingkungan Hidup dan Kehutanan (Ministry of Environment and Forestry)
- Kementerian Perencanaan Pembangunan Nasional/ BAPPENAS (Ministry of National Development Planning/ National Development Planning Agency)
- Badan Nasional Penanggulangan Bencana/BNPB (National Disaster Management Agency)
- Badan Meteorologi, Klimatologi, dan Geofisika/BMKG (Meteorological Climatological and Geophysical Agency)
- Badan Nasional Pencarian dan Pertolongan/BASARNAS (National Search and Rescue Agency)
- Badan Pusat Statistik/BPS (National Statistical Center)
- KPU (General Elections Commission or Komisi Pemilihan Umum)
- Otoritas Jasa Keuangan/OJK (Financial Service Authority)
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- Direktorat Jendral Kependudukan dan Catatan Sipil Kementerian Dalam Negeri (Directorate General of Population and Civil Registration, Ministry of Home Affairs)
- Badan Penelitian dan Pengembangan Kementerian Kesehatan/Balitbangkes (National Institute of Health Research and Development, Ministry of Health)
- Badan Penanggulangan Bencana Daerah/BPBD se-Indonesia (Regional Disaster Management Offices throughout Indonesia.

INDONESIA PARTNERS / INTERNATIONAL ORGANIZATIONS

- ASEAN Secretariat Office
- US State Department and US Embassy Jakarta
- UNDP (United Nations Development Programme)
- UNICEF (United Nations Children's Fund)
- UNOCHA (United Nations Office for the Coordination of Humanitarian Affairs)
- USAID (United States Agency for International Development
- WFP (World Food Program)
- AHA Centre
- PMI (Indonesian Red Cross Society - Palang Merah Indonesia)
- CSIS (Center for Strategic and International Studies)
- Pulse Lab Jakarta and UN Global Pulse
- Save the Children
- HOTOSM (Humanitarian Open Street Map Indonesia and Global)

LIST OF ABBREVIATIONS 1/6

AADMER = ASEAN Agreement on Disaster Management and Emergency Response

AAR = After-Action Review

ABTC = APEC Business Travel Card

ACDM = ASEAN Committee on Disaster Management

ADB = Asian Development Bank

ADPC = Asian Disaster Preparedness Center

ADRRN = Asian Disaster Reduction and Response Network

AEIC = ASEAN Earthquake Information Centre

AHA Centre = ASEAN Coordinating Centre for Humanitarian Assistance on disaster management

AKSARA = A monitoring and evaluation platform via the Indonesian Ministry of National Development Planning (BAPPENAS) initiated to further Low Carbon Development Indonesia (LCDI)

AMCDRR = Asia Ministerial Conference for Disaster Risk Reduction

AOR = Area of Responsibility

APBD = Ministry of Finance (MoF) Regional Budget

APBN = Ministry of Finance (MoF) State Budget

API-PRB = Adaptation to Climate Change and Disaster Risk Reduction

APEC = Asia-Pacific Economic Cooperation

ASEAN = Association of Southeast Asian Nations

ASEAN-ERAT = ASEAN Emergency Response and Assessment Team

BAPPENAS = Badan Perencanaan Pembangunan Nasional or National Development Planning Agency

BASARNAS = Badan SAR Nasional or National Search and Rescue Agency of Indonesia

BIG = Indonesian Geospatial Agency

BMKG = Badan Meteorologi, Klimatologi, dan Geofisika or Indonesian Agency for Meteorological, Climatological and Geophysics

BNI = Bank Negara Indonesia

BNPB = Badan Nasional Penanggulangan Bencana or National Agency for Disaster Management

BPBD = Badan Penanggulangan Bencana Daerah or Regional Agency for Disaster Management

BPPT = Badan Pengkajian dan Penerapan Technology or Agency for Assessment and Application of Technology

BRG = Badan Restorasi Gambut or Peat Restoration Agency

BRI = Bank Rakyat Indonesia

BSN = National Standardization Agency

BTN = Bank Tabungan Negara

Bulan PRB = Indonesia's Disaster Risk Reduction (DRR) Month

CAP = Common Alerting Protocol

CBDRM = Community Based Disaster Risk Management

CCA = Climate Change Adaptation

CDD = Community-Driven Development

CDE = Consortium for Disaster Education

CDP = Community Development Plan

CFE-DM - Center for Excellence in Disaster Management & Humanitarian Assistance

CIKR = Critical Infrastructure and Key Resources

COG = Continuity of Government

COOP = Continuity of Operations

CPI = Center for Public Impact

CSR = Corporate Social Responsibility

DESTANA = Disaster Resilient Village

DFAT = Development Cooperation by Australian Department of Foreign Affairs and Trade

DG-ECHO = European Commission Humanitarian Aid Department

DIBI = Data dan Informasi Bencana Indonesia or Indonesia Disaster Information and Data

DM = Disaster Management

DMA = Disaster Management Analysis

DMIE = Disaster Management Implementing Element

DPO = Disabled People's Organization

DPPN - Education Development Fund

DR4 = Indonesian Post Disaster Needs Assessment methodology

DRM = Disaster Risk Management

DRP = Disaster Resource Partnership

DRR = Disaster Risk Reduction

DRTF = Disaster Response Task Forces

DSP = BNPB Emergency Funds

ECLAC = Economic Commission for Latin America and Caribbean

EM = Emergency Management

EMT = Emergency Medical Teams

EOC = Emergency Operations Center

ERTF = Emergency Response Travel Facilitation

ESDM = Ministry of Energy and Mineral Resources

ESF = World Bank's Environmental and Social Framework

EWS = Early Warning System

FAO = Food and Agriculture Organization

FHH = Female-Headed Households

FPT-PRB - Higher Education Forum for Disaster Risk Reduction

GDP = Gross Domestic Product

GETI = The Global Education and Training Institute

GFDRR = World Bank's Global Facility for Disaster Reduction and Recovery

GHG = Green House Gasses

GIA = Geospatial Information Agency

GII = Gender Inequality Index

GIS = Geographic Information Systems

GITEWS = German Indonesian Tsunami Early Warning System

GIZ = Deutsche Gesellschaft fur Internationale Zusammenarbeit

GNI = Gross National Income

GOI = Government of Indonesia

GRDP = Gross Regional Domestic Product

HADR = Humanitarian Assistance and Disaster Relief

HAZMAT = Hazardous Materials

HDI = Human Development Index

HFA = Hyogo Framework for Action

HFI = Humanitarian Forum Indonesia

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HOTOSM = Humanitarian Open Street Map

IAP = ISDR Asia Partnership

ICCTF = Indonesian Climate Change Trust Fund

ICJR = Institute for Criminal and Justice Reform

ICRC = International Committee of the Red Cross

ICS = Incident Command System

ICT = Information and Communication Technology

IDF = Indonesia Disaster Fund

IDR = Indonesian Rupiah

IFRC = International Federation of Red Cross and Red Crescent Societies

IGO = Intergovernmental Organization

IKB = Flood Vulnerability Index

IKBB = Banjir Bandang Vulnerability Index

IKCE = Extreme Weather Vulnerability Index

IKD = BNBP Regional Resilience Index or Indeks Ketahanan Daerah

IKE = Economic Vulnerability Index

IKF = Physical Vulnerability Index

IKG = Earthquake Vulnerability Index

IKGEA = Gel Vulnerability Index. Extreme & Abrasion

IKK = Drought Vulnerability Index

IKKLH = Land & Forest Fire Vulnerability Index

IKL = Environmental Vulnerability Index

IKLGA = Volcanic Eruption Vulnerability Index

IKS = Social Vulnerability Index

IKT = Tsunami Vulnerability Index

IKTL = Landslide Vulnerability Index

IMDFF-DR = Indonesia Multi-Donor Fund Facility for Disaster Recovery

INA-DRTG = Indonesia-Disaster Relief Training Ground

InaSAFE = a free software developed jointly by Indonesia (BNPB), Australia (Australian Government) and the World Bank (GFDRR)

INA-SDI = An Indonesian, nationwide standardized-based map or Indonesia Spatial Data Infrastructure

InaTEWS = Indonesia Tsunami Early Warning System

INGO = International Non-governmental Organization

INSARAG = International Search and Rescue Advisory Group

IORAC = Indian Ocean Rim Association for Regional Cooperation

IOTWS = Indian Ocean Tsunami Warning System

IPKM = Community Health Indexes

IPSC = Indonesia Peace and Security Center Complex

IRBI = Index Rawan Bencana Indonesia or Indonesia Disaster Risk Index

ITB = Bandung Institute of Technology

ITU = International Telecommunications Union

JAFIP = Jakarta Flood Information Platform

JICA = Japan International Cooperation Agency

JITU PASNA = Post Disaster Needs Assessment

KEMEN ATR = Kementerian Agraria dan Tata Ruang or Ministry of Land and Spatial Planning

KEMEN ESDM = Kementerian Energi dan Sumber Daya Mineral or Ministry of Energy and Mineral Resources

KEMEN KKP = Kementerian Kelautan dan Perikanan or Ministry of Maritime Affairs and Fisheries

KEMEN KOMINFO = Kementerian Komunikasi dan Informatika or Ministry of Communication and Informatics

KEMEN PUPERA = Kementerian Pekerjaan Umum dan Perumahan Rakyat or Ministry of Public Works and Housing

KEMENDAGRI = Kementerian Dalam Negeri or Ministry of Home Affairs

KEMENDESA PDTT = Kementerian Desa, Pembangunan Daerah Tertinggal dan Transmigrasi or Ministry of Village, Disadvantaged Regions and Transmigration

KEMENDIKDA SBUD = Ministry of Education, Culture, Research and Technology

KEMENEG = Kementerian Agama Republik Indonesia or Ministry of Religious Affairs of the Republic of Indonesia

KEMENKES = Kementerian Kesehatan or Ministry or Health

KEMENSOS = Kementrian Sosial or Ministry of Social Affairs

KEMENTAN = Kementerian Pertanian or Ministry of Agriculture

KKNI = National Qualification Framework

KLHK = Ministry of Environment and Forestry

KPI = Key Performance Indicator

LAPAN = Lembaga Penerbangan dan Antariksa Nasional or National Institute of Aeronautics and Space

LCDI = Low-Carbon Development Indonesia Secretariat

LIPI = Indonesian Science Institute

LSP-PB = National Certification Agency for Disaster Management

M&E = Monitoring and Evaluation

MDGs = Millennium Development Goals

MDMC = Muhammadiyah Disaster Management Center

MHEWS = Multi-Hazard Early Warning Systems

MIC = Middle Income Country

MoEC = Ministry of Education and Culture

MoH = Ministry of Health

MOOTW = Military Operations Other Than War

MOU = Memorandum of Understanding

MPBI = Penanggulangan Bencana Indonesia or The Indonesia Society of Disaster Management

MSA = Ministry of Social Affairs

MSME = Micro, Small, and Medium Enterprises

MSS = Minimum Service Standards

MUSRENBANGNAS = Deliberation on National Planning and Development

NAP-DRR = National Action Plan for Disaster Risk Reduction

NDMO = National Disaster Management Office

NDPBA = National Disaster Preparedness Baseline Assessment

NDRF = National Disaster Response Framework

NGO = Non-Governmental Organization

NIMS = National Incident Management System

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OJK = Financial Services Authority

PANRB = Ministry of Administrative and Bureaucratic Reform

PDC = Pacific Disaster Center

PDNA = Post-Disaster Need Assessment

PKK = Pemberdayaan Kesejahteraan Keluarga or Empowerment Family Welfare

PLANAS PRB = Platform Nasional untuk Pengurangan Risiko Bencana or National Platform for Disaster Risk Reduction

PMI = Red Cross Society or Palang Merah Indonesia

PNPM = Program Nasional Pemberdayaan Masyarakat or National Program for Community Empowerment

PNS = Civil Servants

POJK = Financial Services Authority Regulation

POLRI = Kepolisian Negara Republik Indonesia or Indonesian National Police

PPID = Information Management and Documentation Officer

PPP = Purchasing Power Parity

PPPs = Public Private Partnerships

PTWS = Pacific Tsunami Warning and Mitigation System

PUPR = Ministry of Public Works and Public Housing

Pusdalops PB = BNPB Operations Control Center

Pusdiklat PB = Disaster Management Training and Education Center

PVMBG = Pusat Vulkanologi dan Mitigasi Bencana Geologi or Centre of Volcanology and Geological Hazard Mitigation

RAD-PRB = Local Action Plan-Disaster Risk Reduction

RAD-TPB = Local Action Plan

RAN-API = National Action Plan for Climate Change Adaptation

RAN-GRK = National Action Plan for Green House Gas Emission Reduction

RAN-PRB = National Action Plan for Disaster Risk Reduction

RAN-TPB = SDG National Action Plan

RENAKSI = Rencana Aksi or Government of Indonesia's Rehabilitation and Reconstruction Action Plans

RENAS-PB = National Disaster Management Plan

RENSTRA BNPB = National Disaster Management Agency's Strategic Plan

RFI = Request for Information

RIPB = Disaster Management Master Plan

RKPD = Annual Local Government Work Plan

RPB = Rencana Penanggulangan Bencana or Disaster Management Plan

RPJMD = Regional Medium-Term Development Plans

RPJMN = Rencana Pembangunan Jangka Menengah Nasional or National Medium-Term Development Plan

RPJPD = Regional Long-Term Development Plans

RPJPN = National Long-Term Development Plan

RPMN = National Medium-Term Development Plan

RPP = Learning Implementation Plans

RTRW = Rencana Tata Ruang and Wilayah or Spatial and Regional Planning

RUEN = National Energy Plan

RVA = Risk and Vulnerability Assessment

SAR = Search and Rescue

SC-DRR = Safer Communities through Disaster Risk Reduction in Development

SDGs = Sustainable Development Goals

SFDRR = Sendai Framework for Disaster Risk Reduction

SIDIK = Vulnerability Index Data Information System

SiDIKLAT = A centralized information system for staff certification data maintained by the BNPB Training Center (Pusdiklat PB)

SKKNI = Indonesian National Work Competency Standards

SKPDB = Disaster Response Command System or Sistem Komando Penanganan Darurat Bencana

SME = Subject Matter Expert

SPAB = Disaster Safe Education Unit

SPIP = System of Government Internal Control

SPM = Minimum Service Standard

SRC = Rapid Reaction Unit

TAGANA = Disaster Preparedness Cadets

TNI = Tentara Nasional Indonesia or Indonesian National Army

TNP2K = Tim Nasional Percepatan Penanggulangan Kemiskinan or The National Team for the Acceleration of Poverty Reduction

TRC = Rapid Response Team

TWGs = Technical Working Groups

UNDAC = United Nations Disaster Assessment and Coordination

UNDESA = United Nations Department of Economic and Social Affairs

UNDP = United Nations Development Programme

UNDRR = United Nations Office for Disaster Risk Reduction

UNEP = United National Environment Programme

UNESCAP = United Nations Economic and Social Commission for Asia and the Pacific

UNFCCC = United Nations Framework Convention on Climate Change

UNISDR = United Nations Office for Disaster Risk Reduction

UNOCHA = United Nations Office for the Coordination of Humanitarian Affairs

UPT = Technical Operational Unit

USAID = United States Agency for International Development

USAR = Urban Search and Rescue

YTBI = Yayasan Tanggul Bencana Indonesia

WASH = Water, Sanitation, and Hygiene

WHO = World Health Organization

WISELAND = Wireless Sensor Network for Landslide Monitoring

WMO = World Meteorological Organization

WRI = World Resources Institute

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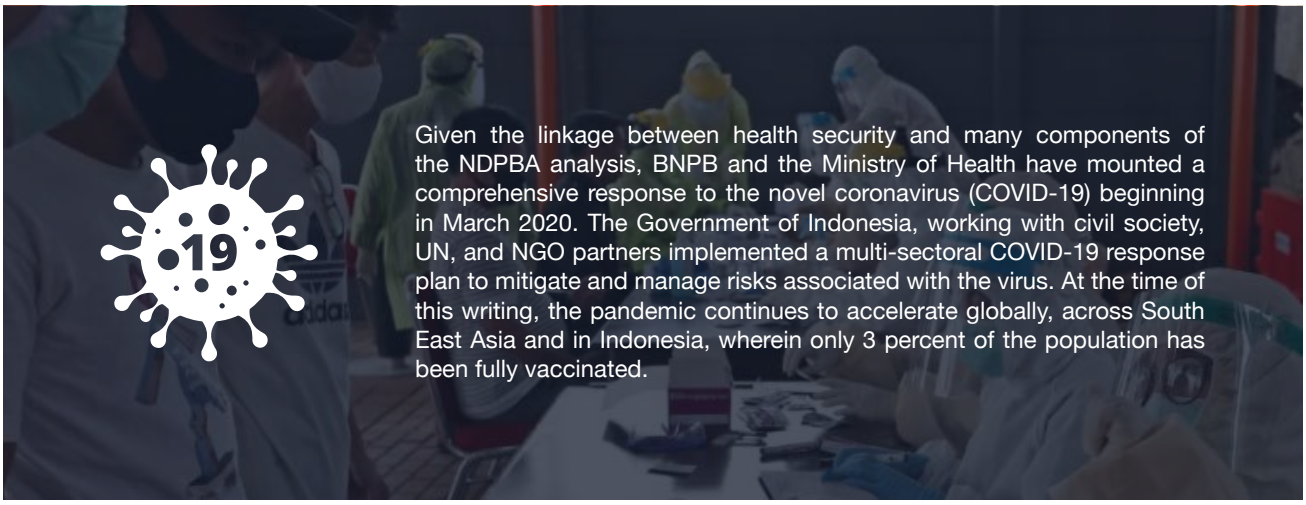
EXECUTIVE SUMMARY

INDONESIA NATIONAL DISASTER PREPAREDNESS BASELINE ASSESSMENT

OVERVIEW

In close collaboration with the Indonesian national disaster management office, Badan Nasional Penanggulangan Bencana (BNPB), the Pacific Disaster Center provides the following National Disaster Preparedness Baseline Assessment (NDPBA). The NDPBA gathered, analyzed, and assessed data from a broad community of Government of Indonesia (GoI) stakeholders, civil society experts, academia, UN and NGO partners. This compendium of a quantitative Risk and Vulnerability Assessment (RVA) and qualitative Disaster Management Analyses (DMA) incorporates a comprehensive sub-national review of Indonesia's hazard-based risks, vulnerabilities, and overall resilience. The NDPBA gives practitioners and decision-makers the analytical tools, evidence, and scientific data – accessed via BNPB's InAWARE solution and PDC's DisasterAWARE suite of HADR applications – to respond to and prepare for all hazards. This effort aligns with the United Nation's Sustainable Development Goals (SDGs) and builds upon PDC's ongoing engagement with the UN Office for Disaster Risk Reduction (UNDRR) and resilience centers of excellence throughout Indonesia and the Asia-Pacific region.

The NDPBA was made possible through funding from the United States Government through the United States Indo-Pacific Command (INDOPACOM) and via the advocacy and innovations of the ASEAN Coordinating Centre for Humanitarian Affairs (AHA Centre). Building upon the longstanding partnership between BNPB and PDC, the NDPBA helps further disaster risk reduction (DRR) and SDG efforts across the 17,000+ island archipelago and expanded data and knowledge sharing among the broad range of academic, civil society, NGO, UN, and Government of Indonesia (GoI) stakeholders who are listed in the acknowledgements above. These collaborative scientific partnerships have also proved foundational to the ongoing COVID-19 pandemic response in Indonesia and throughout the ASEAN region.



Given the linkage between health security and many components of the NDPBA analysis, BNPB and the Ministry of Health have mounted a comprehensive response to the novel coronavirus (COVID-19) beginning in March 2020. The Government of Indonesia, working with civil society, UN, and NGO partners implemented a multi-sectoral COVID-19 response plan to mitigate and manage risks associated with the virus. At the time of this writing, the pandemic continues to accelerate globally, across South East Asia and in Indonesia, wherein only 3 percent of the population has been fully vaccinated.

SUMMARY OF FINDINGS

The results of NDPBA data collection, analysis and modelling have shown Indonesia, broadly, and BNPB, specifically, to be regarded as global centers of DRR and SDG policy and practice excellence. In light of the diverse nature of climate change impacts on the expansive geography of Indonesia, there continue to be challenges and further opportunities for collaboration, specifically due to the logistical, public health, governance, and capacity building dynamics associated with the ongoing COVID-19 pandemic response. Via the Risk and Vulnerability Assessment (RVA) portion of the NDPBA process, a quantitative lens contextualizes a variety of hazards to which Indonesians are exposed, include those relating to the active geology (e.g. earthquakes, tsunamis and volcanic activity) of the archipelago and significant hydrometeorological hazards (such as flooding, flash-flooding, drought, wildfire, landslides and tornadoes), which can be compounded due to climate change.

Ongoing governance and legislative innovations by the GoI and BNPB since the Indian Ocean Tsunami of 2004 have helped to ameliorate certain aspects of Indonesia's multi-hazard risk and vulnerability profile by addressing poverty, gender equity, public health disparities, and educational capacity building. Significant challenges remain as climate change adaption (CCA) efforts are moderated by the urgency of the current pandemic response and concomitant

NATURAL HAZARD EXPOSURE

5.4 million
people affected by natural disasters (2010 - 2019)

929,000
people displaced by flooding in 2019

Flood

Wildfire

Drought

Storms

Water deficit

Across the vast Indonesian archipelago, **socioeconomic vulnerabilities** can compound a given region's exposure to multiple hazards. Though poverty has declined in aggregate across Indonesia, the country ranks in the top ten nations for inequality, which has been exacerbated by the COVID-19 pandemic.

The COVID-19 pandemic **has slowed Indonesia's strong economic growth** as the economy entered recession in 2020 for the first time in two decades.

economic impacts. The DMA component of the NDPBA builds upon the latest literature and in-person interviews with DRR stakeholders throughout Indonesia. PDC's analysis finds that innovative technology, multi-sectoral capacity building, and public-private partnerships have added to longstanding national (BNPB), Civil-Military, and regional response, recovery and resilience efforts. Owing to the unique geography of the archipelago, advancements in humanitarian and public health logistics will be needed to assure timely response and recovery operations. To these ends, various all-hazards data-sharing solutions are leveraged cross the GoI, BNPB, BPBDs and various NGOs and further standardization of open data streams will help ensure interoperability during both response operations, exercises and simulations.

Subsequent sections of this report catalogue the many innovative DRR and SDG-focused initiatives across the GoI and civil society and provide in-depth analysis across the multiple elements of the RVA and DMA efforts. While a great deal of work has been accomplished, and much progress has been made, additional actions can be taken by the GoI and its partners to further build capacity for disaster resilience and response.

RECENT MAJOR DISASTERS

2018

Central Sulawesi Earthquake and Tsunami

Losses: $1.45 billion (USD)

2018

Lombok Earthquake

Losses: $790 million (USD)

RECOMMENDATIONS

These recommendations are included in greater detail in the body of the report. Our hope is that the Government of Indonesia and key development and disaster management partners will leverage the results of this comprehensive assessment to enable a more robust and sustainable disaster risk reduction effort in Indonesia that will contribute to saving lives and property.

IN LIGHT OF OUR FINDINGS, PDC MAKES THE FOLLOWING RECOMMENDATIONS:

1. **Develop a comprehensive platform** to integrate monitoring and evaluation (M&E) of DRR, CCA, and SDG indicators and targets;

2. **Fully incorporate non-government disaster management (DM) stakeholders** into national planning efforts;

3. **Conduct annual review** of plans, strategies and SOPs;

4. **Leverage monitoring and evaluation** (M&E) metrics to address local DM and DRR capabilities;

5 **Formally address surge staffing** needs at every administrative level;

6 **Establish formal mutual assistance agreements** with appropriate parties to support disaster management efforts.

7 **Support implementation of long-term community recovery plans** and procedures at regional / local government levels.

8 **Fully implement a standardized incident command system** at all levels of government;

9 **Expand and enhance** dedicated EOC capacity and capabilities;

10 **Increase communications capacity** and interoperability;

11 **Evaluate and improve** the performance of information systems used by BNPB;

12 **Enhance the capacity and quality** of mass care;

13 **Strengthen national commodity** stockpile capacity;

14 **Establish a formal tracking system** to manage donations and resources for disaster relief;

15 **Improve disaster risk financing** and insurance schemes to increase resilience and mitigate the financial impact of disasters;

16 **Establish position-specific competency requirements** across all Indonesian DM entities;

17 **Expand and maintain the use of a centralized database** for training and responder credentialing;

18 **Maintain dedicated core DM staff functions** and capabilities at the local level;

19 **Invest in fire-fighting prevention** and infrastructure to increase emergency service capacity;

20 **Improve early warning systems** and dissemination of warning information to stakeholders and beneficiaries;

21 **Institutionalize risk awareness** and monitoring at the subnational level;

22 **Strengthen evacuation plans** and procedures for tsunami and volcano events;

23 **Enhance DM and DRR cooperation** with the Ministry of Health to increase strategic health security capabilities;

24 **Integrate public health and medical facilities** into the disaster management system;

25 **Standardize disaster education;**

26 **Increase climate literacy** among farmers and agricultural workers;

27 **Develop a mechanism to evaluate public satisfaction** with disaster management;

28 **Formalize communication and media resources** to support two-way communications between DM and the public;

29 **Strengthen resilience** by reducing vulnerability and increasing coping capacity;

30 **Periodically reassess progress** toward DRR and resilience goals;

AN INTRODUCTION

TO PDC'S NATIONAL DISASTER PREPAREDNESS BASELINE ASSESSMENT (NDPBA)

The NDPBA uses a collaborative, stakeholder-driven approach, PDC worked to integrate national priorities and stakeholder feedback throughout every step of the process. The NDPBA for Indonesia included a Risk and Vulnerability Assessment (RVA) which examined several components of risk including exposure to hazards, vulnerability, coping capacity, and existing disaster management capabilities. The findings of the RVA were further reviewed through the lens of PDC's unique Disaster Management Analysis (DMA). The DMA contextualizes the RVA and guides recommendations designed to increase resilience and reduce disaster risk. Findings of this analysis were compiled into a Disaster Risk Reduction (DRR) Plan offering practical actions to be taken over a five-year period.

To receive access to the findings, recommendations and data (tabular and spatial) used to conduct the Indonesia NDPBA analysis please visit the Pacific Disaster Center's DisasterAWARE platform and request access, visit emops.pdc.org.

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INDONESIA NDPBA

APPLYING ASSESSMENT RESULTS

The Pacific Disaster Center's (PDC) National Disaster Preparedness Baseline Assessment (NDPBA) is more than just an assessment, it is a sustainable system for accessing, understanding, updating, and applying critical risk information in decision making. The NDPBA provides the necessary tools, scientific data, and evidence-based practices to effectively reduce disaster risk—informing decisions at the national, subnational, and local level.

STRENGTHEN PARTNERSHIPS

- Use the NDPBA as a decision-support tool to create a transparent and efficient process for disaster risk reduction efforts within the context of Indonesia.
- Provides necessary tools and data for disaster monitoring to promote risk-informed decision making and sustainable development.
- Allows team members to conceptualize risk as a function of data, measuring the social, cultural, and economic drivers of risk.

SUPPORT SENDAI COMMITMENTS

By participating in the NDPBA process, Indonesia significantly enhances its capacity to meet Sendai Framework commitments under each of these Priority Areas:

- **Priority 1** - Understanding Disaster Risk
- **Priority 2** - Strengthening Disaster Risk Governance to Manage Disaster Risk
- **Priority 3** - Investing in Disaster Risk Reduction for Resilience
- **Priority 4** - Enhancing Disaster Preparedness for Effective Response and to "Build Back Better" in Recovery, Rehabilitation and Reconstruction

INCREASE RESILIENCE

- Align in areas where partner capacity development efforts overlap.
- Improve resilience at the subnational level and reduce potential impacts to the population.
- Rely on trusted and proven data-driven tools.

NDPBA

METHODOLOGY AND OBJECTIVES

OVERVIEW

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MEASURING RISK

RVA METHODOLOGY | COMPONENTS OF RISK

SUBCOMPONENTS

- Population Pressures
- Gender Inequality
- Economic Constraints
- Information Access
- Clean Water Access
- Health Status
- Environmental Stress

The NDPBA methodology is based on a composite index approach and investigates the underlying conditions that lead to increased risk. The assessment combines several components of risk which include multi-hazard exposure, coping capacity, and vulnerability. Individual components are comprised of subcomponents used to assess the status of thematic areas either as a sum or individually. Additional information on the assessment methodology can be found at: https://pdc.org/methodology.

OBJECTIVES

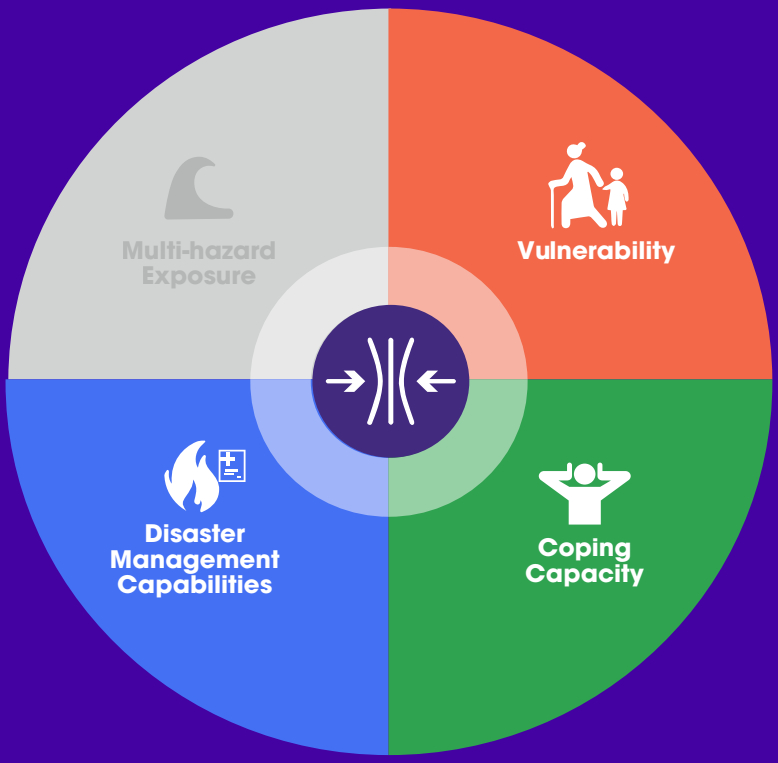
Form a foundation for long-term data sharing and monitoring to support disaster risk reduction.

Enhance decision making through improved access to temporal and spatial data.

MEASURING RESILIENCE

RVA METHODOLOGY

RESILIENCE



HAZARD INDEPENDENT

Components of resilience are independent of natural hazard exposure. This type of measure helps rank countries based on their likelihood of experiencing a disruption outside of a naturally occurring event. The measure of resilience includes vulnerability and coping capacity components, including their subcomponents.

OBJECTIVES

Use vulnerability and coping capacity indicators to determine initiatives and engagements that will decrease vulnerability and reduce disaster risk by increasing the resiliency of the population.

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KEY CONCEPTS
RVA METHODOLOGY

EXAMPLES AND DEFINITIONS

VULNERABILITY: Provides visibility into the underlying socioeconomic and societal factors that predispose areas to disasters. A vulnerability analysis measures the physical, environmental, social, and economic conditions and processes that increase susceptibility of communities and systems to the damaging effects of hazards. Multiple factors influencing disaster outcomes, including those linked to poverty and development, are considered in the analysis.

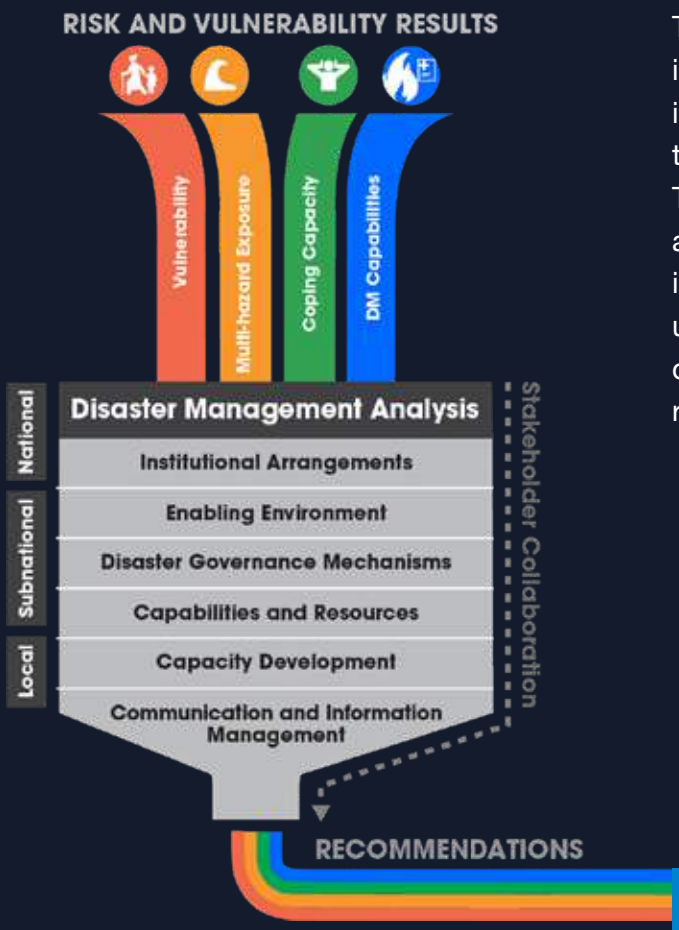
COPING CAPACITY: Provides visibility into the status of governance and capacity within each district. A coping capacity analysis measures the systems, means, and abilities of people and societies to absorb and respond to disruptions in normal function. It considers a range of factors that contribute to the ability of an impacted population to limit the likelihood or severity of the damaging effects of hazards and to manage disruptions that do arise.

DISASTER MANAGEMENT CAPABILITIES: Provides an overall measure of a country's distribution, form, and quality of disaster management systems and resources. The analysis measures what is actively being done by disaster management agencies and systems to mitigate risk—examined separately from societal coping capacities that exist solely due to development in a country as a whole. The existence or absence of systems and resources are both effective indicators of how small or great the impacts of a disaster will be on communities.

RESILIENCE: Provides an overall measure of the ability of a district to withstand shocks and disruptions to normal function. For instance, provinces with lower resilience may also exhibit a decrease in the ability of a population to mitigate the negative impacts of a disaster and return to normal function. This measure is the combination of the vulnerability and coping capacity components.

DISASTER MANAGEMENT ANALYSIS

DMA METHODOLOGY



The Disaster Management Analysis (DMA) identifies, codifies, and characterizes capacity implementation needs given risks identified in the RVA and a country's risk reduction goals. The analysis looks at the capabilities, resources, and systems that have been developed or implemented to reduce disaster risk, to address unmet needs that arise from a subsequent disaster event, and to facilitate long-term recovery of people, economies, and societies.

ANALYSIS OBJECTIVES

Increase resilience and reduce disaster risk through disaster management capacity development initiatives.

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DISASTER MANAGEMENT THEMES

The DMA aims not only to limit hazard risk as assessed, but also address the anticipated response and recovery needs of hazard-exposed populations, economies, and societies. The manner in which unmet capacity is identified, qualified, and quantified supports a sharper focus on cost-effective investment planning. It also helps support long-term development in a manner that directly reflects the Sendai Framework and Sustainable Development Goals. The analysis considers needs in relation to multi-hazard risk, and is based on sector-defined capacity standards. Associated themes are listed below with examples of the data and information that help to inform the analysis.

Institutional Arrangements

Enabling Environment

Disaster Governance Mechanisms

Capabilities and Resources

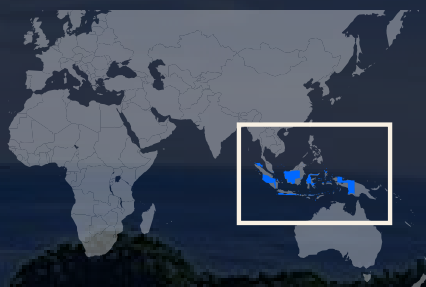
Capacity Development

Communication and Information Management

COUNTRY BACKGROUND AND OVERVIEW

GEOGRAPHY

Location: Indonesia is the largest archipelago in the world, strategically located in Southeast Asia along major sea lanes serving as a cross-roads to the Indian Ocean on the west, the South China Sea on the north, and the Pacific Ocean on the east.



16,056
Islands

108,000 km
(33,998.95 mi) Coastline

2,958 km
(1,838 mi) Land Boundaries

Neighboring countries

- Australia
- East Timor
- Malaysia
- Palau
- Papua New Guinea
- Philippines
- Singapore

Major regions

- Java
- Kalimantan
- Maluku Islands
- Lesser Sunda Islands
- Western New Guinea
- Sulawesi
- Sumatra

34
Provinces

514
Regencies/cities

GEOLOGY AND CLIMATE

Tectonic and Volcanic Activity: Indonesia sits between the world's most active seismic regions—the Pacific Ring of Fire and the Alpide belt. The country is frequently subjected to earthquakes and volcanic eruptions due to its proximity to an intersection of shifting tectonic plates, including the Pacific plate, Eurasian plate, Australian plate and Philippine plate.

Climate: Indonesia's climate is tropical, maintaining a relatively consistent climate year-round with a distinct wet and dry season. Key climate change risks for the region include an increase in:

127
Active volcanoes

$13.34 billion
Earthquake and tsunami losses (2004-2019)

5.02 million
People exposed to potential volcanic impacts

180,472
Earthquake and tsunami deaths (2004-2019)

- Temperature
- Cyclones
- Flooding from rainfall and coastal flooding
- Drought
- Coral bleaching
- Food insecurity
- Sea level rise

DEMOGRAPHICS

268.1 million
Total population

4th
Most populous country in the world

98
Global socioeconomic vulnerability ranking

1.3%
Avg. annual population growth

0.43
Doctors per 10k people

.63
Nurses per 10k people

1.17
Hospital beds per 10k people

71.3
Avg. life expectations

24.2
Infant deaths per 1k live births

96%
Adult literacy

ECONOMY

As of 2018, Indonesia's GDP was $ 1.1 trillion (USD) with key exports of oil, gas, palm oil, electrical appliances and an expanding array of goods and services. Exports markets include China, Singapore, Japan and Thailand. Imports from China, the United States, South Korea, Malaysia and Australia include industrial and electrical machinery, oil and mineral fuels, iron, steel and plastics. The COVID-19 pandemic has increased poverty and turned back 3 years of progress in poverty reduction.

GDP and Key Exports

$1.11 trillion
Gross domestic product (GDP 2018)

5%
Avg. annual growth in GDP

9.8%
People living below national Poverty line

Oil and gas

Minerals

Crude palm oil

Appliances

Rubber products

Major industries (% of GDP)

19.8%
Manufacturing

13%
Wholesale/retail trade, motor vehicles

12.8%
Agriculture, forestry, fisheries

10.5%
Construction

8%
Mining and quarrying

KEY INFRASTRUCTURE

While development efforts continue to expand upon existing infrastructure, additional enhancements are needed to improve connectivity between airports, seaports and road networks, reduce traffic congestion in urban areas, and improve access to services (health, water, sanitation, energy and information and communications technology)—especially in remote and underserved areas.

Transportation

451 Airports

122 Ports

427,423 km roads

5,669 km railroad

8 Large Airports

47 Medium Airports

396 Small Airports

3 Large ports

6 Medium ports

18 Small / **95** Very small

Emergency services

1,728 Police Stations

214 Fire Stations

514 Ambulances

64,371 Shelters

DISASTER MANAGEMENT

Major Capacity Improvements / Milestones (Past 10 Years):

- BNPB's expanded collaboration and coordination with international partners (ASEAN, UN, NGOs, Academia)
- Ongoing improvements and expansion of Indonesia's Tsunami alerting and Doppler radar coverage.
- Expansion of open data (HOTOSM) for critical infrastructure (CIKR) across Indonesian urban areas.
- Expansion of capacity building efforts by BNPB's Disaster Management Education and Training Center, Pusdiklat PB.
- Integration of urban crowd-sourced flood data via Petabencana.id with BNPB InAWARE and EOC.

Disaster stockpiles (BNPB) per region

10 Java
1 Kalimantan
3 Maluku Islands
2 Lesser Sunda Islands
3 Western New Guinea
8 Sulawesi
4 Sumatra

Major Disaster Impacts (2010-2020):

- Central Sulawesi Earthquake and Tsunami (Sept. 2018), Deaths: 4,340, Affected: 206,494, Losses: $1.45 billion
- Lombok Earthquake (August 5th, 2018) Deaths: 564, Affected: 445,343, Losses: $790 million
- Mentawai Islands Earthquake and Tsunami (Oct. 2010), Deaths: 509, Affected: 11,425, Losses: $ 24,48 million
- Sunda Strait Tsunami (Dec. 2018), Deaths: 453, Affected: 33,719, Losses: $250 million
- Mt. Merapi Volcano (Oct. 2010), Deaths: 346, Missing: 5, Affected: 136,686, Losses: $379 million
- West Papua Floods and Landslides (Oct. 2010), Deaths: 346, Missing: 5, Affected: 9,011, Losses: $78 million

InDRA
RAPID ASSESSMENT
Google
Penugasan

THE RVA

RISK AND VULNERABILITY ASSESSMENT RESULTS

RISK AND VULNERABILITY ASSESSMENT RESULTS

Provided in this section are the results of the Risk and Vulnerability Assessment (RVA) conducted by the Pacific Disaster Center as part of the Indonesia National Disaster Preparedness Baseline Assessment. For details on the methodology and data sets used see Appendix A.

INDONESIA PROVINCES

INDONESIA BACKGROUND

Comprised of over 17,000 islands and covering nearly 2 million square kilometers, the Republic of Indonesia is situated in the equatorial region of Southeast Asia between the Western Pacific and Indian Oceans. Five main islands – Sumatra, Java, Kalimantan (also known as Borneo), Sulawesi, and Papua (western New Guinea), and two major island groups – the Maluku Islands and Nusa Tengarra (Sunda) Islands, make up the majority of the country's total land area. The archipelago is divided into 34 administrative provinces which form the basis for RVA data comparison.

COMPONENTS OF RISK

Vulnerability

Coping Capacity

Multi-Hazard Exposure

Disaster Management Capabilities

THE RVA

MULTI-HAZARD EXPOSURE

MULTI-HAZARD EXPOSURE

Forming part of the "Pacific Ring of Fire," Indonesia spans three tectonic plates: the Indo-Australian plate to the south, the Eurasian plate to the north, and the Pacific plate to the east. This geologically active zone makes the country prone to volcanic activity, earthquakes, and tsunami hazards. Prevalent features in Indonesia's climate are two monsoonal seasons – the rainy season spans the months of December to March, and the dry season stretches from June to September. While tropical cyclone activity in Indonesia is uncommon, due to its location within the inter-tropical convergence zone, the country experiences significant meteorological and climatic hazards such as flooding, flash-flooding, drought, wildfire, and extreme weather (tornadoes). Landslides are also common and destructive in Indonesia.

In 2019, Indonesia's National Agency for Disaster Management, Badan Nasional Penanggulangan Bencana (BNPB), reported 3,814 hazard events that caused 589 fatalities and displaced 6,129,405 people. Tornadoes were the most frequent hazard event in 2019, with 1,387 occurrences. Floods, wildfires and landslides were also prevalent, with 784, 746, and 719 events, respectively. Drought affected the largest number of people, displacing 3,872,358 people. With a population of 268 million people and exposure to multiple hazards Indonesia's disaster risk reduction efforts are of paramount importance to protect and lives and welfare of its citizens.

Global Multi-Hazard Exposure Rank **5** OF 207 COUNTRIES

Indonesia's Rank among ASEAN Member States **2** OF 10 COUNTRIES

INDONESIA ESTIMATED POPULATION AND CAPITAL EXPOSURE

Multi-hazard exposure at the provincial level in Indonesia was assessed by combining components of the following hazards:

Flood **43%**
110.5 Million
$1.4 Trillion

Volcanic Eruption **2%**
5 Million
$32.7 Billion

Extreme Weather **94%**
234.4 Million
$2.9 Trillion

Earthquake **48%**
123.5 Million
$1.3 Trillion

Wildfire **8%**
21.6 Million
$224.4 Billion

Tsunami **2%**
4.4 Million
$87.6 Billion

Landslide **4%**
10.4 Million
$107.9 Billion

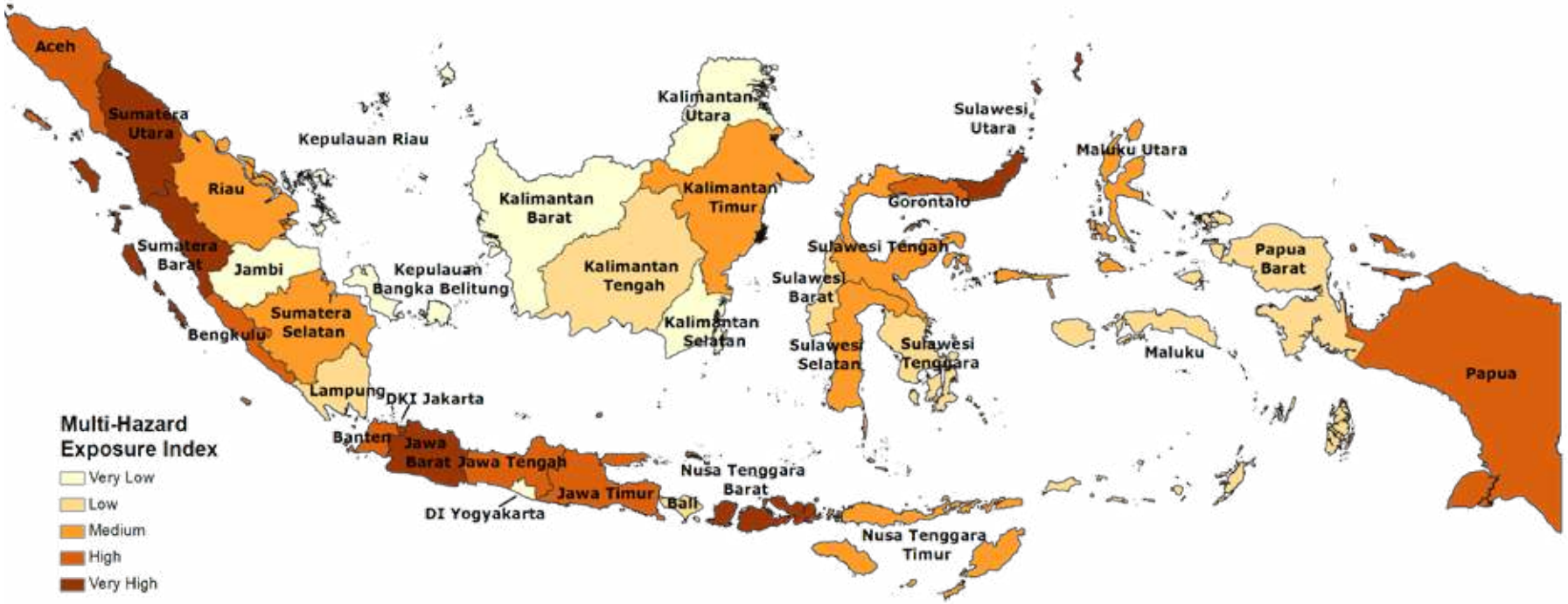
Drought **39%**
101.2 Million
$1.4 Trillion

Flash Flood **4%**
9.2 Million
$108.7 Billion

MULTI-HAZARD EXPOSURE BY PROVINCE

	RANK	PROVINCE	INDEX SCORE
VERY HIGH	1	Sumatera Utara	0.874
	2	Nusa Tenggara Barat	0.778
	3	DKI Jakarta	0.726
	4	Jawa Barat	0.71
	5	Sumatera Barat	0.664
	6	Sulawesi Utara	0.646
HIGH	7	Jawa Timur	0.642
	8	Jawa Tengah	0.639
	9	Gorontalo	0.605
	10	Papua	0.593
	11	Aceh	0.555
	12	Bengkulu	0.551
	13	Banten	0.529
MEDIUM	14	Maluku Utara	0.527
	15	Riau	0.52
	16	Sulawesi Tengah	0.474
	17	Sumatera Selatan	0.466
	18	Sulawesi Selatan	0.456
	19	Kalimantan Timur	0.454
	20	Nusa Tenggara Timur	0.453
LOW	21	Maluku	0.447
	22	Sulawesi Barat	0.447
	23	Lampung	0.446
	24	Kalimantan Tengah	0.418
	25	Sulawesi Tenggara	0.406
	26	Papua Barat	0.352
	27	Bali	0.349
VERY LOW	28	Kalimantan Selatan	0.342
	29	DI Yogyakarta	0.336
	30	Kalimantan Barat	0.33
	31	Kepulauan Bangka Belitung	0.311
	32	Jambi	0.274
	33	Kepulauan Riau	0.186
	34	Kalimantan Utara	0.164

MULTI-HAZARD EXPOSURE BY PROVINCE



THE RVA

VULNERABILITY

VULNERABILITY

Vulnerability measures the physical, environmental, social, and economic conditions and processes that increase susceptibility of communities and systems to the damaging effects of hazards. Vulnerability data is designed to capture the multi-dimensional nature to poverty, the inequality in access to resources due to gender, and the ability of a given area to adequately support the population. In coordination with stakeholders the following indicators were selected to measure vulnerability subcomponents in Indonesia. Breaking down each vulnerability subcomponent to the indicator level allows users to identify the key drivers of vulnerability to support risk reduction efforts and policy decisions.

Global Vulnerability Rank **57** OF 160 COUNTRIES

Indonesia's Rank among ASEAN Member States **4** OF 10 COUNTRIES

VULNERABILITY SUBCOMPONENTS AND INDICATORS

Population Pressures
Net Recent Migration Rate
Average Annual Total Population Change
Average Annual Urban Population Change

Gender Inequality
Female Seats in Government
Female to Male Literacy Rate
Female to Male Labor Ratio
Ratio Female to Male Secondary Enrollment

Information Access Vulnerability
Adult Literacy Rate
Average Years of Schooling
Internet Usage (Percent of Households)
Primary School Enrollment

Economic Constraints
Percent Poverty
Percent Unemployed
GINI Ratio
Age Dependency Ratio

Environmental Stress
Livestock Density
Deforestation Rate
Severe Erosion Potential

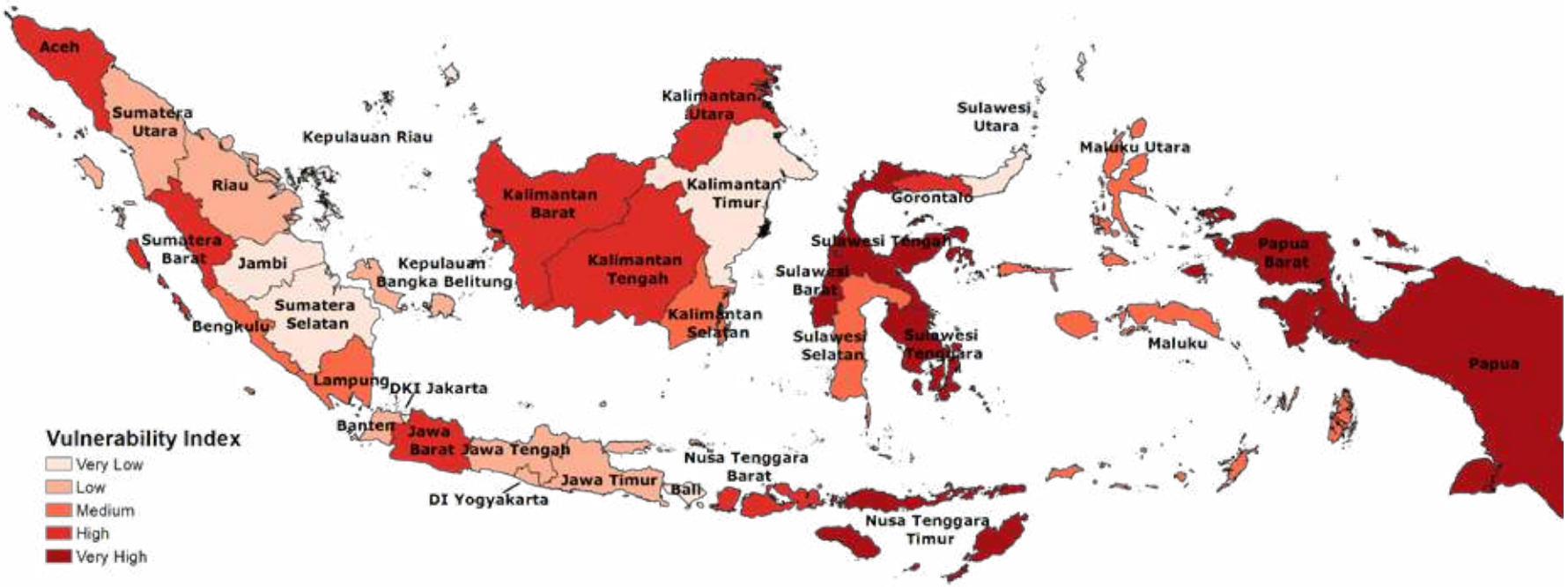
Vulnerable Health Status
Life Expectancy
Infant Mortality Rate
Percent unmet healthcare needs
Percent Disabled Population over age 10
Percent Children under 5 Wasting (Acute Malnutrition)
Percent of households with limited access to health center (>5km)
Percent of Households Experiencing Catastrophic Health Expenditures
Maternal Mortality Rate
Malaria Incidence per 100k
Dengue Incidence per 100k
Measles Incidence Rate per 100k
HIV AIDS Cases per 100k
Prevalence of Leprosy per 10k
Tuberculosis CNR per 100k

Clean Water Access Vulnerability
Percentage of households with improved drinking water source
Percentage of households with improved sanitation

VULNERABILITY BY PROVINCE

	RANK	PROVINCE	INDEX SCORE
VERY HIGH	1	Papua	0.641
	2	Nusa Tenggara Timur	0.612
	3	Papua Barat	0.56
	4	Sulawesi Barat	0.538
	5	Sulawesi Tengah	0.508
	6	Sulawesi Tenggara	0.486
HIGH	7	Jawa Barat	0.483
	8	Kalimantan Barat	0.482
	9	Nusa Tenggara Barat	0.475
	10	Aceh	0.459
	11	Gorontalo	0.453
	12	Sumatera Barat	0.453
	13	Kalimantan Tengah	0.452
	14	Kalimantan Utara	0.448
MEDIUM	15	Maluku Utara	0.447
	16	Bengkulu	0.444
	17	Lampung	0.441
	18	Sulawesi Selatan	0.433
	19	Maluku	0.43
	20	Kalimantan Selatan	0.427
LOW	21	Riau	0.413
	22	Jawa Timur	0.409
	23	Jawa Tengah	0.406
	24	Sumatera Utara	0.403
	25	Banten	0.399
	26	DI Yogyakarta	0.391
	27	Kepulauan Bangka Belitung	0.391
VERY LOW	28	Kepulauan Riau	0.388
	29	Jambi	0.388
	30	Sumatera Selatan	0.384
	31	Sulawesi Utara	0.367
	32	Kalimantan Timur	0.333
	33	Bali	0.321
	34	DKI Jakarta	0.202

VULNERABILITY BY PROVINCE



THE RVA

COPING CAPACITY

COPING CAPACITY

Coping Capacity describes the ability of people, organizations, and systems, using available skills and resources, to face and manage adverse conditions, emergencies, or disasters.

In coordination with stakeholders the following indicators were selected to measure coping capacity subcomponents in Indonesia. Breaking down each coping capacity subcomponent to the indicator level allows users to identify the key drivers of coping capacity to support risk reduction efforts and policy decisions.

Global Coping Capacity Rank **88** OF 176 COUNTRIES

Indonesia's Rank among ASEAN Member States **5** OF 10 COUNTRIES

COPING CAPACITY SUBCOMPONENTS AND INDICATORS

Economic Capacity
Labor Force Participation Rate
Average Monthly Income per Capita (Rupiah)
GDP per Capita

Governance
Voter Participation
Crime Clearance Rate
Crime Rate per 100k Persons

Environmental Capacity
Protected Area per Province

Healthcare Capacity
Immunization Rate (children under age 5)
Physicians per 10,000 persons
Nurses and Midwives per 10,000 persons
Number of Hospital Beds per 10,000 persons
Health Insurance Coverage
Health Care Accreditation Rate
Time to Public Hospital over 1 hour

Transportation Capacity
Rail and Road Density
Average Distance to Port Facility

Communications Capacity
Percent Cellular Phone Ownership
Percent of Households with Fixed Line Telephones

Energy Capacity
Percentage of Households Served by the State Electric Company
Percentage of Total National Electricity Generated (GWh) by Province
Electricity Generated (GWh) per 100,000 persons by Province
Percentage of Households Using Gas/LPG for Cooking Fuel

COPING CAPACITY BY PROVINCE

	RANK	PROVINCE	INDEX SCORE
VERY HIGH	1	DKI Jakarta	0.698
	2	Bali	0.639
	3	Papua	0.594
	4	Banten	0.582
	5	Kepulauan Riau	0.577
HIGH	6	Kalimantan Utara	0.567
	7	Kalimantan Timur	0.567
	8	Bengkulu	0.558
	9	Jawa Barat	0.535
	10	Kalimantan Selatan	0.532
	11	DI Yogyakarta	0.53
	12	Jawa Timur	0.519
	13	Kepulauan Bangka Belitung	0.493
MEDIUM	14	Jambi	0.492
	15	Jawa Tengah	0.485
	16	Sulawesi Tenggara	0.484
	17	Sumatera Selatan	0.483
	18	Riau	0.479
	19	Gorontalo	0.475
	20	Kalimantan Tengah	0.462
LOW	21	Lampung	0.453
	22	Papua Barat	0.45
	23	Kalimantan Barat	0.44
	24	Nusa Tenggara Barat	0.436
	25	Sumatera Utara	0.434
	26	Sulawesi Utara	0.431
	27	Sumatera Barat	0.404
VERY LOW	28	Sulawesi Barat	0.392
	29	Sulawesi Selatan	0.389
	30	Sulawesi Tengah	0.389
	31	Aceh	0.378
	32	Maluku Utara	0.352
	33	Nusa Tenggara Timur	0.338
	34	Maluku	0.263

COPING CAPACITY BY PROVINCE

THE RVA

DISASTER MANAGEMENT CAPABILITIES

DISASTER MANAGEMENT CAPABILITIES

Disaster Management Capabilities describes the systems established to reduce hazard risk and to prepare for, respond to, and recover from disaster events.

In coordination with stakeholders the following indicators were selected to measure disaster management capabilities subcomponents in Indonesia. Breaking down each disaster management capabilities subcomponent to the indicator level allows users to identify the key assets that contribute to risk reduction, mitigation, and disaster risk management to support planning efforts and policy decisions.

DISASTER MANAGEMENT CAPABILITIES SUBCOMOPONENTS / INDICATORS

Emergency Services
Ambulances per 10k Persons
Citizen Brigade Personnel per 10k Persons
Province EOC Coverage
SAR Staff per 10k Persons
Distance to Nearest Fire Station
Distance to Nearest Police Station

Early Warning and Monitoring
Geophysical Monitoring per Exposed Population
Meteorological/Climatological Monitoring per Exposed Population

Mass Care Support
Distance to Nearest Disaster Stockpile
Emergency Shelters per 10,000 persons
Vehicle Equipment per 10,000 persons
Shelter Equipment per 10,000 persons
Communications Equipment per 10,000 persons
Support Equipment per 10,000 persons

DISASTER MANAGEMENT CAPABILITIES BY PROVINCE

	RANK	PROVINCE	INDEX SCORE
VERY HIGH	1	Kalimantan Selatan	0.719
	2	Kalimantan Tengah	0.66
	3	Kepulauan Bangka Belitung	0.599
	4	Nusa Tenggara Barat	0.591
	5	Gorontalo	0.567
HIGH	6	Sulawesi Barat	0.567
	7	Kalimantan Timur	0.56
	8	Aceh	0.552
	9	Kepulauan Riau	0.552
	10	Sulawesi Selatan	0.549
	11	Papua Barat	0.547
	12	Bengkulu	0.54
	13	Sulawesi Utara	0.533
MEDIUM	14	Maluku	0.53
	15	Kalimantan Utara	0.528
	16	DI Yogyakarta	0.525
	17	Jawa Tengah	0.521
	18	Sulawesi Tenggara	0.509
	19	Nusa Tenggara Timur	0.509
	20	Bali	0.506
LOW	21	Sumatera Barat	0.5
	22	Jambi	0.496
	23	Maluku Utara	0.491
	24	Kalimantan Barat	0.488
	25	Jawa Timur	0.483
	26	Riau	0.466
	27	Sulawesi Tengah	0.465
VERY LOW	28	Lampung	0.456
	29	Sumatera Selatan	0.436
	30	Sumatera Utara	0.42
	31	Papua	0.417
	32	DKI Jakarta	0.405
	33	Jawa Barat	0.38
	34	Banten	0.361

DISASTER MANAGEMENT CAPABILITIES BY PROVINCE

THE RVA

RESILIENCE

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RESILIENCE

Resilience represents the combination of susceptibility to impact, the relative ability to absorb, respond to, and recover from short-term disaster impacts, and the distribution, form, and quality of disaster management systems and resources. Resilience provides an indication of current socio-economic and disaster management conditions on the ground, independent of hazard exposure.

Global Resilience Rank **93** OF 155 COUNTRIES

Indonesia's Rank among ASEAN Member States **4** OF 10 COUNTRIES

APPLYING RESILIENCE DATA

Resilience data can be used to:

- Prioritize response and recovery efforts during hazard events.
- Identify the social, cultural, and economic factors that influence disatser risk and vulnerability.
- Provide the necessary justification to support policy decisions that will protect lives and reduce losses resulting from disasters.
- Establish a provincial-level foundation for monitoring risk and vulnerability over time.
- Enhance decision making for disaster risk reduction initatives.

RESILIENCE COMPONENTS

Resilience in Indonesia was calculated by combining Vulnerability, Coping Capacity and Disaster Management Capability. Results are displayed across each province below, while the six main drivers of resilience and detailed provincial recommendations are provided in the individual province profiles.

Vulnerability

Coping Capacity

RESILIENCE BY PROVINCE

	RANK	PROVINCE	INDEX SCORE
VERY HIGH	1	DKI Jakarta	0.634
	2	Kalimantan Selatan	0.608
	3	Bali	0.608
	4	Kalimantan Timur	0.598
HIGH	5	Kepulauan Riau	0.58
	6	Kepulauan Bangka Belitung	0.567
	7	Kalimantan Tengah	0.557
	8	DI Yogyakarta	0.555
	9	Bengkulu	0.551
	10	Kalimantan Utara	0.549
	11	Jawa Tengah	0.534
	12	Jambi	0.533
MEDIUM	13	Sulawesi Utara	0.532
	14	Jawa Timur	0.531
	15	Gorontalo	0.53
	16	Nusa Tenggara Barat	0.517
	17	Banten	0.514
	18	Sumatera Selatan	0.511
	19	Riau	0.51
LOW	20	Sulawesi Tenggara	0.502
	21	Sulawesi Selatan	0.502
	22	Aceh	0.49
	23	Lampung	0.489
	24	Sumatera Barat	0.484
	25	Sumatera Utara	0.483
	26	Kalimantan Barat	0.482
	27	Papua Barat	0.479
	28	Jawa Barat	0.477
	29	Sulawesi Barat	0.474
VERY LOW	30	Maluku Utara	0.465
	31	Papua	0.457
	32	Maluku	0.455
	33	Sulawesi Tengah	0.448
	34	Nusa Tenggara Timur	0.412

RESILIENCE BY PROVINCE

THE RVA

HAZARD-SPECIFIC RISK

HAZARD-SPECIFIC RISK

Hazard-Specific Risk examines individual hazard exposure in combination with provincial resilience to provide a clear understanding of risk drivers for each hazard type. Specific hazards assessed include flood, earthquake, landslide, volcano, wildfire, drought, extreme weather, tsunami, and flash flood. Hazard-Specific Risk provides a tool for disaster managers to anticipate, plan for, and mitigate outcomes of specific hazard events across Indonesia.

APPLYING HAZARD SPECIFIC RISK DATA

Hazard-specific risk data can be used to:

- Examine socioeconomic and cultural factors that make certain populations more susceptible to negative outcomes from a specific hazard.
- Anticipate potential impacts of a specific hazard on a province's population.
- Enhance national and subnational multi-hazard planning.
- Prioritize national and district-level hazard-specific mitigation actions.
- Provide necessary justification to enhance hazard monitoring and implement early warning systems.

HAZARD RISK COMPARED

Flood

Volcanic Eruption

Extreme Weather

Earthquake

Wildfire

Tsunami

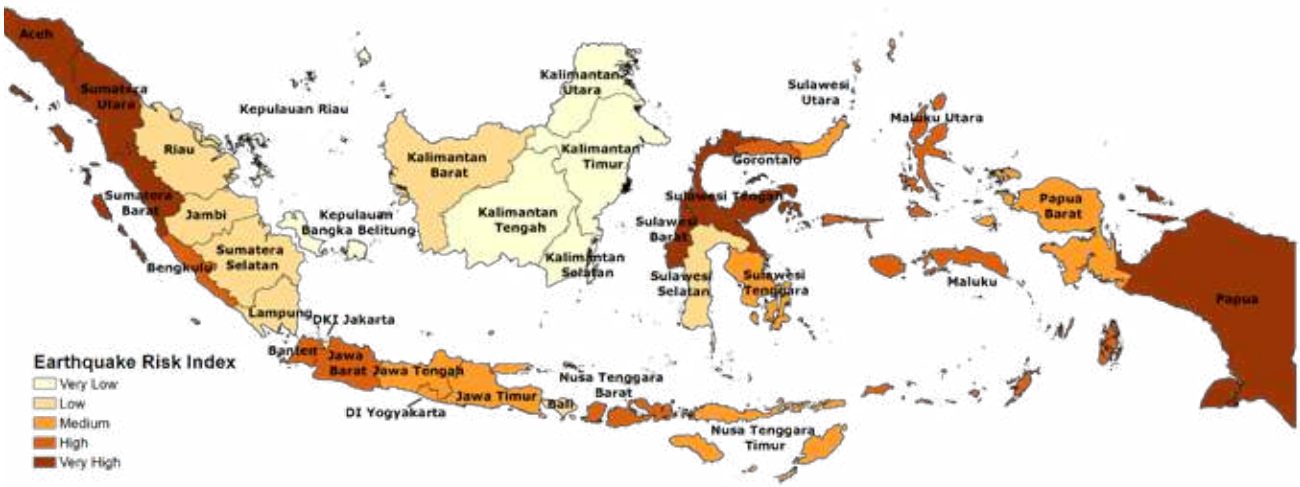
Landslide

Drought

Flash Flood

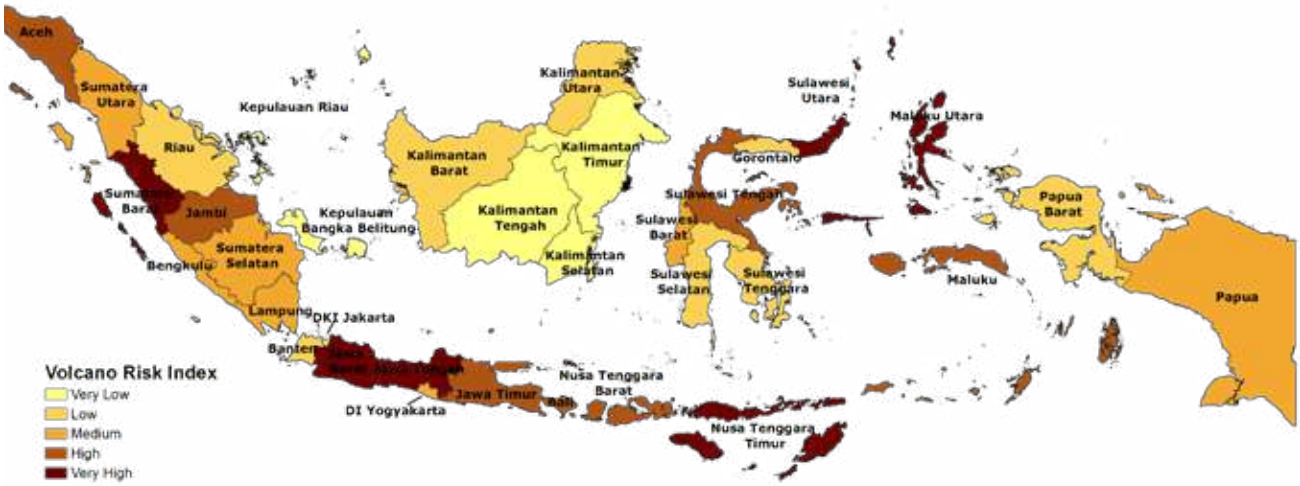
FLOOD RISK

EARTHQUAKE RISK

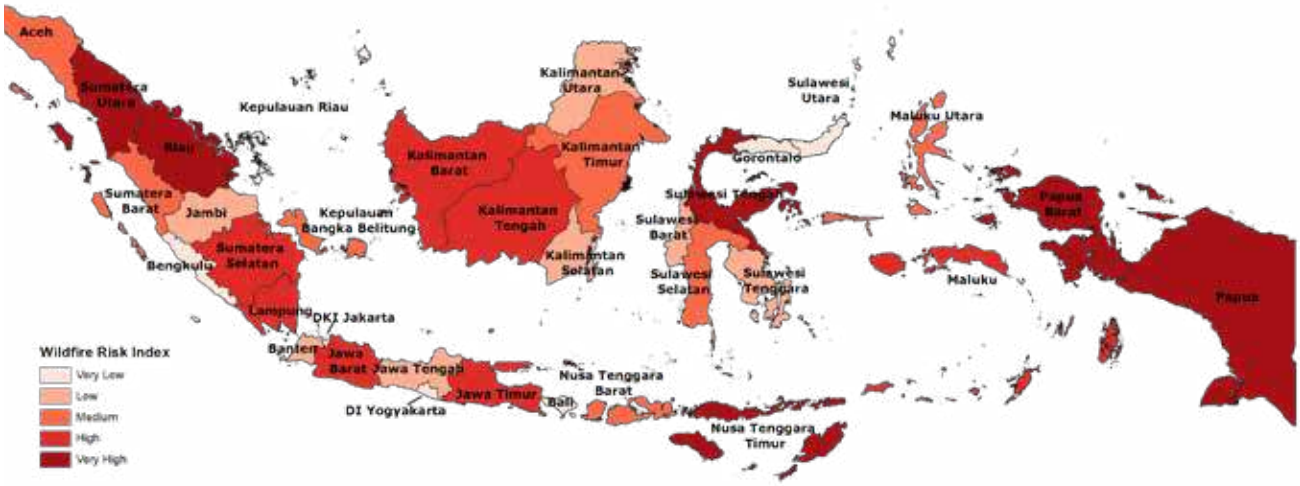


LANDSLIDE RISK

VOLCANIC ERUPTION RISK



WILDFIRE RISK



DROUGHT RISK

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EXTREME WEATHER RISK

TSUNAMI RISK

FLASH FLOOD RISK

THE RVA

MULTI-HAZARD RISK

MULTI-HAZARD RISK

Multi-hazard Risk combines hazard exposure, susceptibility to impact, the relative ability to absorb negative disaster impacts, and the distribution of disaster management resources to provide a collective measure of what is likely how each province may be affected by hazard and disasters as a whole over time. Analyzing risk information throughout all phases of disaster management - mitigation, preparedness, response, recovery - improves operations and promotes efficient resource allocation.

Applying a repeatable methodology and identifying provincial risk provides a baseline for conducting temporal analysis and a better understanding of the potential impact of climate change. Analyzing trends in risk allows decision-makers to determine effective disaster risk reduction initiatives and implement evidence-based policy.

Global Multi-hazard Risk Rank **10** OF 155 COUNTRIES

Indonesia's Rank among ASEAN Member States **3** OF 10 COUNTRIES

MULTI-HAZARD RISK COMPONENTS

Multi-hazard Risk in Indonesia was calculated by combining Multi-hazard Exposure, Vulnerability, Coping Capacity and Disaster Management Capabilities. Results are displayed across each province below, while additional detail on provincial risk is provided in the individual province profiles.

Vulnerability

Coping Capacity

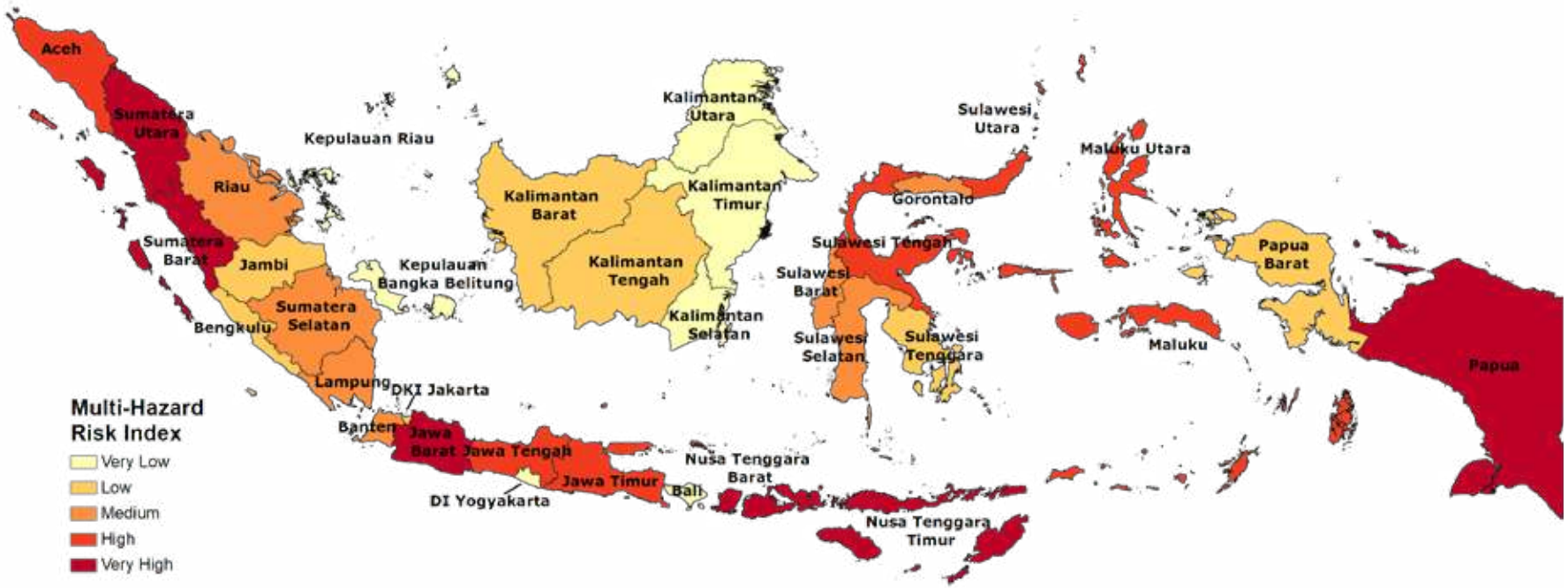
Multi-hazard Exposure

Disaster Management Capabilities

MULTI-HAZARD RISK BY PROVINCE

	RANK	PROVINCE	INDEX SCORE
VERY HIGH	1	Sumatera Utara	0.606
	2	Jawa Barat	0.57
	3	Nusa Tenggara Barat	0.556
	4	Papua	0.556
	5	Nusa Tenggara Timur	0.555
HIGH	6	Sumatera Barat	0.553
	7	Maluku Utara	0.533
	8	Sulawesi Tengah	0.532
	9	Aceh	0.521
	10	Maluku	0.521
	11	Sulawesi Utara	0.512
	12	Jawa Timur	0.512
	13	Jawa Tengah	0.51
MEDIUM	14	Sulawesi Barat	0.506
	15	Gorontalo	0.504
	16	Riau	0.497
	17	Banten	0.496
	18	Lampung	0.494
	19	Sulawesi Selatan	0.488
	20	Sumatera Selatan	0.483
LOW	21	Papua Barat	0.479
	22	Sulawesi Tenggara	0.475
	23	Bengkulu	0.474
	24	Kalimantan Barat	0.471
	25	DKI Jakarta	0.456
	26	Kalimantan Tengah	0.437
	27	Jambi	0.419
VERY LOW	28	DI Yogyakarta	0.418
	29	Kalimantan Timur	0.415
	30	Kepulauan Bangka Belitung	0.402
	31	Bali	0.381
	32	Kalimantan Utara	0.379
	33	Kalimantan Selatan	0.379
	34	Kepulauan Riau	0.361

MULTI-HAZARD RISK BY PROVINCE



THE DMA

DISASTER MANAGEMENT ANALYSIS

SUMMARY OF FINDINGS

DISASTER MANAGEMENT ANALYSIS

FINDINGS & RECOMMENDATIONS

Provided in this section are the results of the Disaster Management Analysis (DMA) that was conducted as part of the Indonesia National Disaster Preparedness Baseline Assessment. The outcome of the DMA enables more effective prioritization of risk-reduction and resilience-building initiatives. Considering diverse community needs, operational successes and barriers, the DMA results enable and communities to prioritize actions for disaster risk reduction and disaster governance at all levels. The following section summarizes key findings in six broad areas of analysis: Institutional Arrangements; Enabling Environment; Disaster Governance Mechanisms; Capabilities and Resources; Capacities; and Communications and Information Management. For details on the DMA methodology and data see Appendix B.

DISASTER MANAGEMENT ANALYSIS THEME & SUBTHEMES

Institutional Arrangements

Organizational Structures
Leadership Arrangements
Mechanisms for Stakeholder Engagement

Enabling Environment

Legal Instruments
Financial Resources
Strategies
Public Confidence
Political Support
Attitudes and Experience

Communication & Information Management

Hazard and Risk Analysis Systems
Disaster Assessment
Media and Public Affairs
Information Collection, Management, and Distribution

Disaster Governance Mechanisms

Plans
Standard Operating Procedures
Emergency Operations Centers
Command, Control, and Coordination Systems

Capacity Development

Capacity Development Plans and Strategies
Training and Education Programs and Facilities
Monitoring and Evaluation Processes and Systems

Capabilities & Resources

Dedicated Facilities and Equipment
Human Resources
Inventory of Commodities and Supplies
Targeted Functional Capabilities

INSTITUTIONAL ARRANGEMENTS

SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Indonesia is uniquely situated in terms of the diverse hazards associated with its geography, an interconnected and vibrant economy, and the legislative foundations of its Disaster Risk Reduction (DRR), Climate Change Adaptation (CCA), and Disaster Management (DM) capabilities. Specifically, at the national level the Badan Nasional Penanggulangan Bencana (BNPB) is equal to all other ministries and directly accountable and subordinate to the President of Indonesia under Law Number 24 of 2007 on Disaster Management and Presidential Regulation No. 8 of 2008. BNPB staff, protocols, interagency collaborations, technological innovation, and capacity-building efforts are widely acclaimed by multilateral organizations and emulated by similar hazard-prone island nations. Following global calls for further localization of DRR, response, and climate change initiatives to regional and local entities, BNPB leadership in Jakarta have made impressive, though not complete, progress as mandated by Head of BNPB Regulation Number 3 of 2008. Indonesian institutional arrangements have also been formalized to achieve the Sustainable Development Goals (SDGs) via Presidential Regulation No. 59 of 2017 and Ministerial Regulation of BAPPENAS No. 7 of 2018 concerning coordination, planning, monitoring, evaluation, and reporting implementation of SDGs.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

INSTITUTIONAL ARRANGEMENTS SUB-THEMES

Organizational Structures

Leadership

Stakeholder Engagement

ORGANIZATIONAL STRUCTURES

CURRENT STATUS

Organization of Government DM Functions: Badan Nasional Penanggulangan Bencana (BNPB) is a standalone, cabinet-level disaster management agency. BNPB is the national governmental office tasked with comprehensive disaster management responsibility. BNPB was established through issuance of Law 24/2007 as a non-departmental entity equal in organizational stature to all other ministries, and directly accountable and subordinate to the President of Indonesia. (Law 24/2007 Concerning Disaster Management; Presidential Regulation 8/2008 Concerning National Disaster Management Agency.)

Development of DM Organizational Structure: Indonesia's interagency disaster management responsibilities are clearly mapped and at high level of implementation. BNPB is comprised of an agency Head, a Disaster Management Steering Element, and a Disaster Management Implementing Element. The steering and implementing elements are each subordinate and accountable to the BNPB Agency Head. The Steering Element advises the Head of BNPB concerning disaster management and is responsible for development of national disaster management policies and monitoring, and evaluation of operations, while the Implementing Element manages the command and coordination of disaster management operations.

Bi/Multilateral Engagement: BNPB is the Indonesian entity dedicated to engagement with bilateral, international, and other humanitarian actors. The Head of BNPB maintains statutory authority to certify international institutions and foreign non-governmental organizations (NGO) to participate in disaster management activities in the country. BNPB is the coordinator of donations, funding and/or grant assistance. Specifically, within the BNPB structure, there is a Division of Cooperation Section under the Bureau of Law, Organization and Cooperation. Furthermore, the Disaster Management Steering Element may invite international organizations to attend and participate in steering committee sessions.

Regionalized Capacity: Disaster management activities, including response efforts, are conducted out of regional BPBD offices. In coordination with BNPB, Regional Disaster Management Agencies (Badan Penanggulangan Bencana Daerah or BDPDs) have been established at the provincial, district, and city levels. BNPB has also set up 12 regional Technical Operational Units (UPTs) which have attached warehouses, each serving multiple provinces. According to BNPB Performance Report 2019, the BPBDs were established in all 34 provinces, and more than 99% of districts and cities (511 of 514) had set up BPBDs at the time of the report.

Disaster Risk Reduction (DRR) Platform: PLANAS PRB, a platform for DRR, is at an advanced level of implementation. The National Platform for Disaster Risk Reduction (PLANAS PRB) was established in 2008 to better coordinate disaster risk-reduction efforts and integrate DRR into planning and policy. PLANAS PRB is an independent entity comprised of a diverse and multi-sectoral stakeholder membership, which includes national government staff (including from BNPB) and representatives from civil society, academia, the private sector, media, professional institutions, the Indonesian Red Cross, and the international community.

Climate Change Adaptation (CCA) Platform: Indonesia has established a platform, but the implementation is incomplete. The National Action Plan for Adaptation to Climate Change in Indonesia (RAN-API) Secretariat was established under BAPPENAS in 2014 to better coordinate the efforts of national and local government

entities along with external partners. In 2020, this secretariat was merged with the Indonesia Emissions Reduction Policy (RAN-GRK) Secretariat to become the Low-Carbon Development Indonesia (LCDI) Secretariat. The latest National Climate Change Adaptation Plan document published in 2019 is included in the series of reports including: List of Priority Locations & Climate Resilience Actions; Institutional Arrangement for Climate Resilience; The Roles of Non-State Actors in Climate Resilience; Climate Resilience Funding; and Monitoring, Evaluation and Reporting of Climate Resilience Actions in the Framework of National Development Planning.

Sustainable Development (SD) Platform: The efforts of the Government of Indonesia have created an SDG platform, but implementation is not complete. Presidential Regulation No. 59/2017 was issued to help achieve the Sustainable Development Goals (SDGs). This was followed by several regulations, including BAPPENAS Ministerial Regulation No. 7/2018, which supports SDG coordination, planning, monitoring, evaluation, and reporting, and provides technical guidance for implementation and development of the SDG Roadmap (2017-2030), National Action Plan (RAN-TPB), and Local Action Plan (RAD-TPB). National implementation is underway and regional implementation is incomplete. BAPPENAS is the entity which leads SDG policy in Indonesia e.g. http://sdgs.bappenas.go.id/.

Military Engagement: The Indonesian military (TNI) is formally integrated in the civil disaster management structure. Indonesia's National Military Forces (TNI) is statutorily obligated to provide disaster assistance in coordination with BNPB per Law 34/2004 as a component of Military Operations Other Than War (MOOTW). BNPB has also signed an MOU with TNI (MOU Number 47/BNPB/III/2016 effective 2016-2021) and several MOUs with the Ministry of Defense to better facilitate cooperation on disaster management activities. TNI has traditionally played an instrumental disaster response role, but to an increasing degree is involved in pre-disaster activities, including mitigation, exercises, and training. TNI is also a member of the BNPB Disaster Management Steering Element. As specified in Law 34/2004, TNI's humanitarian assistance and disaster relief (HADR) assistance may include providing humanitarian aid and supporting search and rescue (SAR) operations.

Integration of DRR, CCA, and SD: Some integration exists across various components of the Government of Indonesia. Evidence of increased integration of DRR, CCA, and SD policy pursuits has become significantly more prevalent in recent years. Convergence of CCA and DRR activities is guided, among other instruments, by Chapter 7 of the National Medium-Term Development Plan (RPJMN) 2020-2024. To better coordinate CCA and DRR mainstreaming efforts, BNPB and the Ministry of Environment and Forestry (KLHK) launched the DRR and CCA Convergence Framework in 2017, which identified five dimensions of convergence: policy, institutional, budget, project management, and methodology. It has been noted that implementation challenges remain on account of ongoing leadership and coordination gaps.

LEADERSHIP

Emergency Management Leadership Arrangement: The Head of BNPB represents a singular leadership position with responsibility for all disaster management activities throughout the GoI. BNPB is the primary organization for disaster management in Indonesia. Local government entities at the provincial and city/regency level, through Local Disaster Management Agencies (BPBDs), also play a role when first responding to an emergency. Likewise, institutions outside BNPB and BPBDs, such as the police, army, Search & Rescue Agency, or relevant agencies can participate during emergency-response activities and are coordinated by BNPB as a singular leading emergency management (EM) entity.

Leadership Positions Filled: All BNPB leadership positions are filled.

Job-specific Competencies of Leadership Positions: Competencies and experience are required for BNPB leadership positions, but not well defined. Key leadership officials, including the BNBP Head of Agency and Steering Committee members, are appointed by the President per Articles 51, 53, Law 24/2007. Article 56 dictates that these positions must be confirmed through a "fit and proper test" conducted by the House of Representatives and nominated individuals must be drawn from a pool of "professional and expert civil servants".

Political Access of DM Leadership: Disaster management leadership in Indonesia has an institutionalized, direct line of reporting and responsibility to the highest level of the Government of Indonesia (GoI). BNPB enjoys a direct line of reporting and accountability to the President of Indonesia on disaster management efforts and issues, per Article 12 of Law 24/2007. Reporting is required monthly except during active disasters when requirements increase.

Proxy Leadership Arrangements: Formal procedures exist in Indonesia for incident-specific proxy leadership during major events, and systems to support this arrangement are fully implemented. Once a disaster has been declared, the BNPB Head of Agency or relevant BPBD Head is authorized by Government Regulation 21/2008, Article 47, to appoint a proxy commander to manage an event.

Special Decision-making Committees in place for Response and/or Recovery Operations: In Indonesia, specifically within BNPB, committees and structures are in place for response and recovery operations. The Executive Committee of BNPB has the task of carrying out integrated disaster management which includes pre-disaster, during a disaster (emergency response), and post-disaster (recovery). In the BNPB Organizational Structure, disaster emergencies are specifically handled by the Deputy for Emergency Management. Meanwhile, the recovery phase is managed by the Deputy for Rehabilitation and Reconstruction in accordance with Presidential Regulation 1/2019 paragraph 2 concerning Organizational Structure. This structure is usually followed the BPBD organizational structure as well at the local level.

Special Disaster Risk Management Policy-making Committees: In Indonesia, DRR policy-making committees and structures are in place. Article 14 of Law 24/2007 establishes and authorizes a Disaster Management Steering Element consisting of governmental and professional society members tasked with

formulating national disaster management policy and monitoring of disaster risk.

Multi-stakeholder Participation in Decision-making Committees: Stakeholders throughout Indonesia's government and civil society are included and have operational or decision-making responsibilities. The BNPB Steering Element is required to draw its membership from a defined set of intergovernmental representatives and from the professional community. The criteria and mechanisms for Steering Element member selection are defined in Head of BNPB Regulation 8/2008.

STAKEHOLDER ENGAGEMENT

Stakeholder Representation in Government DM Structures: Indonesia's disaster management organizational arrangements formalize NGO, private sector, and other stakeholder entities in official DM and DRR structures through assignment of roles and responsibilities, but implementation challenges exist. Participation of international and domestic NGOs, private-sector entities, and other relevant stakeholders is addressed in Articles 28-30 of Law 24/2007 and in Regulation 23/2008. These stakeholders have the opportunity to participate, given they follow prevailing policies: that they account for their activities to national disaster management authorities, and that they follow humanitarian principles. Further clarification of stakeholder involvement is made in Head of BNPB Regulations 17/2011, 11/2014, and 12/2014, where the option of formal organization of civil society and business institutions is detailed as a contractual process facilitated through the incident command system. Differences in the language of provisions have been recognized as a potential source of confusion in terms of whether or not NGOs operate independent of government or within monitoring schemes established for cluster coordination.

Public Private Partnerships (PPPs): The GoI has implemented policies to support the creation of PPPs, and they are utilized regularly. BNPB is tasked with the regulation of private-sector entity participation in disaster management activities through BNPB Regulation 12/2014. Evidence exists of broad use of MOUs to establish formal relationships with private-sector partners, NGOs, banks, media organizations, and logistics entities.

NGO and Private-sector Inventory: PLANAS PRB lists organizations and details the capabilities and resources possessed by each. The national DRR platform, PLANAS PRB, currently lists 110 stakeholder organizations engaged in disaster risk management. Of these, 61 are either NGOs or INGOs, 17 are from the private sector and 14 are from academia.

Nature of Multi-Stakeholder Engagement: NGOs are comprehensively engaged in Government of Indonesia disaster management efforts in a manner that is coordinated and complementary. Stakeholder engagement in disaster management is comprehensively addressed in the language of several government regulations and includes defined rights and responsibilities that apply to both pre- and post-disaster activities (e.g., training, planning, policy making, operations, and reporting).

Private-sector Engagement: Throughout Indonesia, members of the private sector (business associations, major employers, subject matter experts) are actively engaged in official disaster management efforts (plans, exercises, and training), including owners and operators of critical infrastructure. This is guided

by GoI policies and procedures. Private-sector participation in disaster management activities is guided and regulated — but not mandated — by national legislation (namely Law 24/2007 and Head of BNPB Regulation 12/2014). Participation provisions are focused on the strengthening of disaster prevention, emergency response, and disaster-recovery activities.

NGO Organizational Arrangements: There exist formal NGO associations across Indonesia that include established and active members with and without defined disaster management program areas or missions. The National DRR Platform (PLANAS PRB), which was established to engage with a broad range of stakeholders in disaster risk-reduction activities, includes the participation of 61 registered NGOs and INGOs.

Academia Involvement in Government DM: Policies and strategies support a robust academic community of practitioners throughout Indonesia that contributes to official disaster management efforts through R&D, training, etc., using structurally integrated arrangements. Academia involvement in official disaster management efforts is facilitated through the University Forum for Disaster Risk Reduction (FPT-PRB). Established in 2008, the FPT-PRB helps to integrate academic research, practice, and experience, primarily through information exchange and collaboration efforts. Universities also participate and support governmental efforts via the Multi-Hazard Early Warning System (MHEWS) through research, community engagement, and monitoring efforts. BNPB regularly establishes MOUs with universities and academic research institutions for this purpose.

National Government Engagement in Regional and Global Efforts: Indonesia, and BNPB specifically, have strong and effective relationships with global and regional organizations, including support frameworks and agreements that have been formally ratified. Indonesia has a strong and effective relationship with global and regional organizations, including formalized support frameworks and ratified agreements. In addition to hosting the ASEAN Coordinating Centre for Humanitarian Assistance (AHA Centre) in BNPB headquarters, the country is a signatory to the binding ASEAN Agreement on Disaster Management and Emergency Response (AADMER). Indonesia also participates in key policy forums, including the Sendai Framework for Disaster Risk Reduction, the former Hyogo Framework for Action (both of which it ratified), and the Asian Ministerial Conference on Disaster Risk Reduction.

ENABLING ENVIRONMENT

SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

The all-hazards underpinnings of BNPB's legal foundations build upon Law 24/2007 and Regulation 21/2008, which have explicit provisions for pre-disaster, disaster, and post-disaster activities incorporating natural, non-natural (e.g., epidemic), and human-caused disaster situations (e.g., conflict). Political buy-in at the highest levels for Indonesia's DRR, CCA, and DM efforts is achieved by the BNPB and Regional Disaster Management Agencies (BPBDs) led by the President of Indonesia and by regional governors, respectively. Indonesia has begun to incorporate Incident Command System (ICS) tenets requiring civilian-military (CivMil) collaboration. These strategic engagements are bolstered by the fact that the President of Indonesia is both the Head of the BNPB and Commander in Chief of the Indonesian National Armed Forces, per the Government Regulation 21/2008 (Article 25). BNPB's national response and preparedness efforts have traditionally been adequately funded with regional variances. However, the effects of the COVID19 pandemic on Indonesia, ASEAN, UN partners, and all global multi-lateral funding entities will present fiscal challenges over the next five years. Indonesia's DRR and DM leadership have extensive and recent all-hazards experiences, with private-sector partners and insurance markets assisting Government of Indonesia (GoI) efforts.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

ENABLING ENVIRONMENT SUB-THEMES

- Legal Foundation
- Financial Resources
- Strategies
- Public Confidence and Political Support
- Attitudes and Experience

LEGAL FOUNDATION

Legal Arrangements Address DM Requirements: Indonesia's DM legislation is comprehensive and driven primarily by a single current disaster law. The legal basis for meeting Indonesia's disaster management requirements rests largely upon two statutes: Law of the Republic of Indonesia Number 24 of 2007, Concerning Disaster Management, and Government Regulation of the Republic of Indonesia Number 21 of 2008, concerning the Implementation of Disaster Management. Subsequent legislation has helped to clarify aspects of these foundational legal instruments, which are said to have galvanized political engagement for multi-stakeholder disaster management.

Scope of Legislation: Indonesia's DM legislation addresses all disaster management phases. Law 24/2007 and Regulation 21/2008 together comprise a comprehensive approach to addressing all phases of disaster management in Indonesia with explicit provisions for pre-disaster, disaster, and post-disaster activities. Regulation 21/2008 provides a detailed explication of wide-ranging objectives for each phase of disaster management and designates responsible parties for each objective; it thereby codifies a comprehensive legal framework for all phases of disaster management for all responsible parties at city/regency, regional, and national levels (Elucidation of Government Regulation 21/2008).

Basis of the Legislative Process: Indonesia's DM legislation is based on a broad strategic vision. Disaster management legislation is established on the basis of a broad strategic vision with an all-hazards, capacity building approach that includes mechanisms for accountability and oversight. Regulation of the Republic of Indonesia Number 21 of 2008 "Concerning Disaster Management" (Government Regulation 21/2008) confers broad powers upon the leaders of the BNPB and the BPBDs to create policy, strategize, plan, implement action, and to mobilize human and material resources from both public and private entities for the purposes of disaster management.

Implementation Schedules in Legislation: Indonesia's DM legislation details implementation schedules and is fully implemented. Law 24/2007 stipulated schedules for the establishment of national and regional disaster management agencies, for implementation regulations, and for reporting and planning. Subsequently, Presidential Regulation Number 8 of 2008, Concerning National Disaster Management Agency, mandated a "Disaster Management Implementing Element" (DMIE) within the BNPB that is responsible for implementation of operations, coordination, and command in all phases of disaster management. A "principal inspectorat" within the DMIE is designated to oversee the "implementation of duties and functions" of the BNPB; the principal inspectorat is subordinate to the head of BNPB (Article 31).

Legislation and Institutions: DM legislation provides detailed provisions for the establishment of DM institutions in Indonesia. Law 24/2007 established the BNPB and Regional Disaster Management Agencies (BPBD) as the lead disaster management authorities and, through Government Regulation 21/2008, provisions were established to assign functional responsibilities to support disaster management to relevant ministries and institutions (Article 27, Elucidation of Regulation 21/2008).

Legislation and Budgets: Legislation provides basic provisions for the establishment of DM budgets in Indonesia. Basic provisions for budget allocations regarding disaster management in Indonesia are outlined in Law 24/2007 (Articles 6, 8, 12, 21, 60-62) and in Government Regulation 21/2008 (Articles 41, 58, 62, 81, 83), including mandates for the State budget (referred to as APBN) to allocate "sufficient" funds for a disaster management budget; likewise, regional governments shall provide for a regional budget (referred to as APBD). In addition, State and regional governments are compelled to create a "ready fund" for use during an emergency-response effort. Despite the attention given to funding in the legislation, no amounts or percentages are specified.

Legislation is Socialized: Legislation is actively socialized by the Government of Indonesia. Indonesian disaster management legislation is widely socialized through the statutory integration of national, regional, and local government disaster management systems and structures, and through the establishment of MOUs between BNPB and relevant stakeholder ministries and offices.

Declarations Process, Vertical Cooperation, and Resource Requisition: Indonesia's declarations process, vertical cooperation, and resource requisition during disaster events are addressed and adequately described in the language of the law. In the event of an emergency, the President, as leader of the BNPB, shall determine when to declare national disaster-emergency status. In the same manner, regional governors, as leaders of the BPBDs, are empowered to declare regional disaster-emergency status. These powers are codified in both Governement Regulation 21/2008 (Article 23) and Law 24/2007 (Article 50). Both statutes invoke wide-ranging mechanisms that impel the respective Head of either the BNPB or BPBD (or an appointee) to a "Commander" position (Government Regulation 21/2008, Articles 47-50), and allow the Agencies (BNPB and BPBDs) to call upon any governmental or non-governmental institution for human and material resources, logistics, and equipment (ibid., Articles 24-31).

Emergency Powers: Comprehensive legislative provisions enable leadership to curtail certain rights and activities during a state of emergency in Indonesia. Government Regulation 21/2008 grants extraordinary powers to persons in leadership roles at the BNPB and BPBDs during a disaster event. The BNPB and the BPBDs are empowered by the statute, in the context of rescue of persons or property, to command control over: (1) material objects, including the relocation and/or destruction thereof; (2) the movement of people, including their removal and/or relocation from an area; (3) isolation and/or closure of public or private lands; and (4) public utilities, such as electricity, gas, and water (Article 46). Additionally, to facilitate the entry of aid from abroad, both in the form of foreign personnel, equipment, and logistics, the Agencies is also given convenience in the service process in the fields of Immigration, Excise, and Quarantine. (ibid., Articles 32-37).

DM Structures and Arrangements for Lower Levels of Government: Indonesia's DM legislation and provisions are comprehensive. Provisions for BPBDs are provided by Article 18, Law 24/2007 and Article 63, Government Regulation 8/2008. Regulation 21/2008 mandates that Regional Agencies are responsible to coordinate a "regional action plan" involving Regional Government Personnel Work Units (Article 8). As of 2019, BPBDs have been established in all 34 provinces and in 512 cities/districts.

Guidance for DRR Activities and Requirements: Indonesia's legislation provides some guidance for DRR activities and requirements, e.g., code enforcement, land use regulations, sustainable development practices. Adherence to disaster risk-reduction principles and best practices is mandated for public- and private-sector entities by Laws 24/2007 and 26/2007 and Government Regulation 26/2008. Criminal penalties are attached to noncompliance. DRR and CCA activities are likewise promoted in national development planning and policy instruments. However, progress has been impeded in this area.

Facilitation of Military Support: Provisions are comprehensive, and military resources are fully integrated into BNPB and regional government structures. Military support is fully integrated into Indonesian disaster management due to the fact that the President of Indonesia, as Head of the BNPB and as Commander in Chief of the Indonesian National Armed Forces, may call upon the military for the purposes of disaster management during an emergency as per Article 25 of Government Regulation 21/2008. Regional governors likewise have the authority to marshal the armed forces in the event of a disaster emergency.

Facilitation of International & Cross-border Activities (Facilitation and Provision): Indonesia's international and cross-border provisions are comprehensive. Head of BNPB Regulation Number 22 of 2010 (Guidelines for Participation of International Institutions And Foreign Non-Governmental Institutions During Emergency Response), specifies triggers and mechanisms for international assistance, as well as procedures for managing assistance, and designates representatives from specific agencies who shall establish Supporting Posts in the event of an emergency. In addition, Indonesia is a signatory to the legally binding ASEAN Agreement on Disaster Management and Emergency Response (AADMER).

FINANCIAL RESOURCES

DM Budget Arrangement: Indonesia's DM budget provides line-item funding for disaster management activities. Operating budgets for disaster management entities and funding streams to support disaster financing and capacity development are established in Articles 6, 8, 60, and 61 of Law 24/2007. Funds are allocated directly from State (APBN) and regional (APBD) budgets.

DM Budget Funded at Targeted Levels: Indonesia's DM budget does not specify levels for funding. The statutory language in Law 24/2007 (Articles 8, 60-62) and Regulation 21/2008 (Articles 41, 58, 62, 81, 83) lacks specificity and thereby engenders lack of financial commitment in practice.

Scope of DM Budget: Indonesia's DM budget covers programmatic costs as well as administration and operational needs. Disaster management budgeting in Indonesia is mandated to encompass the "entire system, regulation, organization, plan and program related to these matters" (Elucidation of Regulation 22/2008); this mandate concerns national as well as regional budgeting.

DRR Grant Programs: Grant programs for DRR and the support of disaster preparedness exist but are not often recurring or are limited in their scope in Indonesia. Private-sector grant funding to target disaster risk reduction and other capacity-development pursuits are dictated by a singular and reactive "Grant-Patterned Social Assistance Fund." Funds drawn from the National Budget (APBN) per Articles 5 and 6 of Government Regulation 22/2008 are granted to disaster-impacted sub-regional and local governments. The Guidelines for the Management of Direct Grants in the BNPB Environment are stated in Head of BNPB Regulation 16/2009.

Budget Supports Training, Education, and Research & Development: Indonesia's DM budget supports the development of training, education, and R&D. Regulation 22/2008 dictates that government budgets at all administrative levels allocate funding to address, in addition to other activities, disaster management training and education, preparation of technical standards, "alertness" activities, and development of early warning. Disaster management training and education efforts are shared among relevant agencies and ministries, each of which is granted line-item funding from the State budget (APBN).

National Budget Supports Sub-jurisdictions: Indonesia's DM budget supports capacity-development efforts at the local level, but implementation obstacles exist. Multiple budgeting arrangements exist to support local DM capacity development in accordance with the mandate of Government Regulation 22/2008 which requires the Central Government to budget for disaster contingency funds sourced from the National Budget (APBN). Disaster Resilient Village (DESTANA) and Disaster Resilient Families (KATANA) are examples of BNPB's activities targeting capacity building at the local level by combining the principles of community-based disaster risk reduction (PRBBK).

Dedicated Emergency or Contingency Funds: Legal provisions exist to establish and maintain a contingency fund in Indonesia, but implementation challenges exist. National and regional Contingencies Funds and Ready Fund/On-Call budget ("Dana Siap Pakai"), are stipulated in Articles 5 and 6 of Regulation 22/2008 as a means for the national (APBN) and regional (APBD) budgets to support disaster financing. However, capitalization challenges have been identified.

Contingency-fund Levels: DM reserve funding exists but is less than 2% of national annual GDP and/or has fallen short of needs in the past even when emergency appropriations have been passed in Indonesia. Contingency-fund allocations are statutorily required in the national and regional budgets, but funding levels remain unspecified in the language of the law. Analysis of historic contingency-funding levels found regional allocations to be well below 1% of GDP.

Contingency-fund Limits: The disaster reserve fund in Indonesia includes guidelines for access and provisions that limit non-disaster uses. Head of BNPB Regulation No. 6A/2011 regulates the use of Ready Funds during Disaster Emergency Status. Government Regulation Number 22 of 2008 (Concerning Disaster Aid Financing and Management) extensively codify the approved uses for all funds.

Existence of and Public Support for Catastrophe Risk Transfer: A catastrophic risk-insurance market exists and is supported by the public sector in Indonesia. The Government of Indonesia greatly expanded public-sector access to catastrophic risk insurance in 2019 through the signing of an agreement with 56 insurance companies.

Insurance Industry Oversight: The Government of Indonesia regulates insurance markets to ensure solvency. Solvency capital requirements for insurers and reinsurers in Indonesia are mandated by a series of laws and regulations, notably Chapter 10 of Law of the Republic of Indonesia No. 40 Year 2014 on Insurance.

Availability of Low-interest Loans to Support Recovery: Low-interest loans to support recovery are only provided to a limited audience in Indonesia. Regulation 22/2008 stipulates soft loans for "productive businesses" shall be available to persons affected by disaster (Articles 24, 27). The Financial Services Authority (OJK) established provisions through the Financial Services Authority Regulation (POJK) 45/POJK.03/2017 ("Special Treatment of Credit or Bank Financing for Certain Areas in Indonesia Affected by Natural Disasters") to enable restructuring existing loans held by disaster-affected persons experiencing loan payment difficulties.

However, there are no government-backed low-interest loans to address losses from disaster events, nor to support household or NGO recovery costs.

Availability of Microfinance Credit Schemes: The Government of Indonesia supports microfinance credit schemes through formalized arrangements and structures. According to the Center for Public Impact (CPI), "30,000 microcredit groups were funded" for community infrastructure via the National Programme for Community Empowerment (PNPM). However, PNPM funding is not always explicitly or exclusively directed to disaster-hit regions.

Guidelines for Disaster Relief Disbursement: Assistance mechanisms exist for distribution of relief funds to lower jurisdictions, but implementation is challenging in Indonesia. If a regional authority has exhausted its funds but is still in the midst of relief operations, it may apply for access to the national Ready Fund by submitting a report (Chapter 3, BNPB Regulation 6/2008). Subsequently, "money, goods, and/or services" may be disbursed. Despite the BNPB acknowledged that the previous five years had exposed weaknesses that had impeded the mobilization of post-disaster financing.

STRATEGIES

Strategic Plans and Policies: Standalone or distinct DM and DRR strategic plans (strategies) and policies exist for all DM phases in Indonesia. As mandated in Law 24/2007 and Government Regulation 21/2008, the Government of Indonesia is obliged to prepare disaster management planning documents and streamline them into development planning, for both national and regional governments. From 2006-2018, GoI issued a series of DM and DRR plans at the national level, including the National Action Plan for Disaster Risk Reduction (RAN-PRB), the National Disaster Management Plan (RENAS-PB), and the Disaster Management Master Plan (RIPB). The RAN-PRB has been published twice, in 2006-2009 and 2010-2012, and subsequently was updated into RENAS-PB 2010-2014 and 2015-2019. In December 2018, the RIPB 2015-2045 was published in line with the vision and mission of the National Long-Term Development Plan (RPJPN) 2005-2025. The RIPB 2015-2045 was also the primary reference for preparation of the 2020-2024 and 2025-2029 National Disaster Management Plans RENAS-PB. A Disaster Management Plan (RPB) has also been issued at the regional level.

Stakeholder Engagement: DM and DRR strategic plans are inclusive of and developed in coordination with relevant Indonesian stakeholders, including NGOs and the private sector. As stated in Government Regulation 21/2008 (Article 8), the national action plan for disaster risk reduction is compiled in a comprehensive and integrated manner in a forum that includes government representatives, non-governmental entities, communities, and business institutions coordinated by BNPB. There is significant evidence that the Government of Indonesia (GoI) has pursued significant and meaningful engagement with the broad disaster management stakeholder community while developing the current legislative, strategic, and operational frameworks, including in the process for RENAS-PB and RIPB document development.

Stakeholder Guidance: Guidance is provided through a combination of self-directed and facilitated means (e.g., support from technical staff) to the full spectrum of Indonesian disaster management

stakeholders. Guidance to support the pre- and post-disaster efforts of various stakeholder community groups (e.g., NGOs, private sector, and voluntary organizations) is briefly addressed in the 2018 proposed National Disaster Response Framework (NDRF), which operationalizes the early guidance set forth via Government Regulation 21/2008. BNPB provides technical guidance to stakeholders in multiple regulations (e.g. Government Regulation 23/2008, Head of BNPB Regulation 23/2014 and 12/2014).

Policy Support of DRR Integration: Indonesia's DRR and DM policies ensure adequate integration of national goals in development, planning, recovery, and reconstruction, and ensure integration and coordination with CCA and SD policies and goals. Articles 6 and 7 of Law 24/2007 identify the integration of DRR in development efforts as being a responsibility of the national and regional governments and ensure that disaster management policies advance capacity-development efforts. The Disaster Management Master Plan (RIPB) 2015-2045 was published in line with the vision and mission of the National Long-Term Development Plan (RPJPN) 2005-2025, which aligns with the 2015-2030 Sustainable Development Goals (SDGs), as well as the commitment to the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030.

DRR and DM Policy Integration Progress: DM and DRR policy goals are integrated across all of Indonesia's government and are widely socialized. DRR has been mainstreamed through the provisions outlined in laws, policies, budget frameworks, and plans developed since the issuance of Law 24/2007. As a component of the country's 2015-2045 "Golden Indonesia Vision," integration of the complementary DRR, CCA, and sustainable development policy goals are notably present in multiple strategic plans and documents, including the 2015-2045 Disaster Management Master Plan (RIPB) and the 2020-2024 Medium-Term Development Plan (RPJMN). Indonesia's dedication to the Paris Agreement and Agenda for Sustainable Development (Presidential Regulation 59/2017) are testament to this commitment. Cooperation between BNPB and the State Ministry of National Development Planning (BAPPENAS) to support DRR at all administrative levels, relevant ministries, and institutions is likewise notable.

Mitigation Mandates in DRR Policies: Explicit DRR policies exist in Indonesia that mandate mitigation-planning requirements. Indonesia's DRR policies mandate explicit mitigation planning. Per Article 44 and 47 of Law 24/2007, and Article 20 of Government Regulation 21/2008, which describes the implementation of disaster management, disaster mitigation should be carried out to reduce the risks and impacts caused by disasters to communities in disaster-prone areas. These disaster-mitigation activities are carried out through (1) spatial planning (Law 26/2007 concerning Spatial Planning and Law 27/2007 concerning the Management of Coastal Areas and Small Islands); (2) development arrangements, infrastructure development, and building management (Law 28/2002 concerning Building); and (3) organizing education, training, and counseling, both conventional and modern. Provisions regarding sanctions for violations are described in Chapter XI of Law 24/2007, Chapter VIII of Law 26/2007, and Chapter XVI of Law 27/2007.

Consideration of Gender and Vulnerable Groups in Strategies and Policies: The specific needs of Gender and Vulnerable groups are considered across Indonesian national-level strategies and policies, but implementation challenges remain. Law 24/2007 clearly states in Article 3 that DM is to be implemented on the basis of humanity, equality before the law and government, togetherness and holding non-discrimination principles. Beyond this overarching statement, specific applications of inclusivity mandates are evident in various regulations and laws, such as Regulation 23/2008, which states that international organizations must provide assistance without discriminating among ethnic, gender, religious, cultural, social, economic, or political backgrounds. Head of BNPB Regulation 13/2014 "Gender Mainstreaming in Disaster Management" promotes the development of gender-responsive planning and budgeting.

PUBLIC CONFIDENCE AND POLITICAL SUPPORT

Support from Top Government Officials: Indonesia's national leadership champion DM and DRR activities, including activities associated with preparedness and mitigation. The President of Indonesia has shown a commitment to the country's DRR agenda, often personally announcing key milestones, such as the launch of programs, participation in national-level disaster exercises, and the issuance of Presidential Decrees to address disaster management needs. The President is the principal national-level official for disaster management, and the BNPB Head of Agency reports directly to the President.

Support of the Legislature: Standing Indonesian legislative committees have a central focus on DM and DRR. Indonesia House of Representatives Commission VIII (Religion, Social Affairs, Disaster, and the Empowerment of Women) is tasked with the development of disaster management legislation. The SDG Working Committee also promulgates DM and DRR policy.

Interagency and Multi-stakeholder Input in the Legislative Process: Government of Indonesia committees facilitate interagency and multi-stakeholder input in the legislative process. Commission VIII has eight main partners at the ministerial level: (1) the Ministry of Religion; (2) Ministry of Social Affairs; (3) the Ministry of Women's Empowerment and Child Protection; (4) National Disaster Management Agency; (5) National Amil Zakat Agency; (6) Indonesian Waqf Board; (7) Indonesian Child Protection Commission; and (8) Hajj Financial Management Agency. The disaster law (24/2007) is said to have been the result of a multi-sectoral stakeholder process, which included civil-society and UN organizations.

Public Support of DRR Provisions: The Indonesian public supports a majority of DRR provisions, even when they result in increased national spending, increased costs, or a potential loss of some other benefit. The public supports a majority of DRR provisions, even when they result in increased national spending. So far, there has never been a public response (through civil society, academics, and observers) that disputed the amount of disaster management funds. BNPB has received critiques of its budgetary processes by the GoI Ombudsman, but public support has been consistently positive for BNPB's DRR mission.

Public Confidence in DM and DRR Entities: The Indonesian public is confident in the capabilities and capacity of DM agencies. In almost 13 years of operation, BNPB has performed with the confidence and support of the Indonesian public. More recent challenges associated with the response to COVID-19 have identified areas for improvement, which the President has addressed in part through a Presidential Regulation, and the House of Representatives is seeking to further address through the creation of new disaster legislation.

Political Approval Ratings: Approval ratings are collected unsystematically in Indonesia, and public support is not an important factor for DM decision making. BNPB has not regularly conducted public surveys to assess attitudes. However, mechanisms to do so are expected to be implemented as part of the guidance of the Government Bureaucracy Reform. In the meantime, public sentiment is measured primarily through examination of social and mass media.

ATTITUDES AND EXPERIENCE

Practical Experience of the Jurisdiction: Indonesia experiences a handful of major disasters requiring interagency and/or extra-jurisdictional coordination every year. Disasters are commonplace in Indonesia, and, as such, disaster management officials have extensive operational experience. Data collected since BNPB's 2008 establishment indicate that there has been an average of 2,770 disasters declared across all administrative levels, resulting in an annual average of 1,262 fatalities, 10,961 injuries, and 2,495,738 people evacuated.

Practical Experience of the Lead DM Official: During the previous year, BNPB's leadership has coordinated a major disaster requiring (or in provision of) extra-jurisdictional assistance. BNPB Head of Agency, Doni Monardo, assumed office in January 2019. As Agency Head, he has already managed several national-level disaster incidents, including the COVID-19 pandemic (2020), the Jakarta Floods (2020), the South Sulawesi Floods (2019), the Jayapura Flood and Landslide (2019), and the Lombok Earthquake (2019) (Mr. Ganip Warsito recently replaced Monardo as BNPB Head).

Public Engagement in DM: The Indonesian public is actively organized and engaged in DM efforts, including but not limited to exercises, planning groups, and community emergency-response teams and brigades. The Indonesian public has traditionally been active in disaster-preparedness and operational efforts due to the country's active hazard profile. Law 24/2007 encourages community participation in the pre- and post-disaster contexts and establishes participation as the right of all members of the community. Protections provided to volunteers through disaster management legal and policy instruments further encourage participation.

Private-sector Engagement in DM: The business community actively participates in BNPB disaster management exercises, events, and trainings; and business associations report a high utilization of business continuity and emergency planning among members. Chapter 6 of Law 24/2008 encourages private-sector entities to participate in disaster management activities, whether at the municipal level in coordination with other stakeholders or to protect businesses themselves. Businesses that choose to participate in disaster management activities are required to register and submit periodic reports to government disaster management agencies and to inform the public in a transparent manner.

Household Preparedness: No assessments or surveys of Indonesian household or individual disaster preparedness are conducted, or if they are, less than 25% of households report adequate preparedness. Although preparedness efforts have been hampered by the COVID19 response, there have been some nascent household-preparedness efforts starting with the 2019 Disaster Preparedness Day event. This inclusive event had the theme "Women become Disaster Preparedness Teachers, Houses become Schools," highlighting the role of women as pillars in the household in efforts to deal with family-level disasters. Surveys are not regular or encompassing all of Indonesia.

DISASTER GOVERNANCE MECHANISMS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

BNPB and BPBD Standard Operating Procedures (SOPs) and mutual aid agreements are at an advanced stage of development, with some items, such as Memorandums of Understanding (MOUs), requiring further formalization and expansion with both domestic and international partners. The formal and informal nature of stakeholder engagement throughout the linguistically and culturally diverse archipelago bodes well for lessons learned for other island nations, with volunteer engagement and public-private partnerships among notable areas of excellence and expansion. Transparent plans, SOPs, and Emergency Operations Center (EOC) exercises with domestic as well as international partners have furthered BNPB's preparedness and response efforts. Advances in resilient EOC technology and situational awareness data and communications are ongoing. However, due to the variety of hazards and broad expanse of the Indonesian archipelago, further interoperability gains will need to be achieved in the near and medium-terms.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

DISASTER GOVERNANCE MECHANISMS SUB-THEMES

Plans & Processes

Command, Control and Coordination Structures

Governance Infrastructure

PLANS & PROCESSES

DM Phases Addressed in Plans: Indonesia's formal plans and DM standard operating procedures address the phases of Response, Disaster Risk Reduction (Mitigation), and Long-Term Recovery/ Reconstruction. The DM plan is described through three main documents as follows: Disaster Management Master Plan (RIPB) for every 25 years; National Disaster Management Plan (RENAS PB) and BNPB Strategic Plan (Renstra BNPB) which are updated every 5 years. RIPB and RENAS PB were subjected to all DM actors (multi-stakeholders), while Renstra BNPB was developed specifically for BNPB.

Coordination of Government Disaster Plans: Plans guide disaster management activities across all of Indonesia's DM agencies. Both the 2020 RIPB and the 2015 RENAS PB plans address the roles and responsibilities of all relevant national level disaster management ministries and agencies. Synchronization of the organization and structure of disaster management agencies at different administrative levels of government are guided by disaster laws (24/2007, Reg 21/2008) and Presidential Regulation (1/2019). The national disaster management strategy seeks to increase integration of planning instruments among the national, provincial, and local levels to strengthen operational effectiveness, but many local governments still lack synchronized plans.

Continuity of Operations (COOP) and Continuity of Government (COG): COOP and COG planning are required but plans in Indonesia remain under development or are untested. BNPB's operations play the biggest role in ensuring Indonesia's Continuity of Government. Through BNPB collaboration with the National Standardization Agency (BSN), the Disaster Management Technical Committee was created. An outcome of these efforts are guidelines for incident preparedness and operational and governmental continuity. Though strategic guidance is given, specific COOP and COG plans for each ministry/agency are difficult to find.

Roles and Responsibilities Defined by Plans: Indonesia's DM plans and SOPs identify roles and responsibilities for each level of government from local, to regional, and national actors. Emergency Status is stated by local leadership (governor/mayor/regent) Gov Reg 21/2008 Article 23. Then, Article 27 mentioned that the head of the BPBD have a right to command the sector/institution for the deployment of human resources, equipment, logistics, and rescue.. Close alignment between BNPB and the BPBDs all but ensures that functional coordination will be established, even though BNPB has no authority over BPBDs. That's because BPBDs have been designed through legislation and policy to mirror the national organization.

Definition of the Declarations Process: A declarations process exists in Indonesia's disaster management plans, SOPs, or other official documentation, but in practice declaration remains ad hoc. The disaster declarations process is outlined in Articles 21-23 of Government Regulation 21/2008, and Presidential Regulation 17/2018 Concerning the Implementation of Disaster Management in Certain Circumstances. Factors that are considered as part of the declaration decision include the number of victims, property loss, facilities and infrastructure damage, the extent of the affected area, and socioeconomic impacts. Declaration begins at the local level and increases in scope with the size and scale of the event. The authority to declare national-level disaster is reserved for the President.

Accessibility of Plans and Processes: Some, but not all of Indonesia's plans and processes are publicly available. Law 14/2008 on Public Information Disclosure mandates that national and sub-national governments publish their regulations, plans, reports, and/or other key documents to the public. Though most publications and national plans can be accessed on the BNPB website, broken links make some of them inaccessible. Subnational plans and processes are not accessible to the public via websites.

Government Promotion and Coordination of DM Plans with DM Stakeholder Community Plans: The Indonesian DM stakeholder community maintains sectoral and/or facility plans that are coordinated with government DM plans for hospitals, schools, power plants, prisons, etc. Law 24/2007 calls for close synchronization between national and regional disaster management activities, including in the development of plans but most notably with regards to sustainable development as that policy goal extends across all of government. This law also promotes the participation and partnership of the wider disaster management stakeholder community.

Mutual Aid Agreements: Mutual aid agreements exist to support DM efforts in Indonesia. Mutual aid is facilitated primarily through Gov Reg. 21/2008, article 28.2. "If the human resources, equipment, and logistics in the disaster-affected district/city are not available/inadequate, the district/city government may request assistance from the nearest other district/city, either in one province or another province".

International Mutual Aid Agreements: Formal mutual aid agreements have been established at the bilateral/global regional level with Indonesian DM and DRR stakeholders. Indonesia is a signatory member of the ASEAN Agreement on Disaster Management and Emergency Response (AADMER), which ensures that other ASEAN members will come to the country's aid if requested. BNPB manages the engagement with and accounting of foreign disaster management stakeholders. Further, Indonesia has 2,669 bilateral and 19 trilateral agreements.

External Disaster Assistance Protocols: Processing of external resources (e.g., customs and immigration) is facilitated, but not streamlined during disasters; implementation challenges prevent efficient use of external-disaster assistance despite the existence of protocols and procedures. International and foreign non-governmental organizations that participate in disaster management activities during a response receive government protection for their workers. At the 2012 Asia-Pacific Economic Cooperation (APEC), Indonesia proposed the Emergency Response Travel Facilitation (ERTF), a mechanism that supports entry of personnel and goods to areas affected by large-scale disasters. However, there is no evidence that any policies or legal framework developed from that proposal.

Volunteer and Donations Management Capacity: Utilization of donated goods and volunteer resources is managed through formal processes in Indonesia. Volunteer arrangements are regulated in the Head of BNPB Reg. 17/2011 concerning DM Volunteer Guidelines. Donation Management is regulated by several regulations including Head of BNPB Regulation: 16/2008 concerning Guidelines for Direct Grants Management in BNPB; 14/2011 concerning Technical Guidelines for the Application and Management of Grant Pattern Social Assistance Funds for Post-Disaster Rehabilitation and Reconstruction Activities; 22/2010 concerning Participation of International Institutions and Foreign Non-Governmental Institutions during Emergency Response. When it comes to international institutions, this is also stated in Gov Reg 23/2008 concerning the Role of International Institutions and Foreign Non-Governmental Organizations in Disaster Management.

COMMAND, CONTROL, AND COORDINATION SYSTEMS

Incident Command Systems: The Incident Command System (ICS) has been incorporated as a formal component of disaster response operation in Indonesia and is used as a standard of practice in events of all sizes and scope. Incident command in Indonesia is guided by the Disaster Response Command System (Sistem Komando Penanganan Darurat Bencana – SKPDB). The Disaster Emergency Management Command System is a structured unit of effort in one command that is used to integrate emergency management activities effectively and efficiently in controlling the threats/cause of disasters and overcoming the impacts during a disaster emergency.

Incident Coordination Systems: Incident coordination is guided by a standardized incident-management system that has been implemented at all levels of government, enabling transparent and expedited integration of non-governmental and private-sector resources into response activities; however, implementation challenges remain. Incident coordination is guided by the aforementioned Head of BNPB Decree 174/2014 concerning National Cluster for Disaster Management. Disaster management on a national scale involves eight clusters, includes: Health, Search and Rescue, Logistics, Refugees and Protection, Education, Facilities and Infrastructure, Economy, and Early Recovery Cluster.

Legal Basis of Command and Coordination Structures: Incident command, management systems and structures, and decision-making authority and reporting hierarchies are defined by Indonesia's legal and planning instruments. At the national level, Head of BNPB Regulation 3/2016 mandates the use of the Incident Command System at Provincial, City, Regency, or National level. In addition to that, at the national level the command structure oversees the Cluster System as regulated in the Head of BNPB Decree 174/2014 concerning National Clusters for Disaster Management. These regulations details the roles and responsibilities within the incident command construct at all government levels and among all components.

Command and Coordination by Function: Plans and procedures delineate leadership and coordination for disaster and emergency support functional areas, such as SAR, Public Health, and Shelter. TAs per Head of BNPB Regulation 3/2016, Disaster Management Emergency Command Post organizational structure at the National Level involves multi-stakeholders clusters, which duties and roles are detailed on Head of BNPB Decree 174/2014 including following eight clusters: Health, Search and Rescue, Logistics, Refugees and Protection, Education, Facilities and Infrastructure, Economy, and Early Recovery Cluster.

Facilitation of Interagency Coordination: Standard procedures exist for interagency coordination in Indonesia, including interagency agreements, requests for assistance, mission assignments, reporting requirements, and re-imbursement. Coordination of interagency support is facilitated through operation of the Disaster Emergency Management Command Post. The Command Post is led by a commander and assisted by representatives of relevant agencies/institutions at the regional and national levels, provincial governments, and international community assistance coordinators, as well as clusters. The command post coordinates all other partner organizations and agencies, including those that are non-governmental and/or international.

GOVERNANCE INFRASTRUCTURE

Emergency Operations Center: BPBDs maintain a sole-use purpose-built EOC. BNPB Emergency Operations Center (EOC) requirements and capacity is dictated by BNPB Head of Agency Regulation 15/2012. Using these regulations as guidance, a dedicated and purpose-built emergency operations center (Pusat Pengendalian Operasi Penanggulangan Bencana (PUSDALOPS-PB) has been constructed in the organization's headquarters, and most (not all) of the local EOCs are located in their respective BPBD Offices. The EOC space is designed and equipped to support 24-hour, 7-day activation in a major disaster.

Dedicated EOC Facility: BNPB's EOC is not in a dedicated facility. PUSDALOPS PB is located in a building that hosts interagency partners and shares space with the organization's day-to-day operations.

EOC Resources: BNPB's EOC is equipped for minor incidents but may need additional equipment and resources for large-scale events. PUSDALOPS PB is adequately equipped to support major disaster response operations, but its relatively small size limits the number of interagency and other non-governmental partners.

EOC Activation Readiness: BNPB's National EOC is capable of no-notice activations. PUSDALOPS PB is staffed and equipped to activate on a no-notice basis. To improve emergency response speed, the Rapid Reaction Unit (SRC) was formed. The BNPB, in cooperation with the Indonesian National Army (TNI), the Indonesian National Police (POLRI), multiple ministries and NGOs comprise this organized unit. The SRC serves as reinforcement to the regional government to carry out technical assistance, equipment, and logistical support when the local government's ability is exceeded.

EOC Activation Duration: Indonesia's EOC is staffed and equipped to ensure continuous operations. BNPB Head of Agency Regulation 15/2012 provides detailed guidance on staffing and resources requirements for the national EOC. Per this guidance, the national EOC is staffed and has resources to support full-time activation for the duration of the emergency event.

EOC Resilience: Indonesia's National and Regional EOCs are physically protected from most hazards. BNPB Regulation 15/2012 requires the National EOC to be located in a building that is resistant to multiple natural and technological hazards – including seismicity, fire, lightning, and theft – and has access to multiple transportation options, including helicopter access. The facility must also have reliable access to utilities (water, power, communications). BNPB staff report that the facility meets most requirements, with the exception of potential access challenges related to flood.

EOC Accessibility: Indonesia's National EOC is easily accessible for key government officials. The BNPB EOC is located in the BNPB headquarters which is easily accessible to most key officials that must be physically present. A helipad on the building roof provides alternate access, including if ground transportation is not possible.

Backup EOC: BNPB maintains backup National EOC facilities. There are three Provincial BPBD EOCs that serve as backups to the national BNPB EOC. Each is equipped at levels similar to what is maintained at the national EOC.

Field-level Coordination Centers: BNPB has plans, procedures, and resources to establish multiple field-level coordination centers. BNPB operates field-level coordination from BPBD offices when necessary. Most are equipped at sufficient levels and can be quickly established as a field coordination center for BNPB.

Long-term Community Recovery Facilitation Capacity: Indonesia has the plans, procedures, and resources to support long-term community recovery, but these are untested and implementation challenges remain. BNPB maintains the capacity to activate post-disaster recovery centers following major disasters in partnership with district BPBDs. In such instances, the BPBD has the lead responsibility for recovery center operations. Examination of past recovery efforts has highlighted ongoing challenges, including coordination of recovery efforts and a lack of public understanding about the existence or purpose of the recovery centers.

Communications Interoperability: Partial communications interoperability exists amongst Indonesia DM stakeholders. Intergovernmental and partner-to-partner communications interoperability is achieved largely through the use of proprietary third-party mobile applications, namely the WhatsApp messaging application. Although effective, widely used, and inexpensive, dependence on high-speed mobile data network access remains a challenge. High-frequency radios are used as an alternate form of communication, but access to equipment and prevalence of technical capabilities are presumably far lower than access to mobile messaging and voice systems.

Responder Credentialing: Credentialing processes and systems exist but have not been tested in past disaster events. The BNPB is responsible for managing responder credentialing and has made some effort in keeping records in past disasters. However, the agency has not fully utilized credentialing systems in past events. BNPB Regulation 1/2019 addresses the competency standards of key disaster response positions. The Training Center (Pusdiklat PB) maintains a centralized information system that records staff certification data called SiDIKLAT.

CAPABILITIES & RESOURCES

SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

Whilst hydro-meteorological hazards and challenges constitute the lion's share of BNPB's preparedness efforts, persistent volcanic, seismic, and urban/wildland fire challenges will be of strategic importance as climate change affects Indonesia in dynamic ways and at varied locations. BNPB and regional BPBDs are well-resourced, generally, but shelter challenges, specifically vis-a-vis reduced shelter capacity in the wake of the COVID19 pandemic, will need to be addressed. Building upon the health-security theme, further integration of medical systems and public health expertise within BNBP and regional BPBD planning processes will need to be advanced rapidly to counter COVID19 and other public health challenges. Dynamic surge staffing, partnerships, and modernization of human resources tools, processes, and collaborations will help the Indonesian DM and DRR cohort meet the ever-more-complex challenges needed for CCA and resilience. Advanced commodity and logistics tools are in place but must be improved to assure timely response and recovery operations.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

CAPABILITIES & RESOURCES SUB-THEMES

- **Facilities & Equipment**
- **Human Resources**
- **Commodity & Supply Inventory**
- **Functional Capabilities**

FACILITIES & EQUIPMENT

Emergency-services Facilities Capacity: Less than one fire station per 100,000 population and fewer than one fire station per 50 square miles in Indonesia. Fire and rescue services currently fall within the mission and under the management of the Ministry of Home Affairs but will eventually be transitioned into an independent agency. Internal inventories of fire and rescue service facilities indicate that there are fewer than one fire station per 50 square miles of land area, with rural areas facing the greatest deficiencies.

Material Resources Available for DM: More than 75% of emergency services and civil-protection entities are equipped with resources appropriate to manage known hazards. In 2019, Indonesia assessed disaster management resource inventories adequate to address known hazards in almost 89% of disaster-prone municipalities – a sharp increase over 2018 when only 52% were similarly rated.

Supplemental DM Resources: Supplemental disaster management resource and equipment requirements across Indonesia are secured through a comprehensive blend of formalized private-sector partnerships, relationships with the NGO sector, and other means. Indonesia's disaster management framework formalizes and greatly encourages partnership building among members of the broader stakeholder community. Access to human and material resources are enhanced through a variety of means, including the public-private Disaster Resource Partnership (DRP) established by the Ministry of People's Welfare, which secures service and equipment support from humanitarian, construction, and other sectors to address both pre- and post-disaster needs. Effective integration of quasi-government institutions into standard operations, such as exists with the Indonesian Red Cross Society (PMI), has served to enhance preparedness and risk reduction in addition to response-and-recovery capacity.

DM Equipment Inventories: Accurate and up-to-date Inventories of disaster-relevant equipment are maintained. The BNPB Storage Section of the Equipment Storage and Maintenance Sub-Directorate (Logistics and Equipment Directorate) maintains disaster management equipment inventories in 33 of 34 provinces.

S**helter Capacity: Emergency shelters with the capacity to serve at least 50% of anticipated shelter needs have been identified, but alternate sheltering capabilities will likely have to be identified to address all requirements**. The Indonesian government relies heavily upon a myriad of domestic and international NGOs, religious organizations, UN agencies, and especially the IFRC to assist with sheltering capacities. Therefore, although statutory and operational commitments clearly exist, data indicate a need to improve capacity.

Shelter Suitability Assessments: Throughout Indonesia, some, but not all, shelters have been assessed for suitability. Shelter suitability standards in Indonesia are codified by a variety of public and NGO disaster management stakeholders. As a critical partner in shelter operations, IFRC drives shelter suitability assessments through the use of its own minimum standards.

Warehousing Capacity: Purpose-built warehouse and staging facilities exist to meet logistics operations requirements during a major disaster event. BNPB Regulation 6/2009 defines BPBD warehouse requirements, inclusive of location, capability, and capacity.

Integration of Public Health and Medical Facilities within the Nation's Disaster Management System: Integration is informal with expanded integration efforts underway. COVID-19 response has highlighted integration challenges between public health and disaster management, and likewise has helped stakeholders prioritize key integration requirements. This effort is aligned with the BNPB 2019 Performance Report and the Ministry of Health 2015-2019 strategic targets, both of which call for greater integration.

HUMAN RESOURCES

Emergency-services Staff: Indonesia has fewer than one firefighter per 5,000 population. Low-density coverage of fire services facilities is matched by low-service staffing. At the same time, the logistical remoteness of the country means that local first responders will need to serve as the primary response force for the initial hours and, depending on location, days of the incident. The Ministry of Home Affairs oversees the nation's fire service, which represents a primary source of public-sector emergency-services staff. The Ministry has issued multiple statutes seeking to establish minimum service standards (MSS) at all administrative levels. In the meantime, staff rosters remain low and depend heavily on partner support.

Maintaining Staff Dedicated to Disaster Planning or Civil Protection: A cadre of trained staff with job functions dedicated to pre- and post-disaster emergency-management activities and programs in Indonesia exists, but challenges exist in meeting programmatic needs relative to disaster planning. Staffing resources at the national level, namely at BNPB, are generally highly trained, adequate in number, and diversified in terms of job function. A 2019 BNPB assessment of six staff-capacity key performance indicators (KPI) determined that staff-capacity requirements have met one KPI, exceeded two, but are substandard in three. At the local and provincial levels, staff availability is impacted by high staff turnover, which heavily impacts staff knowledge and skills.

Surge-staffing Needs: Surge-staffing needs are formally addressed in Indonesia's disaster plans and procedures, but the adequacy of staffing resources is not at desired levels. Indonesia's disaster management resources are bolstered by the integration of NGO, INGO, private sector, and other partners into the country's disaster management system. A 2016 assessment of response capacity found the potential for surge-capacity shortfalls if partners are facing competing commitments or restrictions (as have since been highlighted by the ongoing COVID-19 global pandemic). Surge resource needs are assessed by BNPB or the relevant BPBD, and resource requests are made of partners at that time.

Surge Staff Source: Surge-capacity staff are drawn from throughout the Indonesia disaster management stakeholder community, including NGOs, the private sector, and other government agencies. The Indonesian Red Cross (PMI) represents the largest source of trained surge personnel, offering competencies that address rapid assessment, WASH, shelter, health and medical response, psychosocial care, and more. The Ministry of Social Affairs deploys TAGANA personnel (Disaster Preparedness Cadets) upon declaration of state of emergency. BNPB's rapid-needs assessment protocol includes the identification of human resource

needs and the activation of personnel from a wide range of stakeholders, including government, military, business, NGOs, and volunteers.

Rosters of Trained Professionals: BNPB maintains rosters of trained professionals for all or most relevant technical needs. The BNPB Deputy for Rehabilitation and Reconstruction is responsible for identifying and commandeering critical personnel when disasters strike and maintains a professional staff roster to manage this task. RedR Indonesia is an NGO that maintains a standby roster of humanitarian personnel from a broad range of specialties, which it provides to the Government of Indonesia as needed and to intergovernmental organizations and NGOs.

Role of Pairing Arrangements, Secondment Schemes, or Other Similar Mechanisms to Address Disaster-related Technical Staffing Requirements: To a limited degree, BNPB leverages these innovative pairing and public-private partner modalities. While formal and widespread secondment and pairing arrangements are not evident, examples exist where such mechanisms have been utilized in disasters. Mechanisms that address disaster-related technical staffing requirements include: DKI Jakarta and Tangerang Regency Government of Banten Province on Fire and Rescue Management in Border Areas; and DKI Jakarta and Gandaria City on Fire and Rescue Service in the Area of Gandaria City and surrounding Areas.

COMMODITY & SUPPLY INVENTORY

Generating Estimates of Post-disaster Commodity Needs: Estimates of post-disaster commodity needs in Indonesia (e.g., food, water, pharmaceuticals) are developed using scenario-based planning. BNPB Regulation 23/2014 establishes disaster logistics minimum standards for national and regional commodity capacities, including for food, water, clothing, and other supplies (e.g., medicine, tools, utensils). Formulas for calculating the logistics needs are based on population, estimated number of people impacted, date, local consumption patterns, and disaster threat. Research, hazard and susceptibility mapping, and monitoring all contribute to planning efforts for post-disaster commodity needs for volcanos, earthquakes, tsunamis, and landslides.

Commodity Stockpile Quantities: Commodity stockpiles are maintained at levels that do not meet estimated needs. National and provincial commodity stockpiles are maintained at levels predetermined by locations according to risk studies and contingency planning per requirements of BNPB Regulation 23/2014. There have been documented instances where pre-positioned relief stocks in different regional warehouses were transported and distributed to the affected areas. However, due to the wide scope of the emergency, the available in-country stocks did not meet the larger needs.

Location of Commodity Stockpiles: Indonesia's commodity stockpiles are kept in locations that require repositioning in rapid-onset events. Between 2010 and 2014, BNPB established commodity disaster preparedness "buffer stocks" in 33 provinces serving 427 district/city BPBDs for disaster preparedness, including the logistics support required to transport, store, and distribute them. Where relief supplies cannot be acquired from the local economy or local sources, access to relief stockpiles can be difficult due to the country's unique dispersed geography, which includes 6,000 inhabited islands and many remote populations.

Basis of Commodity Stockpile Distribution: Indonesia's commodity stockpile locations are based primarily on the location of warehousing facilities. In addition to the national warehouse stockpiles located in the Jakarta Capital Region, government relief-supply warehouses are predominantly collocated at regional BPBD facilities, with some exceptions where separate warehouses are located nearby (in the same municipality). Distribution between these warehouses may differ throughout the year based on hazard profiles and other measures of risk-based need. PMI stockpiles, which are a major component of national preparedness capabilities, are also maintained in various warehouses.

Commodity Contracts: Contracts with Indonesian commodity providers exist but are not assessed for reliability during disasters. BNPB doctrine includes all sectors of society in official response capacities, including the private sector. Pre-disaster contracts with private-sector stakeholders are rare, though MOUs have been signed with some private-sector entities (mainly banks). Commodity shortfalls in past disasters highlight the limited use of such partnerships. In fact, it is common for the Indonesian Red Cross to purchase needed commodities on the local market following a disaster, at times using government funding to support those purchases.

DM Resource and Supply Inventories: DM resource and supply inventories span all Indonesian national and local agencies, facilities, and jurisdictions exist. Resource and supply inventories are mandated by BNPB Regulation 23/2014, which sets a minimum preparedness standard for logistics operations. BDuring emergency situations, the Disaster Emergency Management Command Post establishes the Logistic Cluster led by Director of Logistic BNPB and assisted by Director of Social Protection for Victims of Natural Disasters, Ministry of Social Affairs.

Hosting of Resource and Supply Inventories: Indonesia's DM resource inventories are managed through multiple (individual) information systems and/or a centralized system that is not yet fully operational. Sistem Logistik Nasional Penanggulagan Bencana is a national logistics system accessible to the BNPB; however, it is not evident if it is fully utilized as the core central information system for resources and supplies, or whether partner resources are also tracked through this system.

Maintaining a Defined Disaster Logistics Program: BNPB maintains a national disaster logistics program. Logistics is one of eight Clusters established by the National Disaster Emergency Command System, and BNPB is the coordinating agency for this function. The Logistics Cluster is responsible for developing and maintaining logistics capabilities, including the procurement and tracking of facilities, equipment, and resources, and to ensure that staff receive requisite training. BNPB Regulation 23/2014 drives logistics policies and standardization.

FUNCTIONAL CAPABILITIES

Psychosocial Recovery Capability: National-level support for psychosocial recovery is comprehensive and effective in Indonesia. Article 52 of Government Regulation 21/2008 identifies psychosocial care to be a basic need the government is tasked to provide, and it is likewise prominently featured in the Disaster Management Emergency Command System as a key function to be managed by the Displacement and Protection Cluster.

Evacuation Functional Capability: Comprehensive evacuation-support capacity exists at the national level via BNPB to facilitate the evacuation efforts of subnational and/or local governments, but implementation challenges remain. Evacuation capacity focuses primarily on enabling local government to better facilitate self-evacuation (rather than promoting the capacity to provide evacuation transportation assistance), which is less effective for some hazards. To a degree that varies by location, for instance, evacuation routes and assembly points are assessed, provided with signage, and accompanied with training (instruction and exercise). Purpose-built evacuation structures, such as vertical evacuation structures that provide protection from tsunamis, have also been constructed in some areas of known risk. Evacuation is one of the tasks of the Search and Rescue Cluster under the Disaster Emergency Management Command System, which mobilizes, coordinates, and controls facilities and personnel in carrying out search, rescue and evacuation operations for disaster victims quickly, efficiently and effectively. Many public and community facilities (including faith-based facilities) have been assessed and demarcated as evacuation points, and these have been effectively used in past events.

Post-disaster Water, Sanitation, and Hygiene (WASH) Functional Capability: WASH is addressed in plans, strategies, and BNPB policies, and information regarding the mechanisms for support to impacted areas is accessible. Article 53 of Law 24/2007 and Article 52 of BNPB Regulation 21/2008 require the provision of clean water and sanitation during disaster response and recovery. Provision of Water and Sanitation is one of the tasks of the Facilities and Infrastructure Cluster in the Disaster Emergency Management Command System.

Safety and Security Capability: Safety and security is a defined disaster management function included in plans, policies, and procedures, and is assigned to an appropriate ministry, office, or stakeholder by BNPB. Security Handling is one of the tasks of the Displacement and Protection Cluster within the Disaster Emergency Management Command System which is led by the Director of Social Protection for Natural Disaster Victims of the Ministry of Social Affairs and Operational Assistant of the Indonesian National Police. Security restoration is identified as a requirement of recovery in Regulation 21/2008, while BNPB Regulations 11 and 12 of 2014 note the role of civil society and the private sector in supporting safety, and likewise assures that BNPB and BPBDs will provide security for those stakeholders that participate in response and recovery.

National Hazardous Materials (HAZMAT) Response Capability: HAZMAT response is supported through

Indonesia's centralized HAZMAT response capacity. BNPB continues to develop HAZMAT incident response capabilities, including through bilateral capacity building partnerships and by participating in training opportunities offered by private-sector partners. Though the responsibility for management and use of resources in the disaster response rests with BNPB, the agency works in coordination with the Ministry of Health.

Search and Rescue Functional Capability: Search and rescue (SAR) capabilities exist throughout Indonesia. Search and Rescue is a cluster under the Disaster Emergency Management Command System, with the National Search and Rescue Agency (BASARNAS) serving as the Coordinating Agency. BASARNAS is an independent, non-ministerial agency headed by a member of the armed forces. It drives search and rescue policy, manages capacity-development and response operations, and stages teams into 34 Technical Implementation Units and additional "search and rescue posts." The largest team is divided between Jakarta and Malang and includes over 500 members. SAR capacity is supported by the Indonesian Armed Forces, the National Police, and several local, national, and international partners.

Agriculture Preparedness, Response, and Recovery Capability: Support for the disaster-related needs of Indonesia's agriculture sector are comprehensive and are addressed in plans, policies, and strategies, with some implementation challenges. Response to agricultural disasters or disasters that have a significant impact on the agriculture sector are managed by the Ministry of Agriculture. The Ministry serves in this role as a supporting member of the Early Recovery Cluster under the Disaster Emergency Management Command System. To support farmers affected financially by crop losses, national and local governments are required to provide agricultural insurance that offers financial compensation for disaster-related damages (per Law 19/2013). Recovery support likewise includes the provision of supplies and equipment to restart farming operations to maintain national food security. International organizations, such as the Food and Agriculture Organization (FAO) of the United Nations, continue to play an active supportive role in disasters given ongoing capacity challenges, especially at the local level.

CAPACITY DEVELOPMENT

SUB-THEME STATUS

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

BNPB and disaster management entities throughout Indonesia are obliged to undergo disaster management education and training. Training, both in-person and online, has been integrated throughout BNPB and regional BPBD institutions, with assistance from public-private partners both domestic and international in scope. National and regional simulation and tabletop exercises help enhance readiness. Furthermore, advancements in BNPB and BPBD capacity building systems of record will help promote transparency and training of all DM actors for Indonesia's whole-of-government DM and DRR efforts. Lastly, whilst Indonesia's many noted academic centers of excellence are longstanding partners with BNPB and the DM/DRR community at large, further modernization and integration of curriculum standards for DM and DRR situational awareness at all levels of society should be advanced.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

CAPACITY DEVELOPMENT SUB-THEMES

Formalized CD Plans & Strategies

Training and Education

Capacity Development Monitoring & Evaluation

FORMALIZED CD PLANS & STRATEGIES

Training and Exercise Requirements and/or Recommendations: Training and exercise requirements and recommendations are established for all staff active in disaster management, for leaders, and for the media in Indonesia. Article 4 of Head of BNPB Regulation 4/2016 establishes that the DM education and training curriculum must reflect needs as determined by BNPB's Disaster Management Education and Training Center (Pusdiklat PB). BNPB recently worked with international partners to strengthen the capacity of the Indonesia-Disaster Relief Training Ground (INA-DRTG) to provide pre-disaster technical capabilities, namely risk assessment.

Position-specific Competency Requirements: Position-specific competency has not been addressed by DM entities in Indonesia. BNPB recruitment is not guided by position-specific skills, knowledge, or competencies but rather by more general measures (e.g., university degree and area of study). BNPB maintains a MOU with the National Agency for Professional Certification and has supported the development of a new National Certification Agency for Disaster Management (LSP-PB) to provide certification services relative to disaster management staff positions. Efforts are underway to develop position-specific competency requirements.

Disaster Management Budgets and Capacity Development: BNPB is tasked with coordination and support of DM and DRR capacity development. At the national level, capacity building is implemented and organized by BNPB. In 2017, BNPB's Disaster Management Education and Training budget reached 77.37 billion IDR (~USD 5.18 million). Other ministries and agencies can support these efforts, depending on the specific need. Regional BPBDs can also put forth regular trainings in coordination with BNPB standards.

Strategy-driven Efforts: Indonesia's capacity-development plans and strategies are used to drive CD efforts. The 2015-2019 RENAS PB calls for increased capacity building through education and training. Capacity building is also highlighted as a key component of DRR in the 2015-2045 Disaster Risk Reduction Master Plan (RIPB).

DM and DRR Capacity and Resource Needs Assessments: Indonesia's DM and DRR capacity and resource needs are periodically assessed through deliberative planning. As mandated by The Head of BNPB Regulation 3/2012 concerning Guidelines for Assessing Regional Capacity in Disaster Management, DM and DRR capacity assessment are carried out through the Regional Capacity Assessment. The results are compiled in the Regional Resilience Index for each city/district.

Coordination with Regional/Global CD Efforts: BNPB's capacity-development efforts are coordinated with regional and global efforts. BNPB and other relevant stakeholders at the national and regional levels often partake in regional and global capacity-development efforts.

National Science and Technology (S&T) Agenda: Indonesia's national science and technology agenda addresses DM and DRR needs. Disasters have become one of the 10 focuses of the 2017-2045 National Research Master Plan and are highlighted in the Agency for the Assessment and Application of Technology's

Strategic Plan 2015-2019 . TTwo leading government institutions in the field of S&T, the Indonesian Institute of Sciences (LIPI) and the Agency for Assessment and Application of Technology (BPPT), which were merged into the National Research and Innovation Agency (BRIN) in 2019, often play a role in disaster management and disaster risk reduction. Various research efforts, discoveries, innovations ,and activities related to DM and DRR have been carried out by the two institutions in collaboration with related stakeholders, including other government agencies (e.g., BNPB), ministries, private sectors, universities, research communities, and foreign institutions. The two institutions are also active in carrying out preparedness activities at the regional and community level.

TRAINING & EDUCATION

Conduct of DM and DRR Training: BNPB maintains a formal DM and DRR training program with one or more facilities, a dedicated staff, and a recurring budget. Head of BNPB Regulation 4/2016 mandates the establishment of education and training facilities, as well as dedicated staff and a recurring budget to support them. The BNPB Disaster Management Education and Training Center (Pusdiklat PB), established in 2009, is tasked with carrying out the coordination and implementation of education and technical disaster training. The Center is a part of the multi-functional Indonesian Disaster Relief Training Ground (INA-DRTG) complex, which also addresses DRR capabilities, including risk assessment.

Scope of Training and Education Curriculum: The BNPB DM and DRR training curricula address a comprehensive and expanding set of training and education requirements that closely track all typical and emerging needs across a diverse audience of stakeholders. Pusdiklat PB developed a structured curriculum based on an analysis of needs and competency standards. There are currently 24 distinct training program areas addressed in the curriculum.

Training Methods: Disaster management training is delivered via geographically distributed in-person training facilities with supplemental online resources. Pusdiklat PB provides training through its INA-DRTG complex in Bogor, West Java. Public- and private-sector stakeholders – including other agencies, institutions, and organizations with disaster management responsibilities at the national and international scales – are eligible to participate at this location. Pusdiklat PB also supports training through BPBD facilities conducted in coordination with academic and NGO partners where applicable and targeted primarily towards volunteers, community members, the media, and local disaster management staff. Due to the COVID19 pandemic, online and self-study options are of greater import.

Training Catalog and Schedule: BNPB maintains a structured annual training schedule and catalog of available courses and dates that support comprehensive training throughout the year. A training schedule, calendar of courses, and course catalog are maintained on the Pusdiklat PB website. Registration for online courses is also available.

Maintenance of Training Records: Training records are maintained in a centralized system. Pusdiklat PB maintains publicly accessible records of each student who has taken courses in the program and provides indexed information on each course the student has completed (including date and location).

Program to Support Exercises: A formal exercise program with a dedicated staff is maintained by BNPB. Pusdiklat PB supports district and local governments in the planning and conduct of disaster exercises. There is some evidence that formal program to support exercise conduct through the provision of guidance materials, regular funding, or dedicated staff. Pusdiklat PB regularly coordinates and funds table-top, field, and command-post exercises.

Exercise Evaluation Standards: Exercise standards are common throughout the BNPB AOR. Monitoring and Evaluation is specifically discussed in Chapter 12 in the Head of BNPB Regulation 4/2016. Topics include curriculum, teaching materials, learning, assessment, teaching staff, participants, and facilities and infrastructure. While exercises, both table-top and field-based, are common, a specific exercise-evaluation standard is forthcoming.

Structured Annual Exercise Schedule: BNPB maintains a structured annual exercise schedule.

National-level Exercise: Indonesia conducts a national-level exercise annually. National-level training and exercises are traditionally held as a component of the annual DRR Month ("Bulan PRB") activities. Participants from all BPBDs and DRR stakeholder groups are invited to participate.

Support for Sub-jurisdictional Exercises: BNPB provides comprehensive technical, advisory, financial, and material support to sub-jurisdictions. At the national level, capacity building is led and organized by BNPB. Although the annual budget is from the national government, the beneficiaries are the local government staff through training at the local level (e.g., at the BPBDs).

Exercise Participation Requirements: Indonesian Government agencies with DM functions are required to participate. As stated in Chapter 5 Head of BNPB Regulation 4/2016, BNPB training and exercises are meant for officials (national and subnational), civil society, and business institutions. Law 24/2007 states that is the right and obligation of every community to obtain education, training, and skills in disaster management. BNPB routinely conducts several training and capacity building exercises for its staff. BPBDs at the local government level also routinely send staff to Pusdiklat PB to participate in DM training and exercises.

Stakeholder Involvement in Training and Exercises: Indonesian NGO and private-sector stakeholders are invited to participate in BNPB training and exercises. NGO and private-sector stakeholders are integrated into the Disaster Emergency Management Command System through the SKPDB, and their participation in national, regional, and local training and exercises is indicated. Specifically, the Pusdiklat PB alumni registry of BNPB training-program attendees attests to the inclusivity and broad base of training and disaster-exercise capacity building in Indonesia.

DM Programs in the Higher-Ed Community: BNPB incorporated a robust, formally organized community of higher education institutions into its DRR efforts, many of which offer programs that support DM professionalization. Institutions of higher education in Indonesia have long played significant research, policy development, and professional development roles both nationally and internationally. The Higher Education Forum for Disaster Risk Reduction (FPT-PRB), established in November 2008, is one platform through which efforts are coordinated. Direct engagement with and support for higher-education partners occur through individual MOUs and engagement with Pusdiklat PB.

Higher Education DM and DRR: Indonesian universities offer a broad range of DRR and DM higher-education options, including PhD, DSc, Master's, and Bachelor's degrees, as well as professional certificates.

National DM Curriculum: Currently, a nationwide Indonesian DM and DRR curriculum for K-12 is under development. Inclusion of disaster management education in the current (2013) national K-12 curriculum exists but as an option for teachers to utilize. There are ongoing efforts to mandate disaster risk reduction and resilience-building programs as a component of future curricula, but this has not yet resulted in practical changes.

Public Awareness, Preparedness, and Resilience-building Program: Formal public awareness, preparedness, and resilience-building programs are routinely carried out annually by BNPB as a national DM actor, or by the BPBD at the local level.

Public Education Methods: DM public education is provided on official websites, through media and other campaigns (targeting a generalized audience), and through multi-modal methods (to targeted groups). Both BNPB at the national level and some BPBDs have innovative ways of delivering education to the community via multi-modal methods, media campaigns, and mobile and web technology to engage all audiences throughout this vast archipelago.

Disaster Preparedness Information for the Private Sector: Business institutions in Indonesia are provided with informational and resource support for preparedness and resilience efforts. Business institutions and civil society have the opportunity to carry out disaster management, both individually and jointly with other parties, as clearly stated in Chapter VI Law 24/2007. Business institutions are also given the opportunity to participate in developing a national action plan for disaster risk reduction.

CAPACITY DEVELOPMENT MONITORING & EVALUATION

Standard Evaluation Procedures: The evaluation and revision of BNPB plans, strategies, and SOPs occurs, but procedures and practices are not standardized. Evaluation and revision are statutorily mandated. But without national planning guidelines or a dedicated program to guide the measurement of plans, strategies, and SOP effectiveness, evaluation and revision remain largely ad hoc.

Review of Plans, Strategies, and SOPs: BNPB's plans, strategies, and SOPs are reviewed and revised as needed on a regular but less-than-annual basis. Regulation 21/2008 mandates disaster planning at all government levels and states that comprehensive planning must occur on a five-year basis, with detailed reviews conducted every two years or in the event of a major disaster. Disaster management strategies have been updated on a five-year basis, with strategic plans developed for the periods 2010-2014 and 2014-2019. Reviews and updates to national and local DRR action plans are likewise regulated by this decree that can be done anytime as needed.

Review of DM Legislation: Indonesia's DM-relevant legislation is reviewed and updated only after major disaster events or developments. The country's Disaster Management Law (24/2007) was passed as a result of a major disaster – the 2004 Indian Ocean earthquake and tsunami. However, since that time disaster management regulatory instruments have been promulgated on a periodic and proactive basis at the Presidential

and ministerial levels. In 2020, House of Representatives Committee VIII set forth plans to proactively and comprehensively update the country's disaster management law to address shortfalls that were noted more as a factor of the evaluation process than as a reaction to any one disaster, including COVID-19.

Requirements for Post-disaster Reviews: Post-event reviews occur after all major disaster events in Indonesia, irrespective of whether requirements exist. Chapter V of Government Regulation 21/2008 mandates monitoring and evaluation of all disaster management activities (pre- and post-disaster) for the purposes of increasing minimum standards of practice.

Incorporation of Evaluations into Plans, Policies, and SOPs: Evaluations are conducted and outcomes are used to improve or otherwise modify plans, policies, and SOPs used by Indonesian DM stakeholders. In 2016, BAPPENAS issued a Disaster Management Cross-Sector Planning Evaluation Report for Achieving Development Targets. The report was prepared to fulfill responsibility for the implementation of the Development Monitoring and Evaluation Program and Activity, an evaluation of the planning of disaster management efforts to achieve development at both the regional and central levels. In its implementation, following the Palu earthquake and tsunami of 2018, regional humanitarian and financing multilateral organizations commended BNPB and the GoI for their use of post-disaster evaluations to inform better DRR, response, and transparency policies.

COMMUNICATION & INFORMATION MANAGEMENT

- Limited or No Capacity
- Early Capacity Development
- Achievement with Significant Limitations
- Substantial Progress with Some Limitation
- Advanced Capacity

In 2012 BNPB formally established risk-assessment guidelines (BNPB Regulation 2/2012) and leverages many state-of-the-art web-based risk, vulnerability, DRR and response tools. Whilst these risk-assessment metrics help inform DM and DRR programs, additional human resource challenges and staffing have hindered progress. Vulnerability metrics are also functionally and formally included, with climate change analyses being incorporated in BNBP and BPBD programs to a limited level. Indigenous knowledge and inclusion are encouraged, and risk mapping is an integral process to BNPB planning and programs. Multi-Hazard Early Warning Systems (MHEWS) are at an advanced state for most hazards, but technical and spatially extensive expansions in the strategic term will help protect Indonesia's diverse and distributed stakeholders and critical infrastructure. It will be imperative that Indonesia implement further data storage and open data standards in the near term to promote transparency, interoperability, civic innovation, and capacity building across primary, secondary, and advanced educational institutions. BNPB and other Indonesian DRR and DM centers of excellence are quite adept at social media messaging and community engagement. Given the ongoing COVID19 pandemic - which overlays all other hazards, an expansion of BNPBs communications facilities and briefing venues is also advised.

CURRENT STATUS

Limited or No Capacity — Advanced Capacity

COMMUNICATION & INFORMATION MANAGEMENT SUB-THEMES

- **Hazard & Risk Analysis**
- **Monitoring and Notification**
- **Disaster Assessment**
- **Information Collection, Management, and Distribution**
- **Media and Public Affairs**

HAZARD AND RISK ANALYSIS

Risk-assessment Processes and Standards: Indonesia institutes a standard risk assessment process at national and provincial levels, which are generally adhered to. BNPB Regulation 2/2012 establishes general risk-assessment guidelines. National Standard SNI 8182:2017 provides further technical and practical guidance on risk-management concepts and methods. Extensive documentation shows that Indonesia has instituted a standard disaster risk assessment at national and provincial levels. The Indonesia Disaster Risk Index (IRBI) confirms that 514 cities/districts and 34 provinces in Indonesia have completed risk assessments. These are consolidated at the provincial level to present a detailed, overall picture of provincial risk assessment.

Risk-assessment Requirements for Planning: BNPB mandates risk assessments, but there are no enforcement mechanisms. Regarding risk-assessment requirements for disaster management (DM) and disaster risk-reduction (DRR) planning, Head of BNPB Regulation 2/2012 specifies that risk assessments shall be the foundation for DM and DRR policies and plans. Chapter 6 dictates this foundational approach is a continuum from national to district/city level plans.

Risk-assessment Staffing Capacity: BNPB and regional BPBDs require outside assistance to perform risk assessments as required. Evidence suggests that contract assistance is required to conduct national and regional risk assessments.

Vulnerability Measurements in Risk Assessments: Vulnerability is measured using complex and comprehensive assessment criteria by BNPB and partners. Vulnerability is a central component of the country's risk-assessment standard and methodology. The risk index gives a 30% weighted value to vulnerability in the calculation of risk, with capacity and exposure receiving the other 70%. BNPB and the BPBDs work with national and community stakeholders to collect and process vulnerability data in support of risk management efforts.

Climate Change Included in Risk Assessments: Climate change criteria are limited in scope, and inclusion of climate change measures is hindered by implementation challenges in Indonesia. Indonesia's DRR strategies and policies indicate a commitment to including climate change projections into risk-assessment processes, including for economic development and for building national disaster management capacity. The national risk-management process also includes recognition of the role that climate change plays but offers little direction on how to assess climate risks. As such, there remains significant room to better incorporate leading climate data into local and national risk assessments.

Local and Indigenous Knowledge in Risk Assessments: Local and indigenous knowledge is included in risk assessments in Indonesia. BNPB Regulation 2/2012 advises those tasked with risk analysis to utilize information from "experts with the local wisdom of the community," a recommendation reiterated in the national risk-management standard. Although local knowledge was not heavily utilized in disaster risk management prior to 2015, a deep commitment to its use in the 2015-2019 Disaster Management Plan highlights a recognition that strategic change was required.

Hosting of Risk-assessment Information: BNPB leverages a centralized GIS system to support risk-assessment reporting, and all sub-jurisdictions have access to and training support on this system. InaRISK is Indonesia's premiere risk-assessment portal using ArcGIS server web-mapping technology. This system is integrated into each of BNPB's hazard-specific Technical Modules, as is PDC's InAWARE cloud-based early warning and decision-support platform.

Risk-mapping Requirements: Risk-mapping requirements exist at all levels of Indonesia's government (national, subnational, local) with support provided and enforcement mechanisms utilized. Risk mapping is a requisite component of risk assessment in Indonesia. Mapping requirements stipulate the detail that risk-management teams at each administrative level must pursue.

Risk-mapping Capacity: Adequate risk-mapping capabilities and resources are maintained by BNPB and regional BPBDs. The country's proprietary risk-mapping platforms developed with IGO, NGO, and development partners (including InaRISK and InAWARE) have enabled widespread access to risk-mapping technologies at all government levels. Another resource is InaSAFE, a free software that "produces realistic natural-hazard impact scenarios for better planning, preparedness and response activities," providing a "simple but rigorous way to combine data from scientists, local governments, and communities to provide insights into the likely impacts of future disaster events."

Risk-assessment Link to Development Processes: Risk Assessment is integrated with development processes in Indonesia. Through the Master Plan for Disaster Management (RIPB) 2015-2045, the Ministry of National Development Planning/National Development Planning Agency (BAPPENAS) and BNPB have formally integrated risk assessment and long-term development processes in Indonesia.

MONITORING AND NOTIFICATION

Existence of Hazard Monitoring: Monitoring of all major hazards is occurring throughout Indonesia. Ministries and agencies throughout the national government, as guided by their missions, monitor all major hazards, including (but not limited to) volcanic activity, mass movements, public health, severe storms (including wind and rain), lightning, air quality, seismicity, extreme temperatures, forest fires, sea level, tsunami, and flood.

Coordination of Hazard Monitoring: Indonesia identifies a single office (BNPB) with oversight and management of monitoring for all major hazards. The Multi Hazard Early Warning System and InAWARE serve as centralized platforms for monitoring data.

Population in Areas Served by Monitoring Efforts: Monitoring of hazards benefits between 25% and 75% of Indonesia's population. Indonesia's large geographic size, unique topography, and widely distributed population remain drivers of ongoing monitoring challenges that the country is working to address through lending and development funding. Since 2004, increasing hazard early warning and monitoring capabilities have remained national priorities. However, there remains a heavy reliance on BPBDs for monitoring sudden-onset events given the country's sheer size and scale. Variance in the capacities of these regional and local agencies often translates to uneven monitoring capabilities. Under an all-hazards mantra, the impact of COVID-19 has also complicated addressing gaps in other hazards.

Doppler Radar Coverage: Between 75% and 100% of Indonesia's land area has Doppler radar coverage. As of 2017, an array of 40 Doppler weather radars are being maintained by the Meteorological, Climatological, and Geophysical Agency (BMKG), covering most of Indonesia. BMKG has identified a need for an additional 20 weather radars to achieve desired nationwide coverage. There are also concerns that building height interferes with radar coverage in urban areas.

Hazard-monitoring Responsibility: Hazard monitoring is managed by Indonesian agencies with relevant or hazard-specific missions. Hazard-monitoring responsibilities are assigned to different ministries and agencies as dictated by authority, capabilities, and mission relevance. Several non-governmental partners contribute to these efforts. The Ministry of Energy and Mineral Resources (KEMEN ESDM) is tasked with monitoring geologic hazards (volcano activity and mass movements). The Ministry of Health monitors public health hazards, namely through the National Institute for Research and Development. The BMKG is tasked with monitoring weather, climate, air quality, seismicity, tsunamis, and forest fires whilst the Geospatial Information Agency (BIG) is tasked with sea-level monitoring. The Geospatial Information Agency (BIG) is tasked with sea-level monitoring. The Technology Assessment and Application Agency (BPPT) monitors tsunami hazards. And finally, the Ministry of Public Works and Public Housing (PUPR) maps and monitors flood risk.

Hazard-monitoring Methods: Indonesia uses up-to-date hazard-monitoring methods and technologies for some hazards. Monitoring is conducted using a mix of new and legacy technologies, notably where those capabilities cannot be centralized (e.g., remote sensing). Monitoring challenges are often the result of a dependence on subnational and local capabilities, which differ significantly among the country's many geographic areas. As a result, emerging and modern technologies are available for some hazards nationwide, while for others access varies by location.

Assignment of Notification/Early Warning Responsibilities: For some hazards across the archipelago of Indonesia, notification and early warning functions are consolidated and assigned to various Indonesian government agencies with DM communications responsibilities. Early warning systems in Indonesia are improving as a result of the creation of a Multi-Hazard Early Warning System (MHEWS). Direct warning through multi-modal transmission is also performed, with unique systems used for different hazard types. At present, consolidation of effective early warnings is conducted under MHEWS, but challenges remain (e.g., for coastal inundation forecasting). Alerts may be issued by relevant agencies, such as BMKG issuance of tsunami and earthquake alerts and warnings. BNPA and Pusdalops of BPBD (per statutory authority) have systems in place for some hazards in which hazard information is received and warnings are issued through the media or alert-and-notification systems (e.g., sirens, SMS text, social media). For many hazards, warning is consolidated through the MHEWS system, while others remain outside the system.

Standard Procedures for Early Warning: Standard early warning procedures for all hazards in Indonesia. At the national level, early warning SOPs are available in each institution in accordance with the authority that issued them. For example, BMKG has SOPs for the Provision and Dissemination of Extreme Weather, Extreme Climate and Tsunami Early Warnings through Ina-TEWS. PVMBG has an SOP for issuing early warnings of ground movement and volcanic activity. At the regional level, BPBDs play an important role in formulating SOPs in each region, down to the site level (village or hamlet) and these SOPs are usually synchronized with existing SOPs at the national level and contingency plans.

Targeted Early Warning Capabilities: Early warnings are issued through a range of communication channels, including cellular phones, land-line phones, sirens, radio, television, and social media.

Early Warning Systems Target Specific Locations According to Risk: Indonesia targets early warning according to risk for only some hazards (wherein georeferenced warning is possible) and locations. Building upon early warning failures in 2004 and even 2018 vis-a-vis earthquakes and tsunamis, there have been advances in geotargeted early warning systems in urban areas such as Jakarta vis-a-vis flooding.

Early Warning Systems Coverage Area: At least 75% of Indonesia's population is served by early warning systems. While television and AM/FM radio can be used to alert over 80% of the land area of Indonesia, there is 100% mobile phone coverage in the country as of 2013. Failure of various components of the country's multi-modal warning systems, as occurred in the 2018 earthquake and tsunami in Central Sulawesi, highlights ongoing challenges associated with reaching populations that are highly dispersed and often concentrated in geographically isolated areas.

Testing of Early Warning Systems: Some of Indonesia's early warning systems are tested, but testing occurs on a non-routine basis. Whilst BMKG conducts siren tests across Indonesia on the 26th of each month, Indonesia needs to expand regular testing of early warning systems across all hazards to ensure reliability and efficacy.

Training and Education for Warning Recipients: Indonesian populations served by early warning systems are provided with pre-disaster training and education about message meaning and appropriate response. The national Early Warning System has four components, one of which is capacity building to ensure that the population is prepared to respond appropriately to official messages or other warnings or indicators of an actual or impending event. Several international agencies, development partners, and INGOs also contribute to training the population to recognize and act on disaster early warning messages and signs. Due to network failures during the Central Sulawesi tsunami, there were no sirens, SMS, or internet connectivity. As a result, people did not receive any messages or warnings. Moreover, the tsunami was not predicted by BMKG because it was triggered by submarine landslide rather than seismic activity. This recognition builds upon efforts since 2004 to expand capacity building in conjunction with early warning technological endeavors to include training public officials, disaster-awareness activities in schools, participatory community action (e.g., "tsunami edu-entertainment"), and the establishment of information centers and networks.

Population Targeting of Early Warning Messages: BNPB and regional BPBDs can provide warnings to specific vulnerable groups in major population centers and specific geographic areas. There exist several notable examples of government-led and other multi-stakeholder programs that seek to improve alert-and-warning capabilities for vulnerable populations.

DISASTER ASSESSMENT

Disaster-assessment Capabilities: Indonesian DM entities have the capabilities to conduct assessments. Disaster Assessment is a management-support function described in the Government Regulation 21/2018. Assessments are guided by the information needs of the Disaster Response Task Forces and are coordinated by BNPB or the BPBD as dictated by incident size. A Rapid Response Team (TRC) may be assigned by BNPB or the BPBD to conduct the assessment. For larger events, international partners, namely UNOCHA, may

be asked to deploy a UN Disaster Assessment and Coordination (UNDAC) team to enhance government capabilities. UNDP has been working with government counterparts to apply the Post-Disaster Needs Assessment (PDNA) methodologies. There is evidence of consistent capacity-development efforts focused on the equipping and training of these teams dating back to their creation in 2008.

Disaster-assessment Requirements: Assessments are required for disaster declaration and are regularly used to inform declaration decision making. In Articles 11 and 12 of Government Regulation 21/ 2008 BNPB and local BPBDs are required to conduct disaster assessments. The use of Ready Funds can be made based on official assessments conducted by Rapid Reaction Teams (TRCs). At a macro level across the region, the ASEAN-ERAT initiative also incorporates after-action reviews and assessments into its operational support for Indonesia, BNPB, and surrounding nations.

Nationally Authorized Assessment Methodology: A nationally authorized assessment methodology exists in Indonesia and is adhered to. BNPB has issued Guidelines for Post-Disaster Need Assessment (JITUPASNA) through the Head of BNPB Regulation 15/2011, which is a combination of Damage and Loss Assessment (DaLA) and Human Recovery Need Assessment (HRNA). In certain cases, the Government of Indonesia worked together with UNDP to create a country-specific version of the UNDP Post-Disaster Need Assessment called I-PDNA.

Assessment Resource Capacity: Disaster assessments in Indonesia typically require the intervention of international organizations and NGO Partners. Government disaster-assessment capabilities are primarily a function of the staffing and equipping of National and Regional Quick Response Teams (TRCs), which are statutorily authorized and responsible for mobilizing at the request of BNPB or regional BPBDs. The DRTFs are likewise tasked with disaster assessment beyond the early-response planning stage. In the event of major disasters, such as occurred in 2004 and 2018 following the earthquake and tsunami events of those years, the broader community of IGO and INGO disaster management stakeholders is needed to conduct accurate and comprehensive damage and needs assessments.

Assessments and Incident-action Planning: Assessment outcomes are conducted by BNPB, but challenges exist that limit their utility in incident-action planning. One of the goals of PDNA is to provide accurate evidence-based information in the preparation of post-disaster rehabilitation-reconstruction action plans. The basic principles used in these activities include the Participatory Approach, evidence-based, disaster risk reduction, basic rights approach, accountability, and accuracy.

Stakeholder Engagement in the Assessment Process: Multi-stakeholder engagement is required for assessments in Indonesia. The post-disaster assessment methodology detailed in the proposed JITUPASNA delineates more detailed assessment requirements to the JITUPASNA coordinators. As such, relevant stakeholders play expanded roles in assessment as needs dictate. Where Data Collection Teams include private-sector, NGO, and IGO partners, stakeholder engagement is expanded beyond government.

INFORMATION COLLECTION, MANAGEMENT, AND DISTRIBUTION

Data Collection and Storage: Data in Indonesia are collected, standardized, and stored based on individual agencies' standards and procedures. Disaster-assessment and operational data are typically collected and standardized according to individual agencies' standards and procedures. However, use of the InAWARE platform for information sharing alleviates many of the problems that would otherwise be associated with using different standards and procedures. Moreover, Standardization of Disaster Data in Indonesia has been regulated in the Head of BNPB Regulation 8/2011 which ensures that all disaster information and data must be stored neatly and both electronically and in the form of written documents. Where disaster operations and information-management efforts need to draw on existing datasets, the One Map Policy conceived in 2011 has helped to establish a single database for all government maps, and the INA-SDI Network has helped establish a nationwide standardized base map.

Format of Data: Data in Indonesia are primarily digital at the jurisdictional level and mixed at sub-jurisdictional levels. Data are available primarily in digital format, but access restrictions exist. Data are available in web applications and are not easily downloaded or shared.

Data Sharing: Data are freely shared between Indonesian government levels, with NGO disaster management stakeholders, and with the public. The Open Data Policy is protected by Law 14/2008 and Government Regulation 61/2010 concerning Openness of Public Information. Data access within the BNPB is regulated by BNPB Reg. 9/2013 concerning Guidelines for Information and Documentation Management within the BNPB. In addition, Presidential Regulation 95/2018 concerning Electronic-Based Government Systems and Presidential Regulation 39/2019 concerning "One Data Indonesia" facilitate the process of exchanging data between ministries and agencies at various levels of government.

GIS-Based Data Management System to Leverage a Common Operating Picture: Indonesia leverages GIS-based data management systems. The PDC-based InAWARE application is the country's disaster-information sharing and hosting application, which enables the establishment of a common operating picture. InAWARE allows the sharing and dissemination of damage assessments, situation reports, field-collected data, and AARs. InAWARE is used operationally within BNBP's national EOC and by many provinces.

Disaster Database Linked to the National Statistics Agency: Disaster loss information is linked to Indonesia's national statistics system. BNPB manages the country's historic disaster database called Data Informasi Bencana Indonesia (DIBI) or Indonesia Disaster Information and Data. The objectives of this effort are data access for risk identification, policy formulation and decision making, and project planning.

Facilitation of Information Sharing: In Indonesia, an internet-based platform to share information on

MEDIA AND PUBLIC AFFAIRS

Public Information Officer: BNPB utilizes a single point of contact for public affairs across all government DM functions. The Ministry of Communication and Informatics, which is tasked with coordinating media relations in disaster events, requires every ministry and agency to appoint spokespersons in their respective organization as a component of general government-communication policy. BNPB supports the Ministry in this effort. BNPB has a spokesperson who serves as the Head of the BNPB Centre of Data, Information, and Public Relations. For some major events, a spokesperson will be named to represent all-of-government communication, as occurred with the COVID-19 crisis when the spokesperson from the Ministry of Health was granted this role.

Documented Communications Strategy: BNPB has a documented communications strategy. The BNPB Disaster Communication Work Unit is responsible for maintaining the organization's internal communication strategy.

Dedicated Media-briefing Space: BNPB has procedures in place to set up a media-briefing space when required. BNPB press briefings are conducted in the organization's auditorium or lobby.

Media Training: Media training on disaster-specific communication is offered to key Indonesian DM officials and government leadership. Media training has been obtained through other organizations working with BNPB, such as the ADPC and the AHA Centre, on an ad hoc basis. BNPB also offers training to members of the media to improve reporting during disasters.

Information Dissemination Formats: BNPB and regional BPBDs disseminate public information in multiple formats and through multiple channels. Communicating disaster information with the public is challenging in the Indonesian context, due to both physical isolation of the archipelago and the distance between the country's many different regions (wherein there are approximately 300 distinct ethnic groups that speak more than 740 different languages and dialects). In addition to communicating through a network of more than 1,200 radio stations, 350 television channels, and 1,000 print-media publications, information is conveyed using web-based mass media resources, social media, messenger groups (e.g., WhatsApp), and printed material.

Pre-scripted Information Bulletins: BNPB, in coordination with partners such as PVMBG and BMKG, issues pre-scripted information bulletins for all hazards.

Public Information Audiences: BNPB's public-information capacity includes capability to communicate with special-needs and vulnerable populations. BNPB and the Ministry of Communication and Informatics have addressed a more inclusive communication strategy that includes multiple language messaging and the use of sign language in press conferences. Further enhancement of this capability will be developed as a component of resilience-building efforts inclusive of an early warning information dissemination center that seeks to address all populations regardless of age, gender, or ability.

Tracking Publicly Generated Information: Publicly generated information via BNPB and other official DM stakeholders is tracked and used, but no dedicated policies or procedures exist to do so. BNPB lacks the resources to monitor social media but engages with third parties for this purpose. No specific policies exist to guide these efforts. Social media monitoring is an annual strategy that is used to set agendas and/or anticipate negative news about a situation.

NATIONAL RECOMMENDATIONS

NATIONAL RECOMMENDATIONS

The following national recommendations are presented based on the findings of Indonesia's National Disaster Preparedness Baseline Assessment (NDPBA), conducted by the Pacific Disaster Center (PDC) in coordination with BNPB and other disaster management stakeholders in Indonesia over the course of 2018-2020. The recommendations focus on strengthening the culture of disaster risk reduction through comprehensive disaster management and disaster risk governance along with technical and international capacity building and collaboration.

1 DEVELOP A COMPREHENSIVE PLATFORM TO INTEGRATE MONITORING AND EVALUATION (M&E) OF DRR, CCA, AND SDG INDICATORS AND TARGETS.

- Foster coordination between BNPB, BAPPENAS, Coordinating Ministry for Human and Cultural Development, and KLHK to integrate each of their respective M&E platforms (including InaRISK, IRBI, AKSARA, SIDIK, and SDGs Dashboard) to put forth an integrated, whole-of-government approach to the Disaster Risk Reduction (DRR) agenda, Green House Gas (GHG) reduction, Climate Change Adaptation (CCA), and advancement of Sustainable Development Goals (SDGs).
- Prioritize assessment and forecasting of hydro-meteorological hazards, land use change, and socioeconomic vulnerabilities to anticipate impacts of future climate change.

2 FULLY INCORPORATE NON-GOVERNMENT DM STAKEHOLDERS INTO NATIONAL PLANNING EFFORTS.

- Consistent with mandates of Law 24 of 2007, continue efforts to support whole-of-society participation in disaster management partnerships and national planning.
- Designate a national entity for the management of non-government disaster management stakeholders, including NGOs and volunteers. Promote and mandate coordination with key disaster management agencies.
- Expand plans to integrate special populations and facilities, such as prisons and correctional institutions, in all phases of disaster management.
- Host and conduct regularly scheduled exercises with all key stakeholders and incorporate stakeholder plans into national plans and policies.

3 CONDUCT ANNUAL REVIEW OF PLANS, STRATEGIES AND SOPS.

- Utilize drills and exercises to evaluate and improve disaster management plans, strategies, and SOPs on an annual basis. Incorporate lessons learned from real-world operations, drills, and exercises into plans and SOPs.
- Establish policies to review and update disaster management legislation on a regular basis and following major disaster events

4 LEVERAGE MONITORING AND EVALUATION (M&E) METRICS TO ADDRESS LOCAL DM AND DRR CAPABILITIES.

- Use evidence-based decision making to identify and support specific capacity-development initiatives at the local level. Subnational DM capacities and capabilities vary widely by BPBD office (due to budget constraints, staffing, hazard exposure).
- Leverage BNBP's Regional Resilience Index (Indeks Ketahanan Daerah/IKD), and data from the 71 Indicators of Resilience (71 Indikator) tool to identify priorities to increase the capacity and resilience of regional disaster management offices. The study provides data coverage for 34 provinces (100%) and 246 cities/regencies (48%).
- Continue to support the ongoing city- and regency-level assessments in the remaining 268 local jurisdictions.

5 FORMALLY ADDRESS SURGE-STAFFING NEEDS AT EVERY ADMINISTRATIVE LEVEL.

- In coordination with NGOs and the private sector, establish a system to identify and manage a disaster cadre to serve dedicated support functions during disaster events.
- Establish formal provisions for identifying and managing surge and supplemental staffing needs as a requirement for all Regional Disaster Management Agencies (BPBDs) plans.

6 ESTABLISH FORMAL MUTUAL ASSISTANCE AGREEMENTS WITH APPROPRIATE PARTIES TO SUPPORT DISASTER MANAGEMENT EFFORTS.

- Strengthen and streamline disaster response by establishing formal, detailed, and codified mutual aid agreements, including regional, national, and foreign governments, as well as the private sector.
- Use evidence-based decision making to anticipate resource needs for a disaster response via scenario-based planning and risk and vulnerability assessments.
- Survey potential resource providers to determine the types of resources that may be available.

7 SUPPORT IMPLEMENTATION OF LONG-TERM COMMUNITY RECOVERY PLANS AND PROCEDURES AT REGIONAL/LOCAL GOVERNMENT LEVELS.

- Survey all district BPBDs to understand challenges that preclude their compliance with requirements for post-disaster recovery centers.
- Coordinate with BNPB, international NGOs, foundations, and UN partners to support BPBDs with resources needed to successfully support long-term recovery efforts and provide regular training on recovery-phase operations.

8 FULLY IMPLEMENT A STANDARDIZED INCIDENT COMMAND SYSTEM AT ALL LEVELS OF GOVERNMENT.

- Standardize incident command protocols to expedite integration of resources during response activities.
- Mandate compliance for use of an incident command system (such as SKPDB) at all levels of government.
- Establish regular incident command training regimes and web-based resources for all levels of government.
- Conduct exercises and surveys to identify existing incident command implementation gaps and focus efforts on closing gaps.

9 EXPAND AND ENHANCE DEDICATED EOC CAPACITY AND CAPABILITIES.

- Identify additional or alternate dedicated EOC space to facilitate multi-agency coordination and operations during large-scale emergency activations.
- Invest in additional backup power, water supply, and food-storage equipment to supply the national EOC continuously for one week.
- Conduct regularly scheduled tests, such as simulation exercises, using backup power and supplies to ensure equipment is in proper working order.

10 INCREASE COMMUNICATIONS CAPACITY AND INTEROPERABILITY.

- Expand communications capacity by implementing high-frequency (HF) radio communications across Indonesia's government agencies and ministries, in addition to satellite communications between EOCs. These mediums represent resilient emergency-communications alternatives to the internet and mobile phones.
- Conduct terrain analysis to best identify placement of HF Antennas and other communications infrastructure.
- Equip Indonesia's government agencies and ministries with standalone Automatic Link Establishment (ALE) high-frequency HF Radio communications for the following reasons:
  - Provide a reliable rapid method of HF connectivity between stations during periods following disasters where HF ionospheric propagation could be greatly affected.
  - Enable two or more stations within Indonesia government and ministries to initiate a circuit during emergencies without worry of congestion on shared spectrum use or interference.
  - Allow for HF communication beyond line of sight (BLOS) during and following disasters.
- Assess suitability for use of HF radios by key partners and increase number of key partners equipped with HF radios as appropriate.
- Provide policy guidelines and training for use of HF radios.

- Identify periodic maintenance schedules for HF communication equipment.
- Periodic testing of HF communications equipment at least twice per year.
- Explore other viable and sustainable options for emergency communications, such as satellite communication kits in conjunction with the International Telecommunications Union (ITU) and Emergency Telecommunications Cluster.

11 EVALUATE AND IMPROVE THE PERFORMANCE OF INFORMATION SYSTEMS USED BY BNPB.

- Perform regular audits of existing information systems and clarify the function and role of each system to avoid duplication and streamline the budgets for maintenance including DIBI, InaRISK, InaWARE, InaSAFE, I-Tangguh, SiDIKLAT, and MHEWS.
- Ensure that existing systems align with user workflows and needs, both at central and regional levels.
- Establish annual budgets for the operation and maintenance of BNPB systems to ensure uninterrupted service and availability at all times.
- Improve accessibility of internet-based systems to users, considering variations in socioeconomic background, urban/rural locations, and internet bandwidth. Ensure compatibility with multiple devices and browsers, including low bandwidth.
- Utilize mixed communications technology and dissemination methods, such as handheld radio, HF radio, SMS, or mosque loudspeaker to ensure that hazard and disaster information is widely broadcasted and received by affected communities.
- Ensure all public information is updated regularly and is easily accessible.
- Identify periodic maintenance schedules for HF communication equipment.

12 ENHANCE THE CAPACITY AND QUALITY OF MASS CARE.

- Strengthen communication and cooperation mechanisms between BNPB, International Federation of Red Cross and Red Crescent Societies (IFRC), Ministry of Social Affairs (MSA), and Ministry of Public Works and Public Housing (PUPR) to ensure sheltering standards, resources, and training are universally applied.
- Identify and designate suitable and strategically located buildings to serve as regional shelters. Adopt a standardized process for rapidly transforming designated buildings

into suitable mass-sheltering facilities during emergencies.

- Allocate adequate time and resources to conduct a comprehensive post-disaster needs assessment to ensure victims have been securely and appropriately sheltered.
- Promote resilient warehouse locations and logistics plans that supply building materials and supplies for constructing temporary shelters. Though IFRC provides shelter toolkits containing tools and instructions, building materials are not furnished.
  - Designate strategic warehousing locations to supply building materials to hazard-prone and socioeconomically vulnerable communities.
  - Consider government legislation and/or executive action to eliminate sales of inferior and/or toxic building materials.

13 STRENGTHEN NATIONAL COMMODITY STOCKPILE CAPACITY.

- Establish additional national commodity stockpiles in areas that will enable delivery of resources to all disaster-affected areas within 24-48 hours.
- Identify additional sites in remote areas that are suitable for housing national stockpiles.
- Pre-position appropriate national government resources to build up all local government stockpiles.
- Review and exercise plans to decrease the time it takes to deliver resources to affected communities to within 24-48 hours.
- Establish formal contracts with commodity providers.
- Operationalize and institutionalize Sistem Logistik Nasional Penanggulagan Bencana (national logistics system) to track and maintain current list of resource providers (government and non-government) and potential resources in a centralized database.

14 ESTABLISH A FORMAL TRACKING SYSTEM TO MANAGE DONATIONS AND RESOURCES FOR DISASTER RELIEF.

- Invest in a central system, managed at the national level, that can be accessed at all levels of government.
- Mandate compliance at all levels of government to enable resource visibility at the national level.
- Establish standard operating procedures (SOPs) and regular update schedules to ensure compliance, quality, and transparency of information.

- Provide training on use of the system at all levels of government and include community-resource providers who may be engaged in the management or provision of resources for disaster relief.

15 IMPROVE DISASTER RISK-FINANCING AND INSURANCE SCHEMES TO INCREASE RESILIENCE AND MITIGATE THE FINANCIAL IMPACT OF DISASTERS.

- Develop legal instruments and implement government asset insurance for central and local governments to protect public assets, such as schools and government buildings.
- Develop a methodology to estimate insurance rates based on the latest risk information to cover households, small to medium enterprises, and communities within disaster-prone areas.

16 ESTABLISH POSITION-SPECIFIC COMPETENCY REQUIREMENTS ACROSS ALL INDONESIAN DM ENTITIES.

- Expand existing educational requirements to establish minimum position-specific competencies as a prerequisite for employment across all BNPB and BPBD staff positions.
- Consider using international programs and guidelines, such as International Association of Emergency Managers' (IAEM) AEM/CEM certification standards, as a template for position-specific competencies.

17 EXPAND AND MAINTAIN THE USE OF A CENTRALIZED DATABASE FOR TRAINING AND RESPONDER CREDENTIALING.

- Expand the use of SiDIKLAT to increase response efficiency and expand the use of this reference database during disaster events to quickly find needed resources.
- Expand the SiDIKLAT database to include credential information for every responder, including government responders and volunteers.
- Maintain and update the SiDIKLAT database regularly, allowing all levels of government to input credential information into the database.
- Analyze resource gaps to better understand potential shortfalls in response capacity.

18 MAINTAIN DEDICATED CORE DM STAFF FUNCTIONS AND CAPABILITIES AT THE LOCAL LEVEL.

- Leverage staff exchange and cooperation agreements to maintain dedicated technical DM staff competencies.
  - For example, the cooperation agreement between DKI Jakarta and Gandaria City Fire and Rescue Services could be replicated by other neighboring cities, towns, and provinces.
- Establish pairing arrangements between BPBD offices.
  - If retaining a skilled DM practitioner is not in a specific BPBD's budget, multiple BPBDs could retain one professional together. This approach is especially beneficial if the neighboring BPBDs face the same hazard risks and/or geographic/socioeconomic circumstances.
- Once agreements between multiple BPBDs are in place, incorporate NGOs and non-traditional partners (e.g., academia) into pairing arrangements.
- Leverage existing organizations like the National DRR Forum to promote staffing arrangements and pairing agreements.
- Establish protocols that encourage new administrations to meet with their respective BPBD partner agencies to promote knowledge sharing.

19 INVEST IN FIRE-FIGHTING PREVENTION AND INFRASTRUCTURE TO INCREASE EMERGENCY-SERVICE CAPACITY.

- Expand the number of fire stations and facilities, human resources, and working fire hydrants to reduce disparities in emergency-service coverage. This approach will reduce the cascading effects of increased urban and rural fire incidence, including the burden of rebuilding and recovery.
- Invest in fire prevention, including fire-code inspections and enforcement mechanisms in residential, commercial, and public buildings.
- When feasible, install sprinklers and fire extinguishers for residential and critical infrastructure and key resources (CIKR) settings.
- Invest in fire-prevention education and outreach in schools, workplaces, and communities.

- Designate volunteers to oversee fire-prevention strategies in workplaces and communities, ensuring that strategies fit the context and setting (e.g., urban vs. rural environments), including:
  - Training for regular fire drills
  - Instructions for using fire extinguishers when they are present
  - Strategies for survival in case of fire
- Consider an apprenticeship/internship program wherein qualified firefighting personnel train novices in the vocation, in both urban and rural contexts, to reduce the formal costs of firefighting education, and create employment opportunities that increase resilience.

20 IMPROVE EARLY WARNING SYSTEMS AND DISSEMINATION OF WARNING INFORMATION TO STAKEHOLDERS AND BENEFICIARIES.

- In accordance with the mandate outlined in Government Regulation 93/2019 concerning "Strengthening and Development of Earthquake Information Systems and Tsunami Early Warning," enhance BNPB's role in promoting a culture of risk reduction that consists of risk assessment, capacity building, research and development, and evacuation planning.
- Collaborate with community groups (e.g., farmers, fisherfolk) to help maintain devices and sensors that have been installed both on land (e.g., extensometer, rain gauge) and in the ocean or in coastal areas (e.g., tsunami buoy, tide gauge).
- Improve and/or develop monitoring and early warning systems for tsunami hazards resulting from volcanic activity or submarine landslides.
- Build local community capacity by developing community-based early warning systems (e.g., for floods, landslides) in anticipation of hydrometeorological disasters, and encourage the use of village funds to finance the system.
- Encourage local governments to invest in in-situ observation and dissemination systems in the form of sensors and communication devices to support local early warning (e.g., tide gauges for tsunamis, automated water-level recorder for floods, extensometer for landslide, small sirens).
- Integrate information from all monitoring and early warning systems across authorized institutions into one centralized decision-support system (e.g., InAWARE).

21 INSTITUTIONALIZE RISK AWARENESS AND MONITORING AT THE SUBNATIONAL LEVEL.

- Expand and socialize the General Guidelines for Disaster Risk Assessment, including minimum data requirements to support risk-analysis and disaster monitoring and reporting at the subnational level.
- Support the commitment to climate change adaptation by developing standards for measuring risk to climate-sensitive hazards.
- In coordination with non-traditional partners, including academia, develop technical skills among staff to support the measurement of disaster risk.
- Ensure that policies, methodologies, and data standards are synchronized across national, provincial, and regency/city levels to coordinate disaster preparedness and mitigation investments.

22 STRENGTHEN EVACUATION PLANS AND PROCEDURES FOR TSUNAMI AND VOLCANO EVENTS.

- Identify gaps in tsunami and volcano evacuation plans for remote areas. Establish new plans and required resources to support evacuation.
- Comprehensively map and widely disseminate hazard zones and evacuation routes. Engage and educate exposed communities to ensure risk awareness and literacy of evacuation procedures.
- Promote systematic review and regular updates to BPBD's plans by hosting annual evacuation drills in exposed communities.
- Upgrade and maintain tsunami-evacuation centers and explore viable options for dual-use of these centers.

23 ENHANCE DM AND DRR COOPERATION WITH THE MINISTRY OF HEALTH TO INCREASE STRATEGIC HEALTH-SECURITY CAPABILITIES.

- Continue efforts to integrate public health with national and regional disaster management systems. COVID-19 presents an opportunity to expand and enhance health-security capabilities to prepare for future pandemics.
- Formalize the strategic working relationship between the Ministry of Health (MoH) and BNPB for coordinated response to public health emergencies.
- Dedicate additional BNPB resources toward helping the MoH increase its capacity to manage concurrent or cascading emergencies.
- Improve the surveillance system, early warning, and reporting capability related to zoonotic and infectious diseases to anticipate potential outbreaks (e.g., dengue, COVID-19, malaria).

24 INTEGRATE PUBLIC HEALTH AND MEDICAL FACILITIES INTO THE DISASTER MANAGEMENT SYSTEM.

- Designate a strategic advisory group, led by the Minister of Health and the Head of BNPB, to create an implementation program to ensure that every hospital in Indonesia creates and maintains a disaster plan.
  - Establish timelines, oversight, and assessment protocols for plan development and maintenance.
- Use evidence-based decision making to systematically address hospital bed shortages, establishing priorities for vulnerable communities.

25 STANDARDIZE DISASTER EDUCATION.

- Standardize and nationally implement DRR content areas within the mandated national public education curriculum and Learning Implementation Plans (RPP).
  - Integrate DRR insights into existing curriculum-content areas, such as ecology, environmental science, social studies, and statistics.

26 INCREASE CLIMATE LITERACY AMONG FARMERS AND AGRICULTURAL WORKERS.

- Increase support for community agricultural extension and education, including climate literacy, sensitivity and adaptation, as well as sustainable-farming practices.
- Standardize a communications system that enables all local government BPBDs to have the means to disseminate important climate information (seasonal and immediate) to the agricultural community in a timely manner.
- Ensure climate information is distributed in a format that is accurate and understood by the agricultural community.

27 DEVELOP A MECHANISM TO EVALUATE PUBLIC SATISFACTION WITH DISASTER MANAGEMENT.

- Consistent with guidance from the Ministry of Administrative and Bureaucratic Reform (PANRB), conduct public satisfaction and performance surveys for disaster management at both the national and regional levels.
- Survey respondents should include NGOs, academia, media, the private sector, and community members who are exposed to disasters. The survey should include the following elements:
  - Stakeholder familiarity with DM agencies and specific services (BNPB and BPBD) and other relevant organizations that issue early warnings (e.g. BMKG, PVMBG).
  - Community-risk communications, assessing public understanding of hazards and risks.

28 FORMALIZE COMMUNICATION AND MEDIA RESOURCES TO SUPPORT TWO-WAY COMMUNICATIONS BETWEEN DM AND THE PUBLIC.

- Establish dedicated media briefing space with audio-visual equipment to support formal press releases and public communications.
- Expand BNBP public information resources to monitor social media produced by the public and designate specific policies for public engagement via social media.

29 STRENGTHEN RESILIENCE BY REDUCING VULNERABILITY AND INCREASING COPING CAPACITY.

- Continue to expand health care capacity by developing health care infrastructure and human resources in underserved and rural areas. Expand minimum health-service standards to improve access to, and quality of care, with special focus on mothers, children, adolescents, elderly, and those with chronic health conditions. Advance accreditation efforts in hospitals and public health care centers (puskesmas) to promote standards for health care.
- Continue to promote gender equality, including equal access to education, labor participation, wages and access to credit, and political rights and representation. Reducing gender disparities empowers women and balances economic development opportunities for both men and women across Indonesia.
  - In collaboration with UN Women, UNDRR, and USAID's Gender Equality and Empowerment partners, the GoI and BNPB partner with academic institutions and ASEAN / AHA Centre to build the representation of women within BNPB, BPBDs, and allied national and local-level DRR organizations.
- Continue to expand transportation capacity and improve access in remote areas. To meet both DRR and Climate Change Adaptation (CCA) goals, investments in transportation infrastructure can target mass transit/public transport systems to augment transportation needs and reduce environmental impacts in urban areas.
- Encourage local governments to enforce regulations related to land use and spatial planning in upstream and downstream watersheds, liquefaction-prone areas, and coastal areas to reduce the risk of floods, earthquakes, landslides, coastal floods, and tsunamis.
- Mainstream disaster risk and climate change adaptation into spatial planning (RTRW) and mid- and long-term regional development planning (RPJMD).

30 PERIODICALLY REASSESS PROGRESS TOWARD DRR AND RESILIENCE GOALS.

- Update the NDPBA, including both the RVA and DMA analyses, to track progress toward reducing vulnerabilities, increasing coping capacities, and building disaster management capabilities in support of Indonesia's Disaster Risk Reduction and Sustainable Development Goals for a more resilient nation.

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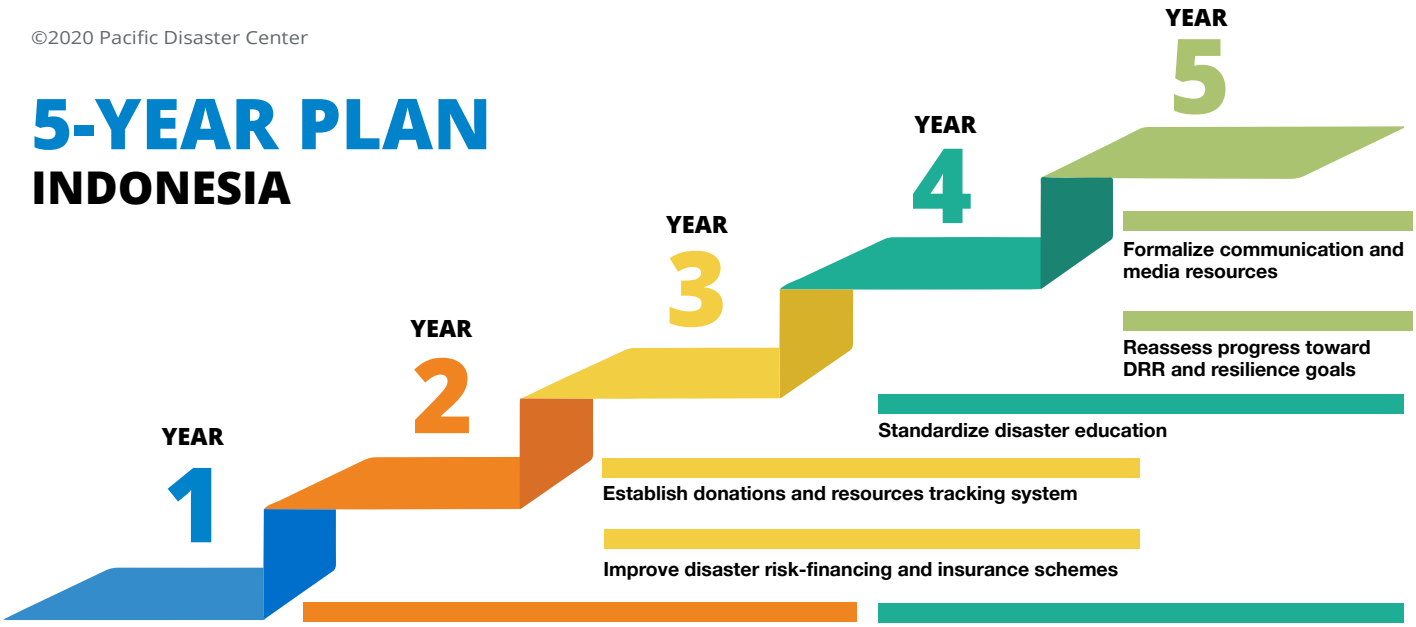
5-YEAR PLAN
INDONESIA



Develop DRR, CCA, and SDG M&E integration platform

Establish donations and resources tracking system

Improve disaster risk-financing and insurance schemes

Standardize disaster education

Reduce vulnerability & increase coping capacity

Formalize communication and media resources

Reassess progress toward DRR and resilience goals

Incorporate non-government DM stakeholders into national planning

Conduct annual review of plans, strategies and SOPs

Leverage M&E metrics to address local DM and DRR capabilities

Formally address surge-staffing needs at every administrative level

Develop a mechanism to evaluate public satisfaction

Establish agreements to support disaster management efforts

Implement standardized incident command system at all levels

Expand and enhance dedicated EOC capacity and capabilities

Increase communications capacity and interoperability

Evaluate and improve the performance of information systems

Enhance the capacity and quality of mass care

Strengthen national commodity stockpile capacity

Establish position-specific competency requirements

Expand and maintain database for training and responder

Maintain DM staff functions and capabilities at the local level

Invest in fire-fighting prevention and infrastructure

Improve early warning systems and dissemination

Institutionalize subnational risk awareness & monitoring

Strengthen evac plans & procedures for tsunami and volcano

Enhance DM and DRR cooperation with the Ministry of Health

Integrate public health & medical facilities into DM system

Increase climate literacy among farmers & agricultural workers

PROVINCE RISK PROFILES

SUBNATIONAL ASSESSMENT RESULTS

Download Province Risk profiles:
https://www.pdc.org/wp-content/uploads/NDPBA-IDN-Province-Profile-English-Merged.pdf

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PROVINCE RISK PROFILES

Province risk profiles are provided as an addendum to this report and offer a more granular assessment of each province in Indonesia. Included in the province risk profiles are drivers of vulnerability, coping capacity, and resilience, a comparison of each province with the overall country, and strategic, data-driven, actionable recommendations. Each province recommendation looks at one of the top four drivers of resilience through the lens of the existing national disaster management structure in Indonesia. The recommendations are designed to be concise, actionable, and supported by data.

NDPBA

APPENDIX A

RVA METADATA

APPENDIX A
RVA METADATA

Multi-Hazard Exposure			
Subcomponent: Raw Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Raw Multi-Hazard Population Exposure	Hazard, InaRisk/ PDC (2019); Population AIM (2020)	2020 (source hazard, 2019)	Raw multi-hazard population exposure represents an estimation of the number of people exposed to one or more of nine hazards.

Notes

Hazard exposure zones:

Flood: InaRisk flood hazard zones, based on geomorphology, regional hydrology, vegetative cover, soil type and annual rainfall parameters, establish three hazard severity classes (low, moderate, high). Areas of 'moderate' and 'high' susceptibility to flooding were used as inputs for exposure analysis.

Earthquake: InaRisk earthquake hazard zones, based on topography, ground amplification and shaking intensity, establish three hazard severity classes (low, moderate, high). Areas of 'moderate' and 'high' susceptibility were used as inputs for exposure analysis.

Landslide: InaRisk landslide hazard zones, based on slope (%), length and direction, rock type, soil type and depth, slope stability, rainfall, and proximity to fault lines, establish three hazard severity classes (low, moderate, high). Areas of 'high' susceptibility to landslides were used as inputs for exposure analysis.

Volcano: InaRisk volcano hazard zones, based on lava flow and pyroclastic flow/fall as designated KRB danger zones (PVMBG), establish three hazard severity classes (low, moderate, high). Areas of 'low,' 'moderate' and 'high' susceptibility were used as inputs for exposure analysis.

Wildfire: InaRisk wildfire hazard zones, based on land cover, climate (rainfall), and soil type, establish three hazard severity classes (low, moderate, high). Areas of 'moderate' and 'high' susceptibility were used as inputs for exposure analysis.

Drought: InaRisk drought hazard zones, based on monthly rainfall and Standardized Precipitation Index (SPI) analysis, establish three hazard severity classes (low, moderate, high). Areas of 'high' susceptibility were used as inputs for exposure analysis.

Extreme Weather: InaRisk extreme weather hazard zones, based on land use/land cover, annual rainfall, and slope, establish three hazard severity classes (low, moderate, high). Areas of 'moderate' and 'high' susceptibility were used as inputs for exposure analysis.

Tsunami: InaRisk tsunami hazard zones, based on a digital elevation model, slope, and surface roughness, establish three hazard severity classes (low, moderate, high). Areas of 'low,' 'moderate' and 'high' susceptibility to the tsunami hazard were used as inputs for exposure analysis.

Flash Flood: InaRisk flash flood hazard zones, based on topography, river network, and upstream landslide potential, establish three hazard severity classes (low, moderate, high). Areas of 'low,' 'moderate' and 'high' susceptibility were used as inputs for exposure analysis.

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Multi-Hazard Exposure			
Subcomponent: Raw Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Raw Multi-Hazard Economic Exposure	Hazard, InaRisk/ PDC (2019); Capital Stock AIM (2020)	2020 (source hazard, 2019)	Raw multi-hazard economic exposure represents an estimation of the replacement cost of economic stock exposed to one or more of nine hazards.
Notes			
Refer to hazard information above. Cumulative value of capital stock exposed to one or more of nine hazards.			

Multi-Hazard Exposure			
Subcomponent: Relative Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Relative Multi-Hazard Population Exposure	Hazard, InaRisk/ PDC (2019); Population AIM (2020)	2020 (source hazard, 2019)	Cumulative raw count of person units exposed to multiple hazards, per capita.
Notes			
See above for detailed description of hazard zones.			

APPENDIX A
RVA METADATA

Multi-Hazard Exposure			
Subcomponent: Relative Exposure			
Indicator	**Source(s)**	**Year**	**Description**
Relative Multi-Hazard Economic Exposure	Hazard, InaRisk/ PDC (2019); Capital Stock AIM (2020)	2020 (source hazard, 2019)	Cumulative value of economic capital stock exposed to multiple hazards, divided by total economic capital stock value of the province.
Notes			
See above for detailed description of hazard zones.			

Vulnerability				
Subcomponent: Economic Constraints				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percent Poverty	Badan Pusat Statistik (BPS)	2019	Percentage of population living in poverty by province	Values are Semester 2 (September) Sum/Totals.
Percent Unemployed	Badan Pusat Statistik (BPS)	2019	Percent unemployment rate by province	
GINI Ratio	Badan Pusat Statistik (BPS)	2019	GINI ratio, urban and rural, by province	
Age Dependency Ratio	Badan Pusat Statistik (BPS)	2020	Dependency ratio by province	Estimates based on 2010 Census.

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Access to Information Vulnerability				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Adult Literacy Rate	Badan Pusat Statistik (BPS)	2019	Percent of population (age 15 and above) that is literate	
Average Years of Schooling	Badan Pusat Statistik (BPS)	2019	Average number of years of schooling	
Internet Usage (Percent of Households)	BPS, Survei Sosial Ekonomi Nasional/ BPS-Statistics Indonesia, National Socioeconomic Survey	2019	Percentage of households that used the Internet within the last 3 months.	
Primary School Enrollment	Badan Pusat Statistik (BPS)	2019	Percentage net enrollment rate in primary school.	Data values used in the analysis are: SD / MI / Package A
Households with Television	SSL/UNICEF - Multiple Indicator Cluster Survey (MICS) for Indonesia, 2017	2017	Percentage of household with a television.	

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APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Access to Clean Water Vulnerability				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Percentage of households with improved drinking water source	Statistik Indonesia 2020	2019	Percentage of households with improved drinking water services	Percentage of households with improved drinking water source
Percentage of households with improved sanitation	Statistik Indonesia 2020	2019	Percentage of households with improved sanitation services	Percentage of households with improved sanitation

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Vulnerable Health Status				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Life Expectancy	Badan Pusat Statistik (BPS)	2019	Life expectancy at birth (new method)	
Infant Mortality Rate	Badan Pusat Statistik (BPS)	2012	Infant mortality rate per 1,000 live births	
Percent unmet healthcare needs	Badan Pusat Statistik (BPS)	2018	Percent unmet need in healthcare by province	
Percent Disabled Population over age 10	IDN Ministry of Health	2015	Percentage of the population over age 10 reporting a disability in 2015	
Percent Children under 5 Wasting	IDN Ministry of Health	2018	Percentage of children under 5 years of age whose nutritional status is considered wasting or severely wasting	Sum of wasting and severely wasting. Wasting (low weight for height) is an indicator of Acute Malnutrition.
Percent of households with limited access to health center (>5km)	Village Potential Statistics survey (PODES)	2014	The percentage of households with limited access to a health center (a distance greater than five kilometers)	
Percent of Households Experiencing Catastrophic Health Expenditures	Ministry of National Development Planning	2014	The percentage of households experiencing catastrophic levels of health expenditure, by province	Data were extracted using WebPlotDigitizer
Malaria Incidence per 100k Pop	IDN Ministry of Health	2019	Malaria incidence per 100,000 persons	
Dengue Incidence per 100k Pop	IDN Ministry of Health	2019	Incidence rate of dengue hemorrhagic fever per 100,000 persons	

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Vulnerable Health Status				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Maternal Mortality Rate	Cameron L, Contreras Suarez D, Cornwell K (2019). Understanding the determinants of maternal mortality: An observational study using the Indonesian Population Census. PLoS ONE 14(6): e0217386. https://doi.org/10.1371/journal.pone.0217386	2019	Maternal mortality rate per 100,000 live births by province. Modeled estimates based on 2010 Census data.	Data were extracted using WebPlotDigitizer
Measles Incidence Rate per 100k Pop	IDN Ministry of Health	2019	Incidence rate of measles per 100,000 persons	
HIV AIDS Cases per 100k Pop	IDN Ministry of Health; Statistical Yearbook of Indonesia 2019	2018	Cumulative HIV/AIDS cases per 100,000 persons	
Prevalence of Leprosy per 10k Pop	IDN Ministry of Health	2019	Prevalence rate of leprosy per 10,000 persons	
Tuberculosis CNR per 100k Pop	IDN Ministry of Health	2019	Case notification rate of tuberculosis per 100,000 persons	

APPENDIX A
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Vulnerability				
Subcomponent: Population Pressures				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Net Recent Migration Rate	Badan Pusat Statistik (BPS); BPS 2015 Intercensal Provincial Population Statistics	2015	Crude net recent migration rate per 1,000 habitants.	
Average Annual Total Population Change	Badan Pusat Statistik (BPS); Supplemental data: BPS 2015 Intercensal Provincial Population Statistics	2020	Average annual percentage of total population change for the period 2010 to 2020, based on projections.	Data are projections based on the 2010 Census. Supplemental data sources were used to determine population values for Kalimantan Utara province (established after the 2010 Census), and revise Kalimantan Timur values for years 2010, 2015 and 2020.
Average Annual Urban Population Change	Badan Pusat Statistik (BPS); Supplemental data: BPS 2015 Intercensal Provincial Population Statistics	2020	Average annual percentage of urban population change for the period 2010 to 2020, based on projections.	Data are projections based on the 2010 Census. Supplemental data sources were used to determine population values for Kalimantan Utara province (established after the 2010 Census), and revise Kalimantan Timur values for years 2010, 2015 and 2020.
Population that is Food Insecure	WFP - Indonesia Food Security Monitoring System Report, 2018	2018	Population experiencing moderate to severe food insecurity.	The severity of food insecurity in measured using the Food Insecurity Experience Scale. Food insecurity at moderate levels of severity is typically associated with the inability to regularly eat healthy, balanced diets. As such, high prevalence of food insecurity at moderate levels can be considered a predictor of various forms of diet-related health conditions in the population, associated with micronutrient deficiency and unbalanced diets. Severe levels of food insecurity, on the other hand, imply a high probability of reduced food intake and therefore can lead to more severe forms of undernutrition, including hunger.

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Vulnerability				
Subcomponent: Environmental Stress				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Livestock Density	Direktorat Jenderal Peternakan dan Kesehatan Hewan/ Directorate General of Livestock and Animal Health Service; Statistik Indonesia 2020, Ministry of Home Affairs (land area)	2019	Number of ruminants and other livestock per square kilometer of land area.	
Deforestation Rate	Indonesia Ministry of Environment and Forestry	2018	Net deforestation rate (hectares per year) of permanent and convertible production forests for the year 2017-2018.	Majority forested area was estimated for the year 2000 using regions with tree cover ≥ 50%. Trees are defined as vegetation taller than 5m in height. Forest Cover Loss is defined as a stand-replacement disturbance, or a change from a forest to non-forest state, during the period 2000–2018 Data and methods are based on: Hansen, M.C. et al. (2013). High-Resolution Global Maps of 21st-Century Forest Cover Change. Science, Vol. 342, Issue 6160, pp. 850-853.
Severe Erosion Potential	Erosion rates: Indonesia Ministry of Environment and Forestry; Area (square km) per province: Ministry of Home Affairs	2018	Percentage of provincial land area subject to severe erosion rates - greater than 180 tons per hectare per year.	Mine locations were buffered using 1 km buffers to represent conservative estimate of cascading areal effects of mining on surface and subsurface water, soil, and land degradation. Note that the dataset includes only mining sites recognized by the National Minerals Agency and does not include degradation from illicit mining.

APPENDIX A
RVA METADATA

Vulnerability				
Subcomponent: Gender Inequality				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Female Seats in Government	Badan Pusat Statistik (BPS)	2018	Percentage of government seats held by women.	
Female to Male Literacy Rate	Badan Pusat Statistik (BPS)	2019	Proportion of females to males who are literate.	
Female to Male Labor Ratio	Badan Pusat Statistik (BPS)	2019	The ratio of females to males age 15 and over who worked in the previous week.	
Ratio Female to Male Secondary Enrollment	Badan Pusat Statistik (BPS)	2019	Ratio of female to male net enrollment in secondary school.	Indicator was based on senior high school enrollment.
Economically active population (female and male)	SSL - Population and Housing Census 2015, National Analytical Report	2015	Ratio of female labor force participation to male labor force participation. Values closer to 1 indicate greater parity	

APPENDIX A
RVA METADATA

Coping Capacity

Subcomponent: Environmental Capacity

Indicator	Source(s)	Year	Description	Notes
Protected Area per Province	UNEP-WCMC and IUCN (2020), Protected Planet: The World Database on Protected Areas (WDPA)/OECM Database] [On-line], July 2020, Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net	2020	Percentage of each province that is designated as a protected area.	

Subcomponent: Energy Capacity

Indicator	Source(s)	Year	Description	Notes
Percentage of Households Served by the State Electric Company	Badan Pusat Statistik (BPS) Statistics Indonesia https://www.bps.go.id/, National Socioeconomic Survey	2019	Percentage of households served by the state electric company.	
Percentage of Total National Electricity Generated (GWh) by Province	Badan Pusat Statistik (BPS) Statistics Indonesia https://www.bps.go.id/	2018	Percentage of total national electricity generated (GWh) by province.	
Electricity Generated (GWh) per 100,000 persons by Province	Badan Pusat Statistik (BPS) Statistics Indonesia https://www.bps.go.id/; Ministry of Health population data for 2018	2018	Electricity generated (GWh) per 100,000 persons by province.	
Percentage of Households Using Gas/ LPG for Cooking Fuel	BPS-Statistics Indonesia, National Socioeconomic Survey	2019	Percentage of households per province using gas, or liquid propane gas as cooking fuel.	

APPENDIX A
RVA METADATA

Coping Capacity				
Subcomponent: Health Care Capacity				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Immunization Rate (children under age 5)	Statistik Indonesia 2020	2019	Percentage of children under five years old who received complete basic immunization	
Physicians per 10,000 persons	Directorate General of Population and Civil Registration (Ditjen Dukcapil), the Ministry of Home Affairs of the Republic of Indonesia (Kemendagri)	2019	Number of doctors per 10,000 persons by province.	
Nurses and Midwives per 10,000 persons	Statistik Indonesia 2020 (midwives); Directorate General of Population and Civil Registration (Ditjen Dukcapil), the Ministry of Home Affairs of the Republic of Indonesia (Kemendagri) (nurses)	2019	Number of nurses and midwives per 10,000 persons by province.	
Number of Hospital Beds per 10,000 persons	Ministry of Health, Republic of Indonesia	2018	Ratio of hospital beds per 10,000 persons by province.	
Health Insurance Coverage	Statistik Indonesia 2020	2019	Percentage of the population with one or more health insurance types by province.	
Health Care Accreditation Rate	Directorate General of Health Services (Directorate of Quality and Accreditation of Health Services), Ministry of Health RI, 2019	2019	Accreditation rate for hospitals and public health centers (puskesmas) by province.	
Time to Public Hospital over 1 hour	Riskesdas	2013	Percentage of households that take over 1 hour to reach the nearest public hospital.	

APPENDIX A
RVA METADATA

Coping Capacity

Subcomponent: Communications Capacity

Indicator	Source(s)	Year	Description	Notes
Percent Cellular Phone Ownership	Badan Pusat Statistik (BPS) https://www.bps.go.id/, National Socioeconomic Survey	2019	Percentage of population aged 5 and over who own a cellular phone by province.	
Percent of Households with Fixed Line Telephones	Statistik Indonesia 2020	2019	Percentage of households with fixed line telephones, by province.	

Subcomponent: Emergency Service Capacity

Indicator	Source(s)	Year	Description	Notes
Estimated Firefighters per 100,000 Persons	National Fire Force	2015	Estimate of the number of firefighters per 100,000 persons.	
Emergency Vehicles per 100,000 Persons	National Fire Force	2015	Estimate of the number of fire and rescue vehicles per 100,000 persons.	
Search and Rescue Teams per 100,000 Persons	National Fire Force	2015	Estimate of the number of search and rescue teams per 100,000 persons.	

Subcomponent: Transportation Capacity

Indicator	Source(s)	Year	Description	Notes
Rail and Road Density	Humanitarian OpenStreetMap Team (HOTOSM)	2020	Number of kilometers of roads and railways per provincial area (square km).	
Average Distance to Port Facility	PDC, World Port Index, Humanitarian OpenStreetMap Team (HOTOSM)	2020	Average distance (in km) to the nearest airport or seaport for each province.	

APPENDIX A
RVA METADATA

Coping Capacity

Subcomponent: Economic Capacity

Indicator	Source(s)	Year	Description	Notes
Labor Force Participation Rate	Badan Pusat Statistik (BPS) https://www.bps.go.id/, February and August National Labor Force Survey; Statistik Indonesia 2020	2019	Labor force participation rate by province.	
Average Monthly Income per Capita (rupiah)	Badan Pusat Statistik (BPS) https://www.bps.go.id/; Labor Force Situation in Indonesia (Keadaan Angkatan Kerja Di Indonesia) August 2019	2019	Average net wage/salary (rupiah) per month of employees by province.	
GDP per Capita	Global Business Guide Indonesia	2015	Gross Domestic Product (GDP) in million Indonesian Rupiah (IDR) per capita by province.	

Subcomponent: Governance

Indicator	Source(s)	Year	Description	Notes
Voter Participation	Election Commission, Indonesia	2019	Voter participation in the 2019 Presidential and Vice-Presidential elections, as a percentage of registered voters.	
Crime Clearance Rate	Statistik Indonesia 2020	2018	Crime clearance rate (percent), by province	
Crime Rate per 100k Persons	Statistik Indonesia 2020	2018	Crime rate per 100,000 persons, by province	

APPENDIX A
RVA METADATA

Disaster Management Capability				
Subcomponent: Emergency Services				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Ambulances per 10k Persons	Humanitarian OpenStreetMap Team (HOTOSM)	2020	Ambulances per 10,000 persons, by province	
Citizen Brigade Personnel per 10k Persons	Humanitarian OpenStreetMap Team (HOTOSM) (citizen brigade personnel); Badan Pusat Statistik (BPS) https://www.bps.go.id/ (population)	2020	Citizen Brigade Personnel per 10,000 persons, by province	Citizen Brigades were identified by HOTOSM and may not be exhaustive of all Citizen Brigades in the country.
District EOC Coverage	Humanitarian OpenStreetMap Team (HOTOSM) (emergency operations centers); Badan Pusat Statistik (BPS) https://www.bps.go.id/ (population)	2020	Percentage of Provinces in each province that have an Emergency Operations Center (EOC).	EOC locations were designated by HOTOSM and may not be exhaustive of all EOCs in the country.
SAR Staff per 10k Persons	Humanitarian OpenStreetMap Team (HOTOSM) (search and rescue staff); Badan Pusat Statistik (BPS) https://www.bps.go.id/ (population)	2020	Search and Rescue (SAR) staff per 10,000 persons, by province	SAR teams were identified by HOTOSM and may not be exhaustive of all SAR teams in the country.
Distance to Nearest Fire Station	Humanitarian OpenStreetMap Team (HOTOSM)	2020	Average distance (km) to the nearest main fire station from populated area of each province.	Main fire station locations were designated by HOTOSM and may not be exhaustive of all firefighting resources in the country.
Distance to Nearest Police Station	Humanitarian OpenStreetMap Team (HOTOSM)	2020	Average distance (km) to the nearest main police station from populated area of each province.	Main police station locations were designated by HOTOSM and may not be exhaustive of all police resources in the country.

APPENDIX A
RVA METADATA

Disaster Management Capability				
Subcomponent: Early Warning and Monitoring				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Geophysical Monitoring per Exposed Population	BNPB InaRISK, PDC's AIM Model	2020	Number of geophysical monitoring stations per 100,000 Persons exposed to earthquakes, tsunami, landslides, and/or volcanic hazards.	Geophysical monitoring stations included accelerographs, InaTEWS/ BKMG Seismic and Tsunami Monitoring Stations, PVMB PGA Stations, Krakatau High Water Tsunami Sensors, and Tidal Telemetry Receiving Stations.
Meteorological/ Climatological Monitoring per Exposed Population	BNPB InaRISK, PDC's AIM Model	2020	Number of meteorological and climatological monitoring stations per 100,000 Persons exposed to floods, flash floods, landslides, extreme weather, drought, and/ or wildfire hazards.	Meteorological and Climatological monitoring stations included automatic weather stations, AAWS, and automatic rain gauges.

APPENDIX A
RVA METADATA

Disaster Management Capability				
Subcomponent: Mass Care Support				
Indicator	**Source(s)**	**Year**	**Description**	**Notes**
Distance to Nearest Disaster Stockpile	Humanitarian OpenStreetMap Team (HOTOSM)	2020	Average distance (km) to the nearest disaster stockpile from populated area of each province.	Items in stockpiles differ by location, but generally include food and nutritional packages, blankets and bedding, clothing, facemasks, and basic shelter items (plastic tent/flooring).
Emergency Shelters per 10,000 persons	Humanitarian OpenStreetMap Team (HOTOSM) (emergency shelters); Badan Pusat Statistik (BPS) https://www.bps.go.id/ (population)	2020	Number of emergency shelters per 10,000 persons per province.	Includes temporary shelters.
Vehicle Equipment per 10,000 persons	Humanitarian OpenStreetMap Team (HOTOSM) (disaster equipment); Badan Pusat Statistik (BPS) (population)	2020	Vehicle equipment available for disaster management per 10,000 persons.	Disaster Equipment data were collected by HOTOSM and may not be exhaustive of all disaster equipment in the country.
Shelter Equipment per 10,000 persons	Humanitarian OpenStreetMap Team (HOTOSM) (disaster equipment); Badan Pusat Statistik (BPS) (population)	2020	Shelter equipment available for disaster management per 10,000 persons.	Disaster Equipment data were collected by HOTOSM and may not be exhaustive of all disaster equipment in the country.
Communications Equipment per 10,000 persons	Humanitarian OpenStreetMap Team (HOTOSM) (disaster equipment); Badan Pusat Statistik (BPS) (population)	2020	Communications equipment available for disaster management per 10,000 persons.	Disaster Equipment data were collected by HOTOSM and may not be exhaustive of all disaster equipment in the country.
Support Equipment per 10,000 persons	Humanitarian OpenStreetMap Team (HOTOSM) (disaster equipment); Badan Pusat Statistik (BPS) (population)	2020	Support equipment available for disaster management per 10,000 persons.	Disaster Equipment data were collected by HOTOSM and may not be exhaustive of all disaster equipment in the country.

NDPBA

APPENDIX B

DMA SURVEY RESULTS

APPENDIX B
DMA METHODOLOGY & DATA

The Disaster Management Analysis provides context to the risk and vulnerability data. Understanding the complex environment of disaster management across the 17,000+ island archipelago of Indonesia allows stakeholders to identify the best course of action that aligns within Indonesia's legal framework and with national disaster risk reduction (DRR) goals.

In the section below each disaster management indicator is provided with detailed supporting information. Data were compiled through online and archival research and validated with in-country stakeholders.

INSTITUTIONAL ARRANGEMENTS

ORGANIZATIONAL STRUCTURES

ORGANIZATION OF GOVERNMENT DM FUNCTIONS

- Badan Nasional Penanggulangan Bencana (BNPB) is a standalone, cabinet-level disaster management agency.
- For Indonesia, the primary agency mandated with responsibility for Disaster Management (DM) at the national level is Badan Nasional Penanggulangan Bencana (BNPB). With the issuance of Law Number 24 of 2007 concerning Disaster Management, it was mandated that the government of Indonesia establish a national disaster management agency.[1] This agency was to be a non-departmental government institution that sits at an equal level to all other ministries, directly accountable and subordinate to the President of Indonesia. Presidential Regulation No. 1 of 2019 established BNPB with the following duties:[2]
    - Provide guidance and direction in relation to disaster management efforts, which include disaster prevention, emergency response handling, rehabilitation, and reconstruction in a just and equitable manner;

- Enact disaster management operations standardization and needs based on established regulations;
- Communicate information on disaster management activities to the public;
- Report disaster management operations to the President once a month during normal conditions and at any time during emergency-response operations;
- Utilize and account for national and international donations and assistance;
- Manage DM budgets sourced from Government of Indonesia (GoI) State Budget;
- Implement other obligations in accordance with regulations; and
- Formulate guidance on the establishment of Regional Disaster Management Agencies (BPBDs).

DEVELOPMENT OF DM ORGANIZATIONAL STRUCTURE

- Indonesia's interagency disaster management responsibilities are clearly outlined and at high level of implementation.
- The organizational structure and responsibilities of BNPB are clearly mapped and at an advanced level of implementation. BNPB is comprised of an agency Head, Disaster Management Steering Element, and Disaster Management Implementing Element. Both the Steering and Implementing Elements fall under and are accountable to the agency's Head.[1]

  The Disaster Management Steering Element advises the Head of BNPB concerning disaster management, and is responsible for development of national disaster management policies and monitoring and evaluation of operations. This element is chaired by the Head of BNPB and includes 10 nominated government Echelon 1 officials or other officials of equivalent level, representing the following Ministries: Social Welfare, Home Affairs, Social Affairs, Public Works, Health, Finance, Transportation, Energy and Mineral Resources, National Police, and the National Army. In addition, membership includes nine representatives from professional communities, such as community figures and experts.

  The Disaster Management Implementing element is responsible for the actual implementation of disaster management operations, including preparedness, response, and recovery activities. This responsibility includes the coordination, command, and implementation of disaster management operations at the national level. Membership within this element is comprised of the Executive Secretariat, Deputy for System and Strategy, Deputy for Prevention, Deputy for Emergency Management, Deputy for Rehabilitation and Reconstruction, Deputy for Logistics and Equipment, and Principle Inspectorate.[2]

BI/MULTILATERAL ENGAGEMENT

- BNPB is the Indonesian entity dedicated to engagement with bilateral, international, and other humanitarian actors.
- The role of international organizations and non-government organizations (NGOs) is described

in Chapter III, Article 7, Item 1 sub-item 2 and Chapter VI, Article 30 of Law No.24/2007; and Government Regulation No. 21 and 23/2008 on Participation of International Organizations and Foreign Non-government Organizations in Disaster Management.[1,3] Government Regulation No. 23/2008, Article 4, authorizes the BNPB Agency Head to determine which international institutions and foreign NGOs may participate in disaster management activities in the country. Those international institutions and foreign NGOs with a standing MOU and joint workplan are permitted to provide aid during an emergency response, provided they submit to BNPB a list of all personnel, logistics, equipment, and destinations. The Head of BNPB has the authority to grant approval, in accordance with what is needed for the response, and will carry out this support in coordination with the appropriate institutions and agencies. Aid in the form of monetary funds are also to be sent directly to BNPB.[4]

REGIONALIZED CAPACITY

- Disaster management activities, including response efforts, are conducted out of regional BPBD offices.
- In coordination with BNPB, the Regional Disaster Management Agencies (Badan Penanggulangan Bencana Daerah or BDPDs) were established for the purpose of implementing disaster management activities at the provincial, district, and city levels.[2] According BNPB Performance Achievement Report 2019, the BPBDs were established in all 34 provinces between 2010-2013, and more than 99% of districts and cities (512 of 514) had set-up BPBDs at the time of the report.[5]

  As stated in Chapter VII, Article 75 of Presidential Regulation 1/2019, to carry out disaster management tasks in the regions at both the provincial and regency/city level, BPBDs are governed by Regional Regulation at the provincial/municipality level.[2] Guidelines for establishment of regional disaster management agencies are regulated in Head of BNPB Regulation Number 3 of 2008.[6]

DISASTER RISK REDUCTION (DRR) PLATFORM

- The National Platform for Disaster Risk Reduction (PLANAS PRB), a platform for DRR, is at an advanced level of implementation.
- PLANAS PRB was established in 2008 to help coordinate, integrate, and synchronize disaster risk-reduction efforts into planning and policy. PLANAS PRB is not an official government entity and is comprised of a diverse collective of DRR stakeholders, including national government entities (BNPB), civil society, academia, and the international community.[7,8]

CLIMATE CHANGE ADAPTATION (CCA) PLATFORM

- Indonesia has plans to establish a CCA platform, but the implementation is incomplete.
- Anticipating the negative impacts of climate change, the Government of Indonesia (GoI) has

for over a decade implemented CCA strategies, including the formulation of the national policy document for overcoming the impact of climate change. Supporting guidance for the GoI CCA efforts include: the National Action Plan for Climate Change Mitigation and Adaptation (Ministry of the Environment, 2007); the Indonesia Climate Change Sectoral Road Map (BAPPENAS, 2010); the Indonesia Adaptation Strategy (BAPPENAS, 2011); the National Action Plan for Adaptation to Climate Change of Indonesia (DNPI, 2011); and the sectoral adaptation plans compiled by Line Ministries/Government Agencies. For harmonization and operationalization of policy documents, the Ministry of National Development Planning of the Republic of Indonesia published a more comprehensive National Action Plan for Adaptation to Climate Change (RAN-API) in 2014.[9,10]

The RAN-API is a national action plan guiding adaptation to the impacts of climate change. It integrates coordination across a broad swath of stakeholders, from the government to civil society organizations, international cooperation agencies, and other stakeholders. RAN-API puts forth an action plan for adaptation of priority sectors in the short-term, mainstreaming the adaptation action plan into the National Medium-Term Development Plan (RPJMN), and long-term adaptation of CCA policies. RAN-API strengthens mitigation efforts that have been formulated in the RAN-GRK (National Action Plan for Greenhouse Gas Emission Reduction). In 2016, the GoI signed the Paris Agreement in New York, which was then published in Law No. 16 of 2016 concerning Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change.[11,12] BAPPENAS also published a Scientific Based Study of climate change hazards in 2018, which included the terrestrial water, marine, agricultural, and health sectors.[13] The results of this study served as inputs for the 2020-2024 RPJMN Background Study.[14,15]

- For better coordination among GoI Ministries, local government entities, and partners outside the government, the RAN-API Secretariat was established under BAPPENAS. In 2020 the Secretariat was merged with the RAN-GRK Secretariat to become the Low-Carbon Development Indonesia (LCDI) Secretariat.[16] The Secretariat also ensures that the national action plan is integrated with government planning and budgeting. The ICCTF (Indonesian Climate Change Trust Fund) Secretariat was also established in 2009 under BAPPENAS to leverage domestic resources and international funds into CCA and mitigation projects aligned with Indonesia's RAN API & GRK implementation plan.[17] Specifically, the Disaster Management Master Plan (RIPB) 2015-2045 refers to the Paris Agreement on the United Nations Framework Convention on Climate Change as stated in Chapter I, point 1.4.3.[18]

SUSTAINABLE DEVELOPMENT (SD) PLATFORM

- The efforts of the Government of Indonesia have created an SDG platform, but implementation is not complete.
- The Government of Indonesia (GoI) has issued Presidential Regulation No. 59/2017 concerning the Implementation of Achieving Sustainable Development Goals.[19] This regulation was followed by several others, including the Ministerial Regulation of Bappenas No 7/2018 concerning coordination, planning, monitoring, evaluation, and reporting implementation of the SDGs.[20] The

regulation also covers the technical guidelines for implementation of an SDG Roadmap (2017-2030), the SDG National Action Plan (RAN-TPB), and a Local Action Plan (RAD-TPB) published in June 2018. Both RAN-TPB & RAD-TPB put forth programs encompassing a five-year work plan for the implementation of various activities that directly and indirectly support the achievement of SDGs in accordance with national and regional (provincial) targets. The regulation also includes instruction for mainstreaming the plan in the RPJMN and is the basis for determining priorities and budget allocations. Following the RAN-TPB launch, several provincial governments also announced regional action plans (RAD-TPB) for their regions.[21,22] Technical Guidelines for municipalities (city- and regency-level governments) were also developed by NGOs to support regional implementation. The Disaster Management Master Plan (RIPB) 2015-2045 also refers to SDGs in Chapter I, point 1.4.1.[18]

MILITARY ENGAGEMENT

- The Indonesian military (TNI) is formally integrated in the civil disaster management structure.
- TNI has played an active role supporting national humanitarian assistance and disaster relief (HADR) efforts. As specified in Law 34/2004, TNI's HADR assistance may include providing humanitarian aid and supporting search and rescue (SAR) operations.[23] In addition, TNI is included in the Disaster Management Steering Element.[2]

INTEGRATION OF DRR, CCA, AND SD

- Some integration exists across various components of the Government of Indonesia.
- CCA-DRR convergence activities have increased in the last five years and are slated to increase over the next five years, as stated in Chapter 7 of Technocratic Design of National Medium-Term Development Plan Document (RPMN) 2020-2024.[14,24] The conceptual framework of CCA-DRR convergence has been mainstreamed in various policy, budgeting, and planning documents; e.g., the Climate Change Adaptation & Disaster Risk Reduction guidance published by KLHK (supported by BNPB as a contributor) in December 2017, which consists of a framework, recommendation, and performance indicators.[25] RAN-API also mandates the integration of CCA with DRR.[9] At present there are at least 24 laws that regulate disaster- and climate-risk integration implicitly and explicitly.

    - Chapter 7 of the RPJMN 2020-2024 prioritizes three policy groups: (1) improving the quality of the environment; (2) increasing disaster and climate resilience; and (3) climate change mitigation through low-carbon development. At the national level, strategic communication forums have already been established between ministries and agencies. The current convergence agenda also faces challenges in the form of (1) potential overlaps and gaps between CCA and DRR; (2) synchronizing CCA-DRR into spatial planning and development planning; (3) differences in the use of indicators; and (4) how to mainstream the CCA-DRR convergence into mid-term regional planning (RPJMD) based on data-driven scientific studies.[14]

- Currently there is no specific integrated platform (e.g., monitoring and evaluation with measurable and agreed indicators) that targets the integration and convergence of DRR, CCA & SDGs. KLHK has a measurable platform that assesses vulnerability to climate change in every province, city, and regency in Indonesia called SIDIK (Vulnerability Index Data Information System) set forth in the Minister of Environment Regulation 7/2018 concerning Guidelines for Assessing Vulnerability, Risk and Impact of Climate Change.[26,27] BNPB also has InaRISK, a disaster risk-assessment platform for all provinces in Indonesia, including Indonesia's Disaster Risk Index (IRBI) report.[28,29] However, IRBI only captures current risk conditions and has not yet included an analysis of climate change in the near future (e.g., five to 25 years ahead). Of specific concern are hydrometeorological hazards, such as floods, extreme waves, coastal erosion, weather extremes, forest and land fires, and landslides.

LEADERSHIP

EMERGENCY-MANAGEMENT LEADERSHIP ARRANGEMENT

- The Head of BNPB represents a singular leadership position with responsibility for all disaster management activities throughout the GoI.
- BNPB is the primary organization for disaster management in Indonesia. Local governments both at the provincial and city/regency level, via local disaster management agencies (BPBDs), also play a role when first responding to an emergency. Likewise, institutions outside of BNPB and BPBDs, such as the police, army, or Search & Rescue Agency, can participate during emergency-response activities. In addition, other parties outside the government can also participate in responding to disasters, including the private sector, local and foreign NGOs, and community organizations.[1,2]

LEADERSHIP POSITIONS FILLED

- All BNPB leadership positions are filled.
- According to BNPB's main structure posted on its official website, all positions shown are filled.[30]

JOB-SPECIFIC COMPETENCIES OF LEADERSHIP POSITIONS

- Competencies and experience are required for BNPB leadership positions, but not well defined.
- While the Head of BNPB has determined the establishment of the Indonesia national work competency standard for disaster management in 2015,[31] leadership positions must pass a "fit and proper test" conducted by the House of Representatives. Nominated individuals must be drawn from a pool of "professional and expert civil servants" in accordance with legal provisions.

The standard is used as a reference for professional associations, the community, the business world, the national government, and local governments to improve work competence in the field of disaster management.[2,32,33]

POLITICAL ACCESS OF DM LEADERSHIP

- Disaster management leadership in Indonesia has an institutionalized, direct line of reporting and responsibility to the highest level of the Government of Indonesia (GoI).
- Article 12 of Law No 24/2007 states that BNPB has the task of reporting the implementation of disaster management to the President once a month under normal conditions and at any time in a state of disaster emergency.[1]

PROXY LEADERSHIP ARRANGEMENTS

- Formal procedures exist in Indonesia for incident-specific proxy leadership during major events, and systems to support this arrangement are fully implemented.
- Article 7 of Law 24/2007 concerning Disaster Management states that the Government's authority in the implementation of disaster management includes determining the disaster-emergency status and its scale (city/district, provincial, or national level). The status is determined by the number of victims, property losses, damage to infrastructure and facilities, the extent of the area affected by the disaster, and the socioeconomic impacts caused. Article 51, point 2, further explains that the determination of disaster-emergency status is carried out by the President at the national level, by the governor at the provincial level, and by regents or mayors at the district/city level .[1]
- According to Government Regulation No. 21/2008 concerning Disaster Management, shortly after emergency-response conditions are established, a precise assessment of the location, damage, loss, and resources must be carried out immediately. After that, the government can announce the status of the disaster, and the response will be led by the local Head of the BPBD (provincial/district/city level) or the Head of the BNPB, in accordance with the status of the disaster (Article 23). To carry out these command functions, the Head of the BNPB or the head of the BPBD can appoint an official as the Commander for disaster-emergency management (Article 47, point 2).[3]

SPECIAL DECISION-MAKING COMMITTEES IN PLACE FOR RESPONSE AND/OR RECOVERY OPERATIONS

- In Indonesia, specifically within BNPB, committees and structures are in place for response and recovery operations.
- According to Law 24/2007, Article 12 states that the BNPB has the duty to provide guidance and direction on disaster management efforts, including disaster prevention, emergency-response management, rehabilitation, and reconstruction in a fair and equal manner. Article 16 also mentions that to carry out their functions, the implementing elements of disaster management have

integrated tasks for pre-disaster, emergency response and post-disaster (including rehabilitation and reconstruction).[1]

SPECIAL DISASTER RISK MANAGEMENT POLICY-MAKING COMMITTEES

- In Indonesia, DRR policy-making committees and structures are in place.
- Law No. 24 of 2007 concerning disaster management states that the authority of the national and local governments in the implementation of disaster management includes: (1) stipulation of disaster management policies; (2) development planning that includes elements of disaster management policies; (3) determination of the status and level of national and regional disasters; (4) implementing cooperation policies in disaster management; (5) regulating the use of technology to assess threats or dangers via a disaster in a given area; (6) formulation of policies to prevent the control and depletion of natural resources that exceed natural capabilities; and (7) controlling the collection and distribution of money or goods.[1]
- Article 13 also describes BNPB as an executing element tasked with formulating and establishing disaster management and refugee management policies by acting quickly, precisely, effectively, and efficiently. Article 14 states that the Disaster Management Steering Element as referred to in Article 11 has the function of formulating the concept of a national disaster management policy. The Steering Element consists of balanced and proportional government and professional community elements.[1]

MULTI-STAKEHOLDER PARTICIPATION IN DECISION-MAKING COMMITTEES

- Stakeholders throughout Indonesia's government and civil society are included and have operational or decision-making responsibilities.
- The selection mechanism and criteria for professional community members within the Disaster Management Steering Element are regulated in the Head of BNPB Regulation 2/2008.[32] Specifically, the Steering Element is comprised of 10 Echelon I Government Officials or equivalent nominated by Head of Governmental Institutions; and nine professional community members (e.g., experts/professionals and/or community figures). Government officials shall be from the Coordinating Ministry for People's Welfare, Department of Home Affairs, Department of Social Affairs, Department of Public Works, Department of Health, Department of Finance, Department of Transportation, Department of Energy and Mineral Resources, National Police of the Republic of Indonesia, and the National Army of the Republic of Indonesia.

STAKEHOLDER ENGAGEMENT

STAKEHOLDER REPRESENTATION IN GOVERNMENT DM STRUCTURES

- Indonesia's disaster management organizational arrangements formalize NGO, private sector, and other stakeholder entities in official DM and DRR structures through assignment of roles and responsibilities, but implementation challenges exist.
- The role of international and local NGOs in DM arrangements is addressed in Chapter 6 Articles 28, 29 & 30 of Law 24/2007.[1] International institutions and foreign non-government institutions can participate in disaster management activities and get guaranteed protection via the Government of Indonesia (GoI) for its workers per the Non-governmental Organization & Foreign Institutions section described in Government Regulation 23/2008.[4] Private-sector entities can carry out disaster management functions, both individually and jointly with other parties, and are obliged to submit reports to the government and/or agencies that lead disaster management. This process must be transparent, and NGOs are obliged to heed humanitarian principles in carrying out their disaster management functions. The participation of private-sector actors in the implementation of disaster management is regulated in Head of BNPB Regulation 12/2014.[34] NGOs and the private sector also can play a role in developing a national action plan for DRR (Government Regulation 21/2008 Article 8.3), meeting basic needs (Article 52.2), and in preparedness activities (Article 16.3).[3]

PUBLIC PRIVATE PARTNERSHIPS (PPPS)

- The GoI has implemented policies to support the creation of PPPs, and they are utilized regularly.
- The participation of private-sector entities in the implementation of disaster management is regulated via BNPB Regulation 12/2014.[34] According to the BNPB Performance Achievement Report, BNPB signed 24 MOUs with NGO partners and eight MOUs with private-sector entities in 2016.[35,36,37]

NGO AND PRIVATE-SECTOR INVENTORY

- PLANAS PRB lists organizations and details the capabilities and resources possessed by each.
- At least 17 large, national private companies are listed in the PLANAS PRB directory as entities that are experienced in disaster management. Beyond that, many other large, medium, small, and MSME companies not listed in the PLANAS PRB directory participate in disaster management activities. Even so, according to 2017's PLANAS PRB report, only about 2% of businesses and commercial institutions have an understanding of DRR frameworks, although there are many corporate social responsibility (CSR) activities related to DM being implemented. [38,8]

NATURE OF MULTI-STAKEHOLDER ENGAGEMENT

- NGOs are comprehensively engaged in Government of Indonesia disaster management efforts in a manner that is coordinated and complementary.
- The role of international and non-governmental organizations in disaster management – including pre-disaster activities, emergency response, and post-disaster efforts – is described in Government Regulation 23/2008, [4] with detailed technical guidance described in Head of BNPB Regulation 22/2010.[39] The role of international and local NGOs in disaster management is also mentioned in Chapter 6 of Article 30 of Law 24/2007.[1] International institutions and foreign non-government institutions can participate in disaster management activities and receive guaranteed protection from the GoI for NGO workers. Examples include the USAID-APIK project, wherein over 22,000 stakeholders received training in CCA and DRR via an NGO.[40]

PRIVATE-SECTOR ENGAGEMENT

- Throughout Indonesia, the private sector (business associations, major employers, SMEs) is actively engaged in official disaster management efforts (plans, exercises, and training), including owners and operators of critical infrastructure. This is guided by GoI policies and procedures.
- The participation of the private sector in the implementation of disaster management covers pre-disaster preparedness, emergency response, and post-disaster recovery as detailed via the Head of BNPB Regulation 12/2014.[34] Private-sector participation aims to support the strengthening of disaster prevention, emergency response, and rehabilitation activities in an effective and accountable manner. Pre-disaster activities include: (1) monitoring disaster risk; (2) participatory planning for disaster management; (3) improvement of disaster awareness via cultural-capacity building; (4) organizing, installing, and testing of early warning systems (EWS); (5) organizing, counseling, training, and simulation of emergency response; (6) dissemination of information regarding disaster warning and preparation of evacuation routes; and (7) other activities to reduce or eliminating disaster risk. Supporting activities during emergency situations include: (1) search & rescue (SAR), and evacuation of victims and property; (2) fulfillment of basic needs; (3) protection and management of refugees and vulnerable groups; (4) rescue and recovery of vital infrastructure and facilities; and (5) other activities that are carried out immediately in the event of a disaster.
- Post-disaster activities include: (1) post-disaster needs assessment (PDNA) and preparation of action plans for rehabilitation and reconstruction; (2) improvement of environmental, infrastructure, and public facilities, and the provision of assistance for home improvement; (3) health services and social, psychological, and socioeconomic recovery of the community; (4) reconstruction of community environmental and social facilities and infrastructure; (5) improvement of social, economic, and cultural conditions; (6) monitoring the implementation of rehabilitation and reconstruction action plans for the target groups; and (7) other activities in the form of repairing and restoring all aspects of public or community services to an adequate level, as well as rebuilding all facilities and infrastructure institutions in post-disaster areas.

NGO ORGANIZATIONAL ARRANGEMENTS

- There exist formal NGO associations across Indonesia with established and active membership of NGOs with and without defined disaster management program areas or missions.
- Following upon the Hyogo Framework for Action 2005-2015, the National Disaster Risk Reduction Platform (PLANAS PRB) was formed on April 28, 2009, with the aim of becoming a vehicle that integrates insight, accommodates aspirations and interests, and bridges various stakeholders in disaster risk reduction in Indonesia. PLANAS PRB is expected to become a multi-stakeholder national mechanism that acts as an advocate for DRR at various levels by providing coordination, analysis, and advice on priority areas. PLANAS PRB members include institutions, organizations, and forums that declare themselves members through the registration process. Membership elements include educational and research institutions, mass media, business institutions, civil society, local government, the Indonesian Red Cross, and professional institutions. PLANAS PRB membership is also complemented by various Disaster Risk Reduction Forums (DRR Forum or Forum PRB). As of 2019, DRR Forums encompass 25 provinces and 76 regencies/cities (BNPB Performance Report 2019).[8,38,7,41,42]
- Additional associations that deal in the field of disaster management including the Indonesian Society of Disaster Management (MPBI) and Humanitarian Forum Indonesia. MPBI is a non-profit organization that serves as a gathering place for individuals, practitioners, scientists, and observers of disaster management from the government sector, international institutions, national NGOs, and academia. MPBI is also a means of connecting disaster management organizations and institutions in Indonesia. As an association of DM practitioners and networks of organizations, MPBI is more active at the strategic and conceptual level of DRR concepts, policies, strategies, and capacity development versus the direct implementation of DRR activities on the ground. MPBI is a member of the Asian Disaster Reduction and Response Network (ADRRN).[43]
- Humanitarian Forum Indonesia (HFI) is a network of humanitarian and development organizations founded by seven NGOs including Muhammadiyah Disaster Management Center, Yayasan Tangguh Bencana Indonesia, Yakkum Emergency Unit, Dompet Dhuafa, Karina KWI, Wahana Visi Indonesia, and Perkumpulan Peningkatan Keberdayaan Masyarakat. HFI is committed to building mutual understanding between humanitarian actors, especially NGOs, across various backgrounds, ethnicities, tribal affiliations, religions, and countries. HFI furthers DRR norms and humanitarian standard principles through dialog and developing partnerships.[44]

ACADEMIA INVOLVEMENT IN GOVERNMENT DM

- Policies and strategies support a robust academic community of practitioners throughout Indonesia that contributes to official disaster management efforts through R&D, training, etc., using structurally integrated arrangements.
- Academia is involved in governmental disaster management efforts through the Higher Education Forum for Disaster Risk Reduction (FPT-PRB) established in 2008. FPT-PRB provides the intellectual capacity and experience in disaster risk reduction across the full spectrum of scientific fields. The diverse range of technical expertise that can be provided by the FPT-PRB

demonstrates that "Disaster risk reduction is everybody's business." The establishment of the FPT-PRB was fundamental to the subsequent formalization of the PLANAS PRB; without the intellectual capacity and advocacy potential of the FPT-PRB drawn from the expertise of the tertiary institutions, the PLANAS PRB would be reliant on international expertise. [7,45,41,46,47,48]

FPT-PRB cover the following activities:

- Establish cooperation among its members in education, research, and community service in the field of disaster risk reduction;
- Promote disaster science and technology for all levels of application;
- Build synergies between higher-education institutions and other government and non-government disaster risk-reduction stakeholders at all levels in advancing the national disaster risk-reduction agenda.

NATIONAL GOVERNMENT ENGAGEMENT IN REGIONAL AND GLOBAL EFFORTS

- Indonesia, and BNPB specifically, have strong and effective relationships with global and regional organizations, including support frameworks and agreements that have been formally ratified.
- Since 2004, following the Indian Ocean Tsunami, Indonesia has been active in various international forums and has signed commitments on disaster risk reduction, such as the Hyogo Framework for Action (HFA) and the Sendai Framework for Disaster Risk Reduction (SFDRR).[49,50] Likewise, global commitments in the fight against climate change and the mainstreaming of CCA-DRR have led to Indonesia's support of the Kyoto Protocol and the ratification of the Paris Agreement. Indonesia also sent representatives to the Global Platform for Disaster Risk Reduction from 13-17 May 2019 in Geneva, Switzerland. [12,51]
- At the regional level, Indonesia and partner nations in ASEAN established the AHA Centre through Presidential Regulation Number 96 of 2012 concerning Ratification of the Agreement on The Establishment of The ASEAN Coordinating Center for Humanitarian Assistance on Disaster Management. The ASEAN Agreement on Disaster Management and Emergency Response was a direct result of negotiations by the Foreign Ministers of ASEAN Member Countries.[52,53]

ENABLING ENVIRONMENT

LEGAL FOUNDATION

LEGAL ARRANGEMENTS ADDRESS DM REQUIREMENTS

- Indonesia's DM legislation is comprehensive and driven primarily by a single current disaster law.
- The legal basis of Indonesia's disaster management requirements rests largely upon two statutes: Law of the Republic of Indonesia Number 24 of 2007, Concerning Disaster Management (Law 24/2007), and Government Regulation of the Republic of Indonesia Number 21, Concerning Disaster Management (Regulation 21/2008). Law 24/2007 and Regulation 21/2008 are said to have galvanized political engagement for disaster management efforts throughout government and society.[54]
- These two statutes designate national and regional governments as de facto responsible for the command, coordination, and implementation of disaster management activities, and/or the delegation thereof, via the BNPB and BPBDs. The term "national government" in the documents refers to and is synonymous with the President of Indonesia, and "regional governments refers to regional governors. Law 24/2007 and Regulation 21/2008, along with several other guidelines and regulations, represent a comprehensive consolidation of disaster management statutes. Additional foundational statutes include Presidential Regulation Number 8 of 2008, Concerning National Disaster Management Agency (Regulation 8/2008); Government Regulation Number 22 of 2008, Concerning Disaster Aid Financing and Management (Regulation 22/2008); Government Regulation Number 23 of 2008, Concerning Participation of International Institutions and Foreign Non-governmental Organizations in Disaster Management (Regulation 23/2008); and Guideline 22 of 2010, on the Role of International Organizations and Foreign Non-government Organizations During Emergency Response (Guideline 22/2010). Other relevant laws and regulations include Law Number 26 of 2007, Concerning Spatial Management (Law 26/2007) and several BNPB regulations including BNPB Regulation Number 11 of 2014, on community participation in disaster management; BNPB Regulation Number 12 of 2014, On Participation of the Private Sector in Disaster Management; BNPB Regulation Number 13 of 2014, On Gender Mainstreaming in Disaster Management; and BNPB Regulation Number 14 of 2014, On Handling, Protection, and Participation of the Disabled in Disaster Management.

SCOPE OF LEGISLATION

- Indonesia's DM legislation addresses all disaster management phases.
- Law 24/2007 and Regulation 21/2008 together comprise a comprehensive approach to addressing all phases of disaster management in Indonesia, with explicit provisions for pre-disaster, disaster situation, and post-disaster activities. Law 24/2007 defines "disaster" broadly to incorporate natural, non-natural (e.g., epidemic), and human-caused (social) disaster situations,

such as conflict. [1 (Article 1)] "Disaster management" is defined comprehensively in Law 24/2007 to encompass "policies on development with disaster risk, disaster prevention, emergency response, and rehabilitation."[1 (Article 1)] Regulation 21/2008 provides a detailed explication of wide-ranging objectives for each phase of disaster management and designates responsible parties for each objective; it thereby codifies a comprehensive legal framework for all phases of disaster management for all responsible parties at city/regency, regional, and national levels.[3 (Elucidation)]

In addition, the BNPB has produced many edicts addressing each phase, including but not limited to:

- Regulation of the Head of BNPB No. 4 of 2013 Directive Petnis Post-Disaster Rehabilitation and Reconstruction of the Settlement Sector: https://bnpb.go.id/produk-hukum/peraturan-kepala-bnpb/peraturan-kepala-bnpb-no-4-tahun-2013;
- Head of BNPB Regulation No. 15 of 2011 Guidelines for Assessing Post-Disaster Needs: https://bnpb.go.id/produk-hukum/peraturan-kepala-bnpb/peraturan-kepala-bnpb-no-15-tahun-2011;
- Head of BNPB Regulation No. 11 of 2008 Guidelines for Post-Disaster Rehabilitation and Reconstruction: https://bnpb.go.id/produk-hukum/peraturan-kepala-bnpb/peraturan-kepala-bnpb-no-11-tahun-2008;
- Head of BNPB Regulation No. 13 of 2010 Guidelines for Searching, Relief and Evacuation: https://bnpb.go.id/produk-hukum/peraturan-kepala-bnpb/peraturan-kepala-bnpb-no-13-tahun-2010;
- Head of BNPB Regulation No. 24 of 2010 Guidelines for Preparing a Disaster Emergency Operation Plan: https://bnpb.go.id/produk-hukum/peraturan-kepala-bnpb/peraturan-kepala-bnpb-no-24-tahun-2010; and
- Head of BNPB Regulation No. 17 of 2010 About: General Guidelines for Implementing Post-Disaster Rehabilitation and Reconstruction: https://bnpb.go.id/produk-hukum/peraturan-kepala-bnpb/peraturan-kepala-bnpb-no-17-tahun-2010

BASIS OF THE LEGISLATIVE PROCESS

- Indonesia's DM legislation is based on a broad strategic vision.
- The BNPB and BPBDs are led by the President of Indonesia and by regional governors, respectively. Regulation 21/2008 confers broad powers upon the leaders of the BNPB and the BPBD to create policy, strategize, plan, implement action, and mobilize human and material resources from both public and private entities for the purposes of disaster management. In the event of a disaster, the leaders of the BNPB and BPBD are considered Commanders able to exercise control over other agencies, officials, and private entities.[3 (Article 47)]
- Indonesia's disaster management legislation reflects a broad strategic vision with mechanisms for accountability and oversight.[55–57] Law 24/2007 mandates that the BNPB shall provide monthly status reports on all aspects of disaster management to the President.[1 (Article 21)] Additionally, as mandated by Law 24/2007, the BNPB shall coordinate, integrate, and execute all actions

imposed by Presidential Regulation.[1 (Articles 7, 17)] Further legislation stipulates detailed provisions for the "Positions, duties, and functions" of the BNPB, and the implementation thereof.[58 (Section 1)] The BNPB has subsequently authored numerous regulations to further describe and define its roles and responsibilities. Chapter 1, Article 1 of Law 24 in 2007, Concerning Disaster Management (Law 24/2007) iterates hazards included for consideration: "earthquake, tsunami, volcanic eruption, flood, drought, typhoon, and landslide… technological failure, modernization failure, and epidemic… social conflicts between community groups, and terrorism."

IMPLEMENTATION SCHEDULES IN LEGISLATION

- Indonesia's DM legislation details implementation schedules and is fully implemented.
- The government (i.e., the President) and regional governments (i.e., regional governors), via the BNPB and the BPBDs, are empowered by Law 24/2007 to dictate disaster management planning and may compel disaster management teams to implement plans. Law 24/2007 likewise mandates that a regional disaster management steering committee shall implement local disaster management policy.
- Presidential Regulation 8/2008 mandates that there shall be a "Disaster Management Implementing Element" (DMIE) department within the BNPB that is responsible for implementation of operations coordination and command in all phases of disaster management. A "principal inspectorat" within the DMIE is designated to oversee the "implementation of duties and functions" of the BNPB; the principal inspectorat is subordinate to the head of BNPB.[58 (Article 31)] As mandated by Law 24/2007, the BNPB shall coordinate, integrate, and execute all actions as imposed by Presidential Regulation. Additionally, the BNPB is required to provide monthly status reports on all aspects of disaster management to the President;[1 (Article 12)] likewise, the BPBDs must provide monthly reports to their respective regional governors.[1 (Article 21)] As of 2016, all provinces have established Regional Disaster Management Agencies (BPBD), and all BPBDs have produced their respective Provincial Disaster Management Plans (RPBs).[59]

LEGISLATION AND INSTITUTIONS

a. Legislation in Indonesia provides basic provisions for the establishment of disaster management institutions.
b. Law 24/2007 established the National Disaster Management Agency (BNPB) and Regional Disaster Management Agencies (BPBD) as the governmental institutions ultimately responsible for all disaster management activities. Regulation 21/2008 stipulates that the BNPB and BPBDs may call upon the following agencies for whatever they determine is necessary to assist in disaster management: Ministry of National Development Planning (BAPPENAS); Regional Development Planning Agencies (BAPPEDA); unspecified Regional Government Personnel Work Units; National SAR Agencies; Indonesian Armed Forces; National Police; Department of Public Works; Department of Health; and Department of Social Affairs.[3 (Article 25, Elucidation)]

    - The Ministry of National Development Planning (BAPPENAS) along with unspecified

"governmental, non-governmental, community, and business institution elements", are mandated by Law 21/2008 to be "involved" in developing a national action plan for disaster risk reduction, to be coordinated by the BNPB. Likewise, BAPPEDAs and other unspecified entities are responsible for producing a regional DRR action plan in coordination with the BPBDs.[3 (Article 8)] More specificity regarding which entities should be involved and to what degree would provide better clarity of purpose and coordination. The Ministry of National Education and Culture and the Ministry of Health have independently created their own disaster management teams.[59(p38)]

Further legal clarification of roles and responsibilities for entities participating in disaster management activities are codified in the proposed NDRF with the establishment of task forces. Seven task forces have been proposed: Search and Rescue; Evacuation and Protection; Health; Logistics; Public Works and Utilities; Education; and Early Recovery. Each task force is a grouping of ministries/agencies with one agency taking the lead.

Search and Rescue Task Force:
National Search and Rescue Agency (Lead)
Indonesian National army
Indonesian National Police
Evacuation and Protection Task Force:
Ministry of Social Affairs (Co-lead)
Indonesian National Police (Co-lead)
Directorate of Refugee Management, BNPB
BPBD
Ministry of Education and Culture
Ministry of Women Empowerment and Child Protection
Ministry of Public Works and Community Housing
Commission for the Protection of Indonesian Children

Health Task Force:
Ministry of Health Members:
Food and Drug Monitoring Agency
Quarantine Agency
Logistics Task Force:
BNPB (Lead)
Ministry of Social Affairs
Ministry of Transportation
Ministry of Communication and Informatics
Logistics Agency
Indonesian National army
Indonesian National Police
Public Works and Utilities Task Force:
Ministry of Public Works and Public Housing (Lead)

Ministry of Social Affairs
Ministry of Health
Ministry of Transportation
Ministry of Communication and Informatics
Ministry of Energy and Mineral Resources
Indonesian National army
Indonesian National Police

Education Task Force:
Ministry of Education and Culture Ministry of Religion (Lead)
Ministry of Coordinator of PMK
Ministry of Research and Technology and Higher Education
Ministry of Social Affairs
Ministry of Women's Empowerment and Child Protection
Ministry of Health
BNPB
Ministry of Public Works and People's Housing
Indonesian National army
Indonesian National Police

Early Recovery Task Force:
Ministry of Home Affairs (Lead)
Ministry of Social Affairs
Ministry of Cooperatives and Small and Medium Enterprises
Ministry of Agriculture
Ministry of Forestry and Environment
Ministry of Village and Development of Disadvantaged Areas
Ministry of Labor
Ministry of Public Works and Public Housing
Ministry of Marine Affairs and Fisheries
BNPB

LEGISLATION AND BUDGETS

- Legislation provides basic provisions for the establishment of DM budgets in Indonesia.
- Basic provisions for budget allocations regarding disaster management in Indonesia are outlined in Law
    - 24/2007[1 (Articles 8, 60-62)] and in Regulation 21/2008,[3 (Articles 41, 58, 62, 81, 83)] including mandates for the State budget (referred to as APBN) to allocate "sufficient" funds for a disaster management budget; likewise, regional governments shall provide for a regional budget (referred to as

APBD). In addition, State and regional governments are compelled to create a "ready fund" for use during an emergency-response effort.

- More extensive statutes regarding the establishment of budgets for disaster management activities in Indonesia are codified in Government Regulation of the Republic of Indonesia Number 22 of 2008, Concerning Disaster Aid Financing and Management (Regulation 22/2008). Regulation 22/2008 specifies provisions for the establishment of national and regional disaster management budgets to be funded by the national and regional governments, respectively. Regulation 22/2008 stipulates that funds for disaster management shall be apportioned into three separate funds representing each phase of disaster management: a "disaster contingency fund" for pre-disaster undertakings; a "ready fund" for disaster-response measures; and "grant-patterned social assistance funds" for post-disaster projects.[60 (Article 5)] In addition, Regulation 22/2008 identifies appropriate uses of funds in all phases of disaster management.[60 (Chapter 3)] Despite the attention given to funding in the legislation, no amounts or percentages are specified; this could negatively affect prioritization of disaster management in budgeting.

LEGISLATION IS SOCIALIZED

- Legislation is actively socialized by the Government of Indonesia.
- Indonesian disaster management legislation is socialized throughout the government in the sense that national, regional, and local governments are integrated into the legislation via the BNPB and BPBDs. Regulation 21/2008 grants broad, wide-ranging powers to the President and regional governors as the acting heads of the BNPB and BPBDs.
    - The RENAS-PB 2015-2019 specified 48 agencies with "disaster management-related mandates",[61(p40)] each with its own statutes regarding internal matters. However, by the BNPB's own admission, there is no "overarching umbrella framework."[61(p40)] This has led to an "ad hoc"[61(p37)] assemblage of government institutions involved in disaster management initiatives."[61(pp37-38)] As of 2019, there were 512 BPBDs.[5(p92)] Further statutory guidance has been provided with the establishment of disaster management Task Forces.

DECLARATIONS PROCESS, VERTICAL COOPERATION, AND RESOURCE REQUISITION

- Indonesia's declarations process, vertical cooperation, and resource requisition during disaster events are addressed and adequately described in the language of the law.
- In the event of an emergency, the President, as leader of the BNPB, shall determine when to declare national disaster-emergency status. In the same manner, regional governors, as leaders of the BPBDs, are empowered to declare regional disaster-emergency status. These powers are codified in both Regulation 21/2008[3 (Articles 21-23)] and Law 24/2007.[1 (Article 50)] Both statutes invoke wide-ranging mechanisms that impel the respective Head of either the BNPB or BPBD (or an appointee), to a "Commander" position,[3 (Articles 47-50)] and allow the Agencies (BNPB and BPBDs) to call upon any governmental or non-governmental institution for human and material resources, logistics, and equipment.[3 (Articles 24-31)]

- Regulation No. 10 of 2008 Guidelines for Disaster Emergency Response Command from the BNPB thoroughly codifies the declarations processes, vertical cooperation mechanisms, and a means to conduct requisition of human and material resources during disaster events.

EMERGENCY POWERS

- Comprehensive legislative provisions enable leadership to curtail certain rights and activities during a state of emergency in Indonesia.
- Regulation 21/2008 grants extraordinary powers to persons in leadership roles at the BNPB the BPBDs during a disaster event. The BNPB and the BPBDs are empowered by the statute, in the context of rescue of persons or property, to command control over material objects, including the relocation and/or destruction thereof; the movement of people, including their removal and/or relocation from an area; isolation and/or closure of public or private lands; and public utilities, such as electricity, gas, and water.[3 (Article 46)] Additionally, the Agencies are empowered to implement quarantine and to command control over border activities, such as immigration and importation.[3 (Articles 32-37)]
    - Law No. 6 of 2018 on Health Quarantine grants extensive powers to governments at all administrative levels in Indonesia, including but not limited to "quarantine, isolation, giving vaccinations or prophylaxis, referral, disinfection, and/or decontamination of persons as indicated, large-scale social restrictions, disinfection and decontamination of transport equipment and goods; and/or health**,** security and control against media environment"[62 (Article 15)] and "measures against equipment transport, people, goods, and/or the environment determined by the health quarantine official."[62 (Article 16)] Law 6/2018 also confers powers to control maritime vessels, aircraft, borders, ports of entry, land vehicles, and any/all crew/passengers within.[62 (Articles 20-43)] Articles 44-47 stipulate control over goods; Article 48 covers administrative sanctions.[62]
    - Law 24/2007 and Regulation 21/2008 reference Articles 4, 20, and 21 of the 1945 Constitution to confirm the right of the People's Representative Council (Dewan Perwakilan Rakyat or DPR; aka House of Representatives) and the President to establish laws. Article 12 of the Constitution in its entirety states, "The President may declare a state of emergency. The conditions for such a declaration and the subsequent measures regarding a state of emergency shall be regulated by law."[63]
    - Law of The Republic of Indonesia Number 23 of 1959 does state that once the emergency situation has been resolved, the state of emergency is no longer valid.[64 (Article 8)] There are exceptions: "If deemed necessary, the head of the region concerned can defend it for his region all or part of the regulations/actions of the Regional Emergency Authority, with provisions that the defended rules/measures can be valid for a maximum of four months after the abolition of the civil emergency."[64 (Article 8)]
    - Law 23/1959 provides guidance for military emergency and/or martial law situation: "If a state of civil emergency is replaced by a state of military emergency or a state of war, then

the regulations and actions of the Martial Law Authority or the Lord of War [are enforced]."[64] (Article 8) Law 23/1959 extensively details chains of command and powers of commanders at every administrative level. From the explanation of Law 23/1959: "The special powers granted to rulers…must be in accordance with the gravity of the hazard at hand…It should not be forgotten that the powers…given…are the exception to the conferring and exercising of powers."[64]

DM STRUCTURES AND ARRANGEMENTS FOR LOWER LEVELS OF GOVERNMENT

- Indonesia's DM legislation and provisions are comprehensive.
- Provisions for BPBDs are provided by Article 18, Law 24/2007 and Article 63, Regulation 8/2008. Regulation 21/2008 mandates that Regional Agencies are responsible to coordinate a "regional action plan" involving Regional Government Personnel Work Units (Article 8). As of 2019, BPBDs have been established in all 34 provinces and in 512 cities/districts (p. 92).[5]

GUIDANCE FOR DRR ACTIVITIES AND REQUIREMENTS

- Indonesia's legislation provides some guidance for DRR activities and requirements, e.g., code enforcement, land use regulations, sustainable development practices.
- Indonesia has declared its commitment to integrating climate change adaptation (CCA) and disaster risk reduction (DRR) into its development planning and policies. Law 24/2007 mandates the analysis and incorporation of disaster risk reduction into development plans and policies[1] (Articles 5, 6, 8, 10, 12, 20, 35, 39, 40, 47, 59, 71, 92) and includes penalties for failure to comply.[1] (Article 75) Law 26/2007 stipulates that spatial management activities shall incorporate disaster mitigation; for example, water infrastructure is required to include flood controls, municipal planning must incorporate disaster-evacuation areas and a mandate to set aside 30% of urban areas for green spaces.[65] (Articles 5, 20, 23, 28, 33) Regulation 26/2007 restricts cultivation activity and promotes conservation in disaster-prone areas.[65] (Articles 7, 8, 51, 52, 80, 102, 105)
- However, according to a 2015 report, there are "development challenges…uneven implementation of land use policies and building codes, a relatively high prevalence of corruption, and insufficient law enforcement."[59(p14)] Difficulties in law enforcement are cited elsewhere in the report. The integration of CCA-DRR into planning and development has had its challenges at many levels, including "policy, institutional, funding, and activity management."[25(p13)] A policy study on CCA-DRR development conducted by the BNPB revealed both gaps and overlap in laws and regulations and the need for alignment therein.[25(p14)]

FACILITATION OF MILITARY SUPPORT

- Provisions are comprehensive, and military resources are fully integrated into BNPB and regional government structures.

- Military support is fully integrated into Indonesian disaster management due to the fact that the President of Indonesia, as Head of the BNPB and Commander in Chief of the Indonesian National Armed Forces, may call upon the military for the purposes of disaster management during an emergency as per Government Regulation 21/2008.[3 (Article 25)] Regional governors, depending on the location of a disaster event, likewise have the authority to marshal the armed forces in the event of a disaster emergency. Article 38, Regulation 21/2008 (Elucidation of) stipulates that this power is extended to the Head of the BNPB (the President) regarding aid from foreign military personnel. Further legislation reiterates the powers of command; e.g., Presidential Regulation 8/2008.[58 (Article 48)]

FACILITATION OF INTERNATIONAL AND CROSS-BORDER ACTIVITIES (FACILITATION AND PROVISION)

- Indonesia's international and cross-border provisions are comprehensive.
- The Law of the Republic of Indonesia Number 24 of 2007, Concerning Disaster Management (Law 24/2007) mandates that the President and regional governors, as heads of the BNPB and the BPBDs, respectively, manage policy and make provisions for international participation in disaster management.[1 (Articles 7, 30)] However, Law 24/2007 lacks specificity regarding the roles of relevant stakeholders or mechanisms for implementation. Government Regulation of the Republic of Indonesia Number 23 of 2008, Concerning Participation of International Institutions and Foreign Nongovernmental Organizations in Disaster Management, establishes more provisions for international support in disaster management, including, but not limited to, the following procedures: a formalized process for nations who wish to participate; implementation of participation; and oversight and accountability.
    - Guideline Number 22 of 2010, "On the Role of the International Organizations and Foreign Non-government Organizations During Emergency Response (Guideline 22/2010)," prepared by the BNPB, provides more detailed provisions than previous statutes. Guideline 22/2010 specifies triggers and mechanisms for international assistance, as well as procedures for managing assistance, and designates representatives from the following agencies who shall establish Supporting Posts in the event of an emergency: BNPB; Ministry of Defense; Ministry of Health; Ministry of Agriculture (Quarantine Division); Ministry of Law and Human Rights (Directorate General of Immigration); Ministry of Finance (Directorate General of Duties and Excises); Ministry of Foreign Affairs; The National Police of the Republic of Indonesia (POLRI); Ministry of Trade (Director General of Foreign Trade); Ministry of Transportation; National Intelligence Agency (BIN); Food and Drugs Surveillance Agency; and Local Governments/Local Agency for Disaster Management.[39]
    - As a member state of ASEAN, Indonesia is a signatory to the legally binding ASEAN Agreement on Disaster Management and Emergency Response (AADMER). The Agreement represents member states' commitment to cross-border cooperation regarding disaster management in recognition of their highly disaster-prone regions. Additionally, Indonesia is committed to the implementation of the Sendai Framework for Disaster Risk Reduction

(SFDRR). Although the SFDRR is not legally binding, Indonesia has actively worked with multiple relevant United Nations agencies to begin implementing it, as reflected by Indonesia's Disaster Risk Management Baseline Status Report 2015: Towards identifying national and local priorities for the implementation of the Sendai Framework for Disaster Risk Reduction (2015-2030).

FINANCIAL RESOURCES

DM BUDGET ARRANGEMENT

- Indonesia's DM budget provides line-item funding for disaster management activities.
- Regarding budget arrangements for disaster management, funds are allocated directly from the national (APBN) and regional budgets (APBD) as mandated by Law of the Republic of Indonesia Number 24 of 2007, Concerning Disaster Management (Law 24/2007).[1 (Articles 6, 8, 60, 61)] Funding for the BNPB and other agencies is allocated from the APBN; likewise, the BPBDs are allocated funds from the APBDs.[60 (Elucidation)] The BNPB and the BPBDs are required to produce reports showing management of funds for the purposes of accountability and transparency.[60 (Elucidation)]

  Additional provisions for the financing of disaster management are provided by Government Regulation of the Republic of Indonesia Number 22 of 2008, Concerning Disaster Aid Financing and Management, including mandates for separate types of funds and their uses. The three types of funds stipulated by Regulation 22/2008 are:

  (1) A disaster contingency fund for pre-disaster measures;

  (2) A ready fund to be used for measures taken during an emergency (also called on-call budget); and

  (3) Grant-patterned social assistance funds for post-disaster efforts (social grants).[60 (Articles 5, 6)]

  In addition, Regulation 22/2008 places emphasis on community (i.e., individuals, businesses, and NGOs) participation in terms of financial contributions and fundraising activities.[60 (Articles 4, 7, 8)] An additional fund in the education budget (beyond the State's regular allocations), called the Education Development Fund (DPPN), is earmarked for post-disaster rehabilitation of affected education facilities.[60 (Article 16, Elucidation)] However, while funds are mandated, the statutory environment could be more specific; Regulation 22/2008 stipulates that national and regional governments must "sufficiently allocate disaster management budget."[60 (Article 5)] Other examples of vague statutory language regarding funding are found in Laws 27/2014 and 15/2017, which stipulate that the State "may provide grants" to regional governments for rehabilitation and reconstruction for post-disaster purposes[66 (Article 16),67 (Article

19)

2020 APBN LINE ITEM BNPB:	**IDR:** 1,401,293,628,000
2019 APBN:	
BNPB Management Support and Implementation of Other Technical Tasks	206,975,671,000
Supervision and Enhancement of BNPB Apparatus Accountability	12,000,000,000
Disaster Management	400,450,000,000

DM BUDGET FUNDED AT TARGETED LEVELS

- Indonesia's DM budget does not specify levels for funding.
- Basic provisions for budget allocations regarding disaster management in Indonesia are outlined in Law 24/2007[1 (Articles 8, 60-62)] and in Regulation 21/2008,[3 (Articles 41, 58, 62, 81, 83)] including mandates for the State budget (referred to as APBN) to allocate "sufficient" funds for a disaster management budget, and likewise regional governments shall provide for a regional budget (referred to as APBD). In addition, State and regional governments are compelled to create a "ready fund" for use during an emergency-response effort. Despite the attention given to funding in the legislation, there are no amounts or percentages specified, which might negatively affect prioritization of DM in budgeting.

  Although Indonesia's legislation and policies are clear in their intention that disaster management funding reaches the smallest municipalities, regional and provincial governments have had difficulty sufficiently funding their disaster management requirements. In 2013, BNPB reported that the average regional budgets for BPBDs was 0.38% of regional APBDs, whilst actual DM funds averaged 0.1%, considered well below requisite amounts.[54(p38)] In 2015, BNPB attributed this to turnover in political positions and a general lack of "awareness and commitment" of stakeholders.[54(p38)] However, BNPB suggests that DRR investment may be underestimated, since many programs are "embedded in other sectoral programs"[59(p37)], e.g., Ministry of Public Works, Ministry of Environment and Forestry, Ministry of Agrarian and Spatial Planning (KemenATR), Ministry of Marine Affairs and Fisheries (KKP), Ministry of Public Works and Housing (KemenPUPR), Ministry for Villages, and Ministry of Education and Culture. Disaster management funding in Indonesia has faced significant challenges, some of which can be traced to a lack of specificity in statutory language regarding funding mandates. Law 24/2007[1 (Articles 8, 60-62)] and Regulation 21/2008[3 (Articles 41, 58, 62, 81, 83)] both stipulate mechanisms for funding; however, no amounts or percentages are specified. "There is a significant gap in disaster management needs and our budget availability," according to Doni Monardo of the BNPB.[68]

  To address this issue, in December 2019 the Indonesian House of Representatives put forward

a bill to amend Law 24/2007 that would mandate a 2% allocation from the annual state budget for disaster management purposes. This bill is still in process.[69] If this bill is passed, it would significantly bolster disaster management capabilities nationally; for example, the BNPB has proposed to "establish at least seven disaster relief logistics centers, three emergency preparedness centers, and three crisis command centers" with the additional funds.[68]

SCOPE OF DM BUDGET

- Indonesia's DM budget covers programmatic costs as well as administration and operational needs.
- Disaster management budgeting in Indonesia is mandated to encompass the "entire system, regulation, organization, plan and program related to these matters."[60 (Elucidation)] This mandate concerns national as well as regional budgeting. Regarding administrative, operational, and programmatic costs, the BNPB and BPBDs are sanctioned to manage their disaster management funds in keeping with the Agencies' "duties and functions," including but not limited to "planning, budgeting, implementation, reporting," disaster-mitigation activities, rehabilitation, and reconstruction as stipulated by Regulation 22/2008, Concerning Disaster Aid Financing and Management.[60 (Articles 10, 11, 14, 20)] Both the State (APBN) and BNPB budgets reflect spending for administrative, operational, and programmatic activities.[5,70,71]

DRR GRANT PROGRAMS

- Grant programs for DRR and the support of disaster preparedness exist but are not often recurring or are limited in scope.
- Regarding grant support for preparedness and DRR programs at subregional and local levels, the post-disaster phase of disaster management is supported by "grant-patterned social assistance funds." The funds are provided by the APBN mandated by Regulation 22/2008[60 (Articles 5, 6)] and are intended to be allocated to regions affected by disaster.[60 (Article 5)]

  This is potentially a source for preparedness and DRR activities via Indonesia's "build back better" commitment of incorporating DRR into rebuilding after disaster events (Priority 4 of the SFDRR). Furthermore, Law 24/2007 mandates the inclusion of DRR into development and planning projects.[1 (Articles 6, 7)] BNPB has expressed its intention to dedicate 10% of its post-disaster budget to disaster risk reduction.[72 (p105)]

BUDGET SUPPORTS TRAINING, EDUCATION, AND RESEARCH & DEVELOPMENT

- Indonesia's DM budget supports the development of training, education, and R&D.
- Multiple government agencies and ministries are involved in disaster management training and

education. For example, the Ministry of Education and Culture (MoEC) has established a disaster management center that has its own allocations from the APBN.[59(p36)] This exemplifies the fact that disaster management funding for education and training is distributed across many entities, thus quantifying exact levels of government support is difficult. Training and education are in evidence throughout the BNPB budget report.[73] BNPB "has continuously facilitated BPBDs and local DRR platforms to promote DRR at the village level and have trained these BPBDs in risk assessment, response, and community based DRR."[59(p8)] In addition, whilst most funding for government organizations comes through the Ministry of Finance (MoF) via the APBN, some additional funding (for the MoEC, for example) comes in the form of international loans and grants.[74(pv)]

Disaster management training and education are part of the pre-disaster stage of disaster management, as stipulated by Article 13, Regulation 22/2008 and Article 5, Regulation 21/2008. Accordingly, funding for pre-disaster activities comes from disaster-contingency funds as designated by Article 6, Regulation 22/2008. Training and education activities shall be organized by "agencies/institutions/organizations" involved in disaster management, as sanctioned by the Head of the BNPB, i.e. the President of Indonesia.[60 (Article 14)]

Law 24/2007 codifies the right for anybody to obtain education and training in disaster management and calls for community participation in decision making and planning of disaster management efforts.[1 (Article 26)] Regulation 21/2008 formally compels the Government to provide training and education programs from basic levels up through to "technical, simulation, and rehearsal."[3 (Article 14)] Educational and training objectives stated in Regulation 21/2008 include efforts to heighten community "awareness, concern, capability, and alertness" regarding potential disasters.[3 (Article 14)]

The National Platform for Disaster Risk Reduction Indonesia (Planas PRB Indonesia) collaborates with the education sector to promote disaster resilience in schools. The Consortium for Disaster Education (CDE; alternatively referred to as the National Cluster for Education) created the Framework of School-Based Disaster Preparedness (2011). The CDE held a conference in 2016 for government entities involved in DRR education and training. Attendees included representatives from the Ministry of Education and Culture, Ministry of Religion, BNPB, plus NGOs and international organizations. The goal of the CDE's conference was to further develop policies that support "DRR education in an institutionalized and sustainable manner" in keeping with Indonesia's commitments to the SFDRR for establishing disaster-safe schools.[75] The Ministry of National Education and the CDE released a Circular Letter, No. 70a/MPN/SE/2010 on Mainstreaming DRR in the school curriculum.[76] Lastly, in 2019, the BNPB announced plans to hold disaster mitigation classes in 250,000 schools (75% of schools in high risk areas).[77]

The BNPB and the Yayasan Peta Bencana (Disaster Map Indonesia Foundation) collaboration exemplifies the BNPB's commitment to supporting research. Peta Bencana is a public platform that "follows a sustained, iterative, collective, and multidisciplinary methodology of co-research involving the widest variety of stakeholders including disaster risk-management agencies, government managers, scientific researchers, industry partners, and resident groups" and is

committed to "co-research partnerships and training programs with various local communities, agencies, and universities across Indonesia."[78]

NATONAL BUDGET SUPPORTS SUB-JURISDICTIONS

- Indonesia's DM budget supports capacity-development efforts at the local level, but implementation obstacles exist.
- Regarding capacity development, the National Program for Community Empowerment (Program Nasional Pemberdayaan Masyarakat/PNPM) is a resource for some communities. PNPM Urban was founded in 2006-2007 with a mission to support community-driven development (CDD) and reduce poverty, with initial funding provided by the Indonesian government, the World Bank, and other international organizations. In recent years, its mission has evolved to support projects that mainstream disaster risk management (DRM) into planning by providing block grants to communities,[79(p131)] such that "PNPM Urban covers all urban wards in Indonesia."[79(p127)]

  PNPM dispenses grants to "facilitate local institutional development, capacity building, technical assistance, formulation of the Community Development Plan (CDP)."[79(p127)] As of 2016, PNPM Urban had allocated grants to 11,000 urbans wards, and PNPM Rural funded more than 60,000 rural villages.[79(p125)] In addition, since Indonesia has formally committed to aligning CCA and DRR with its development planning and policies, budgeting for DM-capacity development is likely embedded in planning budgets. The State budget (APBN) 2020 line item for the Ministry of National Development Planning (BAPPENAS) totaled 1,828,689,846,000 IDN (Rupiah).[71] Nevertheless, there remains a lack of capacity at local levels: "BNPB has continuously facilitated BPBDs and local DRR platforms to promote DRR at the village level…However, capacity to respond to climate-related disaster risks, has not been as significantly developed at the local level."[59(p8)]

DEDICATED EMERGENCY OR CONTINGENCY FUNDS

- Legal provisions exist to establish and maintain a contingency fund in Indonesia, but implementation challenges exist.
- "Ready funds" (also called On-Call budget) are stipulated by Regulation 22/2008 to be used during a disaster event, appropriated from the APBN for a national ready fund, and likewise from regional budgets (APBD) for regional ready funds (Articles 5,6). However, implementation challenges exist: There is a "need to ensure adequate financing at provincial and local levels, recognizing that there is an increasing tendency for calls to be made on the On Call budget for financing disaster-related programmes which should rather be included in provincial and local budgets."[59(p38)]

CONTINGENCY FUND LEVELS

- DM reserve funding exists but is less than 2% of national annual GDP and/or has fallen short of needs in the past, even when emergency appropriations have been passed in Indonesia.
- Indonesia has mandated disaster-contingency (preparedness) funds for pre-disaster measures, appropriated nationally from the APBN and regionally from the APBDs.[60 (Articles 5, 6)] According to a United Nations Development Programme (UNDP) survey,[80] Indonesian regional governments' average disaster management investments were below 1% of GDP, while a report from the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) found that from 2006-2012, disaster management funding fell between 0.38% and 0.69% of the national budget.[59(p38)]

2019 BNPB Budget	619,425,671,000 (IDR)
2019 GDP	16,499,355,731,317,548 (IDR)
BNPB Budget/GDP	0.03%

**BNPB budget is not all of DM funding*

CONTINGENCY FUND LIMITS

- The disaster reserve fund in Indonesia includes guidelines for access and provisions that limit non-disaster uses.
- The ready fund, designated for use during a disaster emergency, is limited for use of goods and services for disaster-emergency-response activities, as regulated by the the BPBD in the affected region, in accordance with guidelines established by the BNPB.[60 (Articles 1, 17)] Nevertheless, there is a recognized need to sufficiently capitalize and enforce regulatory compliance of regional ready funds due to a trend of provincial governments tapping the national ready fund inappropriately.[59(p39)]

  Head of BNPB Regulation No. 6A/2011 (rev)[81] regulates the allocation and utilization of On-all budget for three sub-phases in emergency phase:

  (1) Emergency preparedness; operational support, contingency plan, and mitigation activities;

  (2) Emergency response; SAR, evacuation, IDP management, temporary shelter, and food aid; and

  (3) Emergency transition; transitional/permanent shelter, recovery of critical infrastructure, and

  (4) Social-economic recovery.

  In addition, Regulation Number 22 of 2008, Concerning Disaster Aid Financing and Management [60 (Articles 13,14,16,17,20-22 & Ch 3-5)] and Head of BNPB Regulation No. 06 of 2008 Guidelines for Using the Ready Funds extensively codify the approved uses for funds and the procedures

for accessing the funds.[82]

EXISTENCE OF AND PUBLIC SUPPORT FOR CATASTROPHE-RISK TRANSFER

- A catastrophic risk-insurance market exists and is supported by the public sector in Indonesia.
- In 2019, catastrophic risk insurance was established by the Government of Indonesia after negotiations with 56 insurance companies resulted in a contract to insure government properties valued at roughly 11 trillion Rupiah (±769 million USD).[83] It is expected that more contracts, covering more government properties, will soon follow.[83] In addition, the government is said to be planning to establish catastrophe bonds as another instrument of support for post-disaster recovery.[84]
- Contracts to cover more public-sector properties are under development. However, regarding the private sector, "conventional insurance is Haram (forbidden) in Islam because it contains the element of Riba, Maisir, and Gharar."[85]

INSURANCE INDUSTRY OVERSIGHT

- The Government of Indonesia regulates insurance markets to ensure solvency.
- Solvency capital requirements for insurers and reinsurers in Indonesia are mandated by a series of laws and regulations, notably Law of the Republic of Indonesia Number 40 Year 2014 on Insurance.[86 (Chapter 10)]

AVAILABILITY OF LOW-INTEREST LOANS TO SUPPORT RECOVERY

- Low-interest loans to support recovery are only provided to a limited audience in Indonesia.
- Regarding the availability of loans for households, businesses, or NGOs affected by a disaster, the Financial Services Authority (OJK) has established provisions for restructuring loans for those having difficulty making payments on *existing* loans via the Financial Services Authority Regulation (POJK) No. 45/POJK.03/2017: Special Treatment of Credit or Bank Financing for Certain Areas in Indonesia Affected by Natural Disasters.[87] Recently, State-owned banks have restructured 1.84 billion IDN (Rupiah) to ease the financial pressure caused by COVID-19.[88] There are four State-owned banks in Indonesia: Bank Mandiri, Bank Rakyat Indonesia (BRI), Bank Negara Indonesia (BNI), and Bank Tabungan Negara (BTN). However, there is no evidence of a low-interest loan program that supports recovery expenses for disaster victims. Regulation 22/2008 stipulates soft loans for "productive businesses" shall be available to persons affected by disaster.[60 (Articles 24, 27)] However, there is no evidence of the operationalization of this edict. Some of the World Bank's foreign aid programs are meant to reach the household level[89] (but these are not backed by the Indonesian government).

AVAILABILITY OF MICROFINANCE CREDIT SCHEMES

- The Government of Indonesia supports microfinance credit schemes through formalized arrangements and structures.

- According to BNPB, "micro insurance and micro financing programs undertaken by the government and private sector have had limited penetration, and only in some areas"[59(p39)] and "some provinces…offer tax-cuts to disaster affected people. This is helpful for the middle class to recover from disaster shocks. However, it does not support those trapped below the poverty line and marginalized sections of society who are outside the tax bracket."[59(p39)] According to the Center for Public Impact (CPI), "30,000 microcredit groups were funded" for community infrastructure via the National Programme for Community Empowerment (PNPM).[90] However, PNPM funding is not always explicitly or exclusively directed to disaster-hit regions.

GUIDELINES FOR DISASTER-RELIEF DISBURSEMENT

- Assistance mechanisms exist for distribution of relief funds to lower jurisdictions, but guidelines are informal or untested in Indonesia.

- BNPB's Regulation No. 06.A 2011, Guidelines for the Use of Ready Funds in Disaster Emergency Status[81] and Regulation No. 06 of 2008 Guidelines for Using the Ready Funds[82] provision for the allocation and uses of disaster-relief funds to impacted regions. Regulation 22/2008 stipulates that regional governments are financially responsible for the rehabilitation and reconstruction of a community, province, or region impacted by disaster. However, if the regional budget does not provide enough assistance, then the affected community/city/region may request further assistance from the national government by way of the BNPB in the form of grant-patterned social assistance funds.[60 (Articles 1, 6, 23)]

  Despite the comprehensive legal mandates for financing regional post-disaster efforts, in 2015 the Secretary General (Ruswandy) of the BNPB acknowledged that the previous five years had exposed weaknesses that had impeded the mobilization of post-disaster financing: "a) There is no sufficient and specific funding for Rehabilitation and Reconstruction; b) There is no an overall policy framework for Rehabilitation and Reconstruction; c) There is still lack of clarity in its implementation mechanism."[79 (Chapter 2, p. 4)] Ruswandy said that the grant-patterned social assistance funds had been plagued with such difficulties due to legal and bureaucratic miscommunications.[79] These bureaucratic issues have caused serious delays and disruptions for regions that have experienced disaster.[79]

  Problems in securing disaster-relief funds for municipalities were likewise identified in "Indonesia's Disaster Risk Management Baseline Status Report 2015." described as "institutional weakness[es]" regarding the Regional Disaster Management Agencies (BPBDs); e.g., the lack of experience and/or training in disaster management among personnel.[59(p46)] Law Number 27 of 2014, Concerning the Indonesian Budget for Fiscal Year 2015 (Law 27/2014), stipulates that the

State "may" provide grants to regional governments for rehabilitation and reconstruction for post-disaster purposes.[66 (Article 16)] An additional fund, beyond State allocations to the education budget, called the Education Development Fund (DPPN), is earmarked for post-disaster rehabilitation of affected education facilities.[66 (Article 16)]

If a regional authority has exhausted its regional funds but is still in the midst of relief operations, they may apply for access to the national Ready Fund by submitting a report that shall include "number of victims, damage, loss and assistance required."[82 (Chapter 3)] Subsequently, "money, goods, and/or services" may be disbursed whilst "evacuation services and rescue for volunteers, distribution of assistance" and other relief requests may require additional paperwork and/or oral approval by the Head of BNPB.[82] Monitoring and accountability are a part of this process, including sanctions for misuse of any disbursements.[82 (Chapter 5)]

In addition, Mechanisms are in place for the allocation of international aid. Indonesia Multi-Partner Fund Facility for Disaster Recovery (IMDFF-DR) is available once "Government led Post-Disaster Needs Assessments" determine that international assistance is needed.[91] Two funding streams are involved here, "one supported by the United Nations and one with the World Bank."[91]

STRATEGIES

STRATEGIC PLANS AND POLICIES

- Standalone or distinct DM and DRR strategic plans (strategies) and policies exist for all DM phases in Indonesia.
- According to Law 24/2007[1] and Government Regulation 21/2008,[3] GoI must prepare DM plan documents and streamline them into the National and Regional Development Plan. The plan shall be updated every five years and reviewed every two years. For the period of 2006-2012, GoI published two iterations of the RENAS-PB.[92,93] It then evolved into two iterations of the (RENAS-PB) for the periods 2010-2014[94] and 2015-2019.[61] All national planning documents are prepared through coordination of the State Ministry of National Development Planning/BAPPENAS with the BNPB, involving relevant ministries and institutions at the national level, as well as relevant stakeholders, such as universities, donor institutions/countries and NGOs related to DRR.

  In December 2018, in concert with the 2015-2030 Sustainable Development Goals (SDGs) effort as well as the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030, a Disaster Management Master Plan (RIPB) 2015-2045[18] was published in line with the vision and mission of the National Long-Term Development Plan (RPJPN) 2005-2025[95]. The RIPB 2015-2045 also served as a policy input for the preparation of RPJPN 2025-2045.[96] DRR is specifically mentioned in Chapter 7 of Technocratic Design of National Medium-Term Development Plan Document (RPJMN) 2020-2024[14], which includes building the environment, improving disaster

resilience, and addressing climate change. The RIPB 2015-2045 is also the main reference for the preparation of the RENAS-PB for 2020-2024 and 2025-2029.

STAKEHOLDER ENGAGEMENT

- DM and DRR strategic plans are inclusive of and developed in coordination with relevant Indonesian stakeholders, including NGOs and the private sector.
- The Head of BNPB Regulation 4/2008 elaborates on the Disaster Management Planning Guidelines, including involvement of DM stakeholders within the process.[97] The main substance of RENAS-PB is complemented by a disaster risk assessment based on location and types of disasters involving 12 universities and validated through a series of public discussions with ministries and institutions.[61] The recent RIPB 2015-2045 was compiled jointly between the BAPPENAS and the BNPB.[18] This process included a review of performance achievements in disaster management; focus group discussions with relevant ministries and agencies; in-depth consultations with disaster experts and DM actors at local, provincial, national, and international levels; and public consultations with community representatives.

STAKEHOLDER GUIDANCE

- Guidance is provided through a combination of self-directed and facilitated means (e.g., support from technical staff), and guidance is provided to the full spectrum of Indonesian disaster management stakeholders.
- At the outset, early DM guidance was put forth via Government Regulation 21/2008 concerning the Implementation of Disaster Management.[3] Most of the technical guidance provided by BNPB is contained in the Regulation of the Head of BNPB; e.g., Regulation 3/2008 concerning the formation of BPBD,[6] Regulation 11/2014 concerning community participation,[98] or Regulation 12/2014 concerning private-sector participation.[34] Various capacity building activities, including training and development of guidelines, have been implemented to support both DM and DRR efforts. According to Government Regulation 21/2018, one key task is to provide education and training (Article 5). Training is intended to increase awareness, ability, and community preparedness in facing disasters. The Head of BNPB also published two regulations: Regulation No 14/2009 regarding general guidelines for organizing DM training[99] and Regulation No 4/2016 regarding the education and training of disaster managers.[100] To support capacity building across the DRR and response ecosystem, BNPB also established a Disaster Management Training and Education Center (Pusdiklat PB) that has the task of carrying out the implementation of general policies in the field of education and technical-disaster training. Pusdiklat PB has a structured curriculum based on the results of needs analysis, which includes competency standards, indicators of competency achievement, education and training methods, and learning media and resources. The training that is provided by the Training and Education Center is available to BNPB officials and public- and private-sector experts. Pusdiklat PB can work with agencies, institutions, and organizations that carry out disaster management both on a national and international scale.[101,100]

POLICY SUPPORT OF DRR INTEGRATION

- Indonesia's DRR and DM policies ensure adequate integration of national goals in development, planning, recovery, and reconstruction, and ensure integration and coordination with CCA and SD policies and goals.
- Article 6 of Law 24/2007 concerning Disaster Management specifically states that government responsibilities include reducing disaster risk and integrating DRR with development programs.[1] Article 7 1b also states that the GoI is authorized to craft development plans that incorporate elements of DM policies. Article 36 notes that BNPB must prepare the DM strategic plan, and Article 6 of Government Regulation 21/2008 indicates that the plan shall be part of the national development planning document.[3] The detailed guidance is described in Head of BNPB regulation 4/2008 concerning Guidelines for Preparing Disaster Management Plans.[97]
- DRR has been mainstreamed via policies, budgeting, and planning at the national and local level. Mainstreaming DM and DRR in development planning has been set out since the release of Medium Term Development Plan/RPJMN I (2004-2009), which focuses on "Building the nation's commitment to disaster management"; RPJMN II (2010-2014), which focuses on "Laying the foundation of the disaster management system"; and RPJMN III (2015-2019), which focuses on "Increasing the effectiveness of disaster management." [102,103,104]

DRR AND DM POLICY INTEGRATION PROGRESS

- DM and DRR policy goals are integrated across all of Indonesia's government and are widely socialized.
- Law 24/2007, Article 6.4 mentions that Disaster Management plans are also required at the local level (provincial and city/regency).[1] Specific guidance for DM plans at local levels is described via the Head of BNPB regulation 4/2008 regarding Guidelines for Preparing Disaster Management Plans and the Local Action Plan-Disaster Risk Reduction (RAD-PRB).[97] Each of these DM plans is an activity related to prevention, mitigation, and preparedness included in the Regional Long-term Development Plan (RPJPD), Regional Medium-term Development Plan (RPJMD), and the annual local Government Work Plan (RKPD).

MITIGATION MANDATES IN DRR POLICIES

- Explicit DRR policies exist in Indonesia that mandate mitigation-planning requirements.
- Per Article 44 and 47 of Law 24/2007[1], the implementation of disaster management in situations where there is a potential for disaster to occur includes: (a) preparedness; (b) early warning; and (c) disaster mitigation. Specifically, Government Regulation 21/2008[3] article 20 states that:

  (1) Disaster mitigation is carried out to reduce the risks and impacts caused by disasters to communities in disaster-prone areas.

(2) Disaster-mitigation activities are carried out through:

Spatial planning and implementation based on disaster-risk analysis. Law 26/2007 concerning Spatial Planning was prepared recognizing the reality that geographically the Unitary States of the Republic of Indonesia is in a disaster-prone region and that spatial planning based on disaster mitigation is needed to improve the safety and comfort of life and livelihoods.[65] The law was followed up by Government Regulation 15/2010 concerning the Implementation of Spatial Planning,[105] which mandated the collection of data on disaster-prone areas during the drafting the National Spatial Plan to help inform evacuation procedures. In Law 27/2007 concerning the Management of Coastal Areas and Small Islands, disaster mitigation is specifically outlined in Chapter 10 (Articles 56-59).[106] It states that in preparing management plans and utilization of integrated Coastal Areas and Small Islands, national and/or local government entities are required to include and implement sections containing disaster mitigation according to their type, level, and region. Such efforts must also involve local communities and pay attention to social aspects, the economy, community culture, environmental sustainability, usefulness and effectiveness, as well as the scope of the area. Disaster mitigation can be done through structural, physical and/or non-structural/non-physical activities, which are further detailed in Government Regulation 64/2010 concerning Disaster Mitigation in Coastal Areas and Small Islands.[107]

Development arrangements, infrastructure development and building management. Although mitigation was not explicitly stated in Law 28/2002 (concerning Buildings), Article 30 stated that evacuation access in an emergency situation must be provided inside the building, including warning systems for users, emergency exits, and evacuation routes in case of a fire and other disasters, except residential homes. Article 7 point 5 states that the administrative and technical requirements for traditional buildings, semi-permanent buildings, emergency buildings, and buildings built in the disaster area are determined by the local government in accordance with local social and cultural conditions. Local governments can delineate a disaster area via considerations of safety and security in the public interest, or can establish specific requirements for development procedures if the area has been assessed as not dangerous.[108]

Organizing education, training, and counseling, both conventional and modern. Head of BNPB Regulation 14/2009 specifies general guidelines on managing disaster management training, noting that participants in DM training can be government officials or members of the community and private-sector business institutions. As such, training is an effort to mitigate disasters by increasing the capacity of DM actors and potentially affected subjects within the community.[99]

As part of the enforcement mechanism, Chapter XI (chapters 75-79) on Law 24/2007 describes various criminal provisions in these situations:

(a) Negligence is carried out in any development activities that have a high risk of causing a

disaster and resulting in the death or loss of assets or property;
(b) Anyone who deliberately impedes BNPB's easy access in a state of disaster emergency; or
(c) Anyone who deliberately misuses the management of disaster relief resources.

Provisions regarding sanctions for violations are also described in Chapter VIII of Law 26/2007 and Chapter XVI of Law 27/2007.

CONSIDERATION OF GENDER AND VULNERABLE GROUPS IN STRATEGIES AND POLICIES

- The specific needs of Gender and Vulnerable groups are considered across Indonesian national-level strategies and policies, but implementation challenges remain.
- It is clearly stated in Chapter 3.1.C of Law 24/2007 concerning Disaster Management that all DM activities are based on equality in law and government, which means that DM policies must be equitable to stakeholders from all backgrounds regardless of religion, ethnicity, race, class, gender, or social status[1]. The Head of BNPB regulation 13/2014 concerning Gender Mainstreaming in Disaster Management is drafted to: (1) implement the principles of justice and gender equality in every component of disaster management; (2) encourage gender mainstreaming by developing gender-responsive planning and budgeting in disaster management; and (3) encourage the realization and protection and fulfillment of women's and men's rights in disaster management.[109]

PUBLIC CONFIDENCE & POLITICAL SUPPORT

SUPPORT FROM TOP GOVERNMENT OFFICIALS

- Indonesia's national leadership champions DM and DRR activities, including activities associated with preparedness and mitigation.
- The President's commitment to the DRR agenda in Indonesia is realized by allocating expanded budgets to educate and mitigate natural disasters. During the APBN meeting in January 2019, the President instructed the relevant staff to begin introducing and providing education on disaster mitigation in early-educational content. The initial introduction to disaster mitigation is expected to increase the knowledge of students and the public about the actions that must be taken when a disaster occurs.[110]

  In the National Disaster Management Coordination Meeting in February 2019, the President also presented six disaster-related points:[111]

  (1) Every development plan should be based on aspects of disaster risk reduction.
  (2) Academics and disaster experts should be involved in researching, studying, and analyzing potential disasters and disaster-prone areas.

(3) Local governments are asked to increase preparedness in the event of a disaster.
(4) Indonesia must be able to develop and maintain an integrated early warning system.
(5) Disaster education for the community, at school, and through religious leaders needs to be implemented immediately, especially in disaster-prone areas.
(6) Periodic and regular disaster management training simulations are needed to continually remind the community at the lowest level.

These points were also stated in the 2015-2045 Disaster Management Master Plan launched at the end of 2018.[18]

SUPPORT OF THE LEGISLATURE

- Standing Indonesian legislative committees have a central focus on DM and DRR.
- Within the framework of the legislative organization, DM is handled by the House of Representatives Commission VIII, which works in direct partnership with the BNPB. This commission is one of 11 Commissions in the Indonesian Parliament. In addition to Disasters, this commission also deals with Religion, Social Affairs, Women's Empowerment, and Child Protection along with other advisory committees with a central focus on DM and DRR. The SDG Working Committee also promulgates DM and DRR policy.[69]

INTERAGENCY AND MULTI-STAKEHOLDER INPUT IN THE LEGISLATIVE PROCESS

- Government of Indonesia committees facilitate interagency and multi-stakeholder input in the legislative process.
- Commission VIII has eight main partners at the ministerial level , namely: (1) the Ministry of Religion; (2) Ministry of Social Affairs; (3) the Ministry of Women's Empowerment and (4) Child Protection; (5) National Disaster Management Agency; (6) National Amil Zakat Agency; (7) Indonesian Waqf Board; (8) Indonesian Child Protection Commission; and (9) Hajj Financial Management Agency. However, in the drafting of these regulations, discussions were also held with the Local Representative Council, the President, various institutions and ministries and other parties. Every proposed bill is required to be completed with content and text supported by academics.[69,112,7]

PUBLIC SUPPORT OF DRR PROVISIONS

- The Indonesian public supports a majority of DRR provisions, even when they result in increased national spending, increased costs, or a potential loss of some other benefit.
- So far, there has never been a public response (through civil society, academics, and observers) that disputed the amount of DM funds. In 2019, the House of Representatives Commission VIII approved a 2020 Budget Ceiling of Rp 700.664 billion for the operational costs of the BNPB.[113] In addition, the emergency-response budget of up to 5 trillion Rupiah was also

included in the 2020 State Revenue and Expenditure Budget (APBN).[114,115] Overall, DM funds were distributed to several ministries and institutions. Mitigation or prevention funds are also distributed to the Meteorological Climatological and Geophysics Agency (BMKG), the Technology Assessment and Application Agency (BPPT), and the Geospatial Information Agency (BIG).

At the end of 2019, BNPB announced that it had used an emergency-response budget of 6.75 trillion Rupiah.[116] The biggest allocation was leveraged for forests in a number of areas totaling 3.42 trillion Rupiah. The rest was used for disaster management, including but not limed to the earthquake in Nusa Tenggara Barat Rp. 318 billion; the earthquake and tsunami in Central Sulawesi Rp. 337 billion; floods and other landslides Rp. 216.9 billion; other earthquakes Rp. 22.5 billion; volcanic eruptions Rp. 20.4 billion; and the Banten tsunami Rp. 13.2 billion. Lastly, though the GoI Ombudsman Office has delivered several criticisms regarding BNPB's budget utilization and performance related to issues such as disaster mitigation, bureaucratic process, authority during emergency response, and post-disaster handling, public support remains steady for BNPB's DRR efforts.[117]

PUBLIC CONFIDENCE IN DM AND DRR ENTITIES

- The Indonesian public is confident in the capabilities and capacity of DM agencies.
- Since BNPB's founding 12 years ago, its capacity, capability and leadership in disaster management have increasingly matured. One indicator that can be used to assess the public's confidence in the capabilities of BNPB is social media receptivity and growth in collaboration with journalists from local, national, regional, and international media.[118,119]

POLITICAL APPROVAL RATINGS

- Approval ratings are collected unsystematically in Indonesia, and public support is not an important factor in DM decision making.
- To date BNPB has not conducted many public surveys on performance. But the mechanism will soon be implemented as part of the guidance of the Government Bureaucracy Reform. Public sentiment is measured through news publications from the mass media. For example, a January 2020 analysis of 1,814 DRR- and DM-related news items revealed 1,453 positive news stories, 360 neutral, and 1 negative. Thus, the lion's share of news regarding BNBP and the DM cohort was positive or neutral, with very little negative content.[119]

ATTITUDES, ENGAGEMENT, AND EXPERIENCE

PRACTICAL EXPERIENCE OF THE JURISDICTION

- Indonesia experiences a handful of major disasters requiring interagency and/or extra-jurisdictional

coordination every year.

- Data collected across Indonesia from 2008 (when BNPB was established) to 2019 revealed an annual average of 2,770 disasters, 1,262 fatalities/losses, 10,961 injuries, and 2,495,738 people evacuated (DIBI). When a major disaster occurs, regional BPBDs and BNPB coordinate with multiple agencies depending on the type of disaster and the needs of the affected population. For earthquakes, extreme weather, and climate anomalies, BMKG is the lead national agency. PVMBG will be engaged for landslides or volcanic eruptions. Large-scale incidents that impact agricultural areas and livelihoods will incorporate experts from the national Agriculture Office or the Ministry of Agriculture. When disasters affect more than one city, regency or province, coordination is also carried out among local governments and between countries if the incident affects neighboring nations (e.g., forest fires, tsunamis).[120]

PRACTICAL EXPERIENCE OF THE LEAD DM OFFICIAL

- BNPB's leadership coordinated a major disaster requiring or in provision of extra-jurisdictional assistance during the previous year but has held their position for less than three years.
- In the past three years (2017-2019), there have been several priority DM activities, including:

(1) *Land and forest-fire disasters in six provinces in Sumatra and Kalimantan (2019*). BNPB's experience herein included:
Providing assistance in handling emergency preparedness to local governments (provincial and regency/city), in the form of managerial assistance, equipment, and budget;
Activation of command posts in provinces and districts/cities that are coordinated with BNPB's EOC;Providing (establishment & and financing) air operations (air patrols; water bombing in Sumatra and Kalimantan; and weather modification (cloud seeding) activities in South Sumatra, Riau, West Kalimantan and Central Kalimantan);
Providing financial support to the organization handling land-based fire fighting and law enforcement- Formed an Emergency Task Force consisting of BPBD, TNI, POLRI, and community leaders totaling 9,072 personnel in six affected provinces; and
Providing support in the form of equipment for forest and land fire handling operations;

(2) *Earthquake in West Nusa Tenggara Province (2018).*
The earthquake resulted in the 564 deaths, 1,584 injured, and 396,032 residents displaced. A total of 222,530 housing units were damaged: 75,195 were slightly damaged, 32,829 moderately damaged, and 114,506 heavily damaged. The total value of damage and loss in seven regencies/cities was IDR 18.13 trillion. In 2018, the President of the Republic of Indonesia issued Presidential Instruction No. 5 of 2018 concerning the Acceleration of Rehabilitation and Reconstruction of Earthquake Disasters in West Lombok Regency, North Lombok Regency, Central Lombok Regency, East Lombok Regency, Mataram City, and affected areas in West Nusa Tenggara Province. BNPB has channeled Emergency Funds (DSP) to assist in the rehabilitation and reconstruction of earthquake-affected houses. After

the Emergency Response Period ended, the Nusa Tenggara Barat Provincial Government determined the status of the Emergency Transition to Emergency Recovery and Repair until 31 December 2019, with priority for the basic needs of the displaced community and continued improvement of vital infrastructure and facilities, as well as housing repairs. By the end of 2019, all funds for home improvement had been distributed. Of the total 188,863 damaged housing units, 135,203 (71.6%) have been successfully repaired; the remaining 53,661 units (28.4%) are still under repair and construction.

(3) *Earthquake and Tsunami in Banten Province and Lampung Province (2018)*.
The tsunami disaster occurred in the Sunda Strait on the night of December 22, 2018. BNPB continues to provide assistance to provinces and cities in an effort to accelerate post-disaster recovery. BNPB has channeled emergency funds for handling the emergency transition to recovery for South Lampung in the amount of 6.8 billion Rupiah.[121,5]

PUBLIC ENGAGEMENT IN DM

- The Indonesian public is actively organized and engaged in DM efforts via exercises, neighborhood watch or planning groups, community emergency-response teams and brigades, etc.-
- Public participation at the community level in DM activities has been around for centuries and has become part of the culture of Indonesian society. Volunteerism is an essential part of Indonesian life. "Mutual cooperation" is at the heart of community volunteerism and has been used by communities for disaster risk management. The Bahasa translation of "mutual cooperation" roughly corresponds to the term "gotong", which means "work", and "royong", which means "together." However, the biggest gap that needs to be filled is scientific knowledge of various hazards that is translated into more down-to-earth language so that people understand the risks easily. The community also needs to be introduced to early warning systems via expanded communication with authorities.

  The use of communication technology (cellphones, smart phones, walkie talkies, etc.) and the introduction of disaster sensor technology are also important in certain contexts. Mutual cooperation has been accomplished via formal DM actors, such as the central and local governments, BNPB, BMKG, PVMBG and BPBD, NGOs, academia, religious institutions, and international organizations to leverage both local, community DRR wisdom, and combine it with modern science and technology. These activities occur throughout Indonesia both in villages and in cities through the Disaster Resilient Village (DESTANA), Disaster Preparedness Cadets (TAGANA), DRR Forum, and other programs. In some villages, forums were also formed with the theme of "Adaptation to Climate Change and Disaster Risk Reduction"; e.g., the API-PRB Forum (CCA-DRR Forum), which addresses both disasters and climate risks. Private entities are also involved in mutual cooperation via Corporate Social Responsibility (CSR) funding and initiatives. DM actors are now aware that most disasters that have arisen in Indonesia are very local in nature and for this reason place the community as the center of DM and DRR efforts.[59]

PRIVATE-SECTOR ENGAGEMENT IN DM

- The business community actively participates in BNPB disaster management exercises, events, and trainings, and business associations report a high utilization of business continuity and emergency planning among members.
- As mandated in Law 24/2008 chapter 6, business institutions are encouraged to carry out disaster management, both individually and jointly with other parties. They are obliged to submit reports to the government and agencies involved in disaster management and inform the public transparently.[1] They are obliged to heed humanitarian principles in carrying out their economic functions in disaster management. The participation of the private sector in the implementation of disaster management is regulated via the Head of BNPB Regulation 12/2014.[34] Private-sector actors also play a key role in developing the national action plan for disaster risk reduction (Government Regulation 21/2008 Article 8.3) and meeting basic needs (Article 52.2). The private sector can also play a role in preparedness activities (Article 16.3).[3]

  The participation of the private sector in the implementation of disaster management covers pre-disaster, emergency, and post-disaster stages, as detailed in the Head of BNPB Regulation 12/2014. This private-sector participation aims to support the strengthening of disaster prevention, emergency response, and rehabilitation activities in an effective and accountable manner. Pre-disaster activities include: (1) introduction and monitoring disaster risk; (2) participatory planning of disaster management; (3) improvement of disaster-aware culture; (4) organizing, installation, and testing of early warning; (5) organizing, counseling, training, and simulation of emergency response; (6) dissemination of information regarding disaster warning and preparation of evacuation routes; and (7) other activities to reduce or eliminate disaster risk. Supporting activities during emergency responses include: (1) search and rescue, and evacuation of victims and property; (2) fulfillment of basic needs; (3) protection and management of refugees and vulnerable groups; (4) rescue and recovery of vital infrastructure and facilities; and (5) other activities that are carried out immediately in the event of a disaster.

  Post-disaster activities include: (1) post-disaster needs assessment (PDNA) and preparation of action plans for rehabilitation and reconstruction; (2) improvement of the environment, infrastructure, and public facilities, and the provision of assistance for home improvement; (3) health services and social, psychological, and socioeconomic recovery of the community; (4) reconstruction of community environmental and social facilities and infrastructure; (5) improvement of social, economic, and cultural conditions; (6) monitoring the implementation of the rehabilitation and reconstruction action plan for the target group; and (7) other activities in the form of repairing and restoring all aspects of public or community services to an adequate level, as well as rebuilding all facilities and infrastructure institutions in post-disaster areas.

  In practice, the private sector has long been involved in disaster management. Usually, the private sector cooperates with other stakeholders, such as NGOs, donors, universities, researchers, or the government in carrying out DM activities. At least 17 large, national private companies are

listed in the PLANAS PRB directory as entities that are experienced in DM.[38] Beyond that, many other large, medium, small, and MSME companies not listed in the PLANAS DRR directory still participate in DM activities. Even so, according to 2017's PLANAS PRB report, only about 2% of business institutions have an understanding of DRR frameworks.[122] Some private-sector entities have already adopted a "Beyond CSR" concept and play a role in channeling aid funds through CSR programs, which also protect their supply chains from natural disasters.

Examples of private party CSR and DRR efforts include a poultry company in East Java that helped communicate climate risks and hydrometeorological threats, such as floods and landslides, to the small farmers in Blitar Regency who are their suppliers. Some activities have integrated DRR with CCA. In 2018, ACA Insurance and South-East Sulawesi Bank collaborated with BMKG, USAID, and the regional governments of Konawe Selatan and Southeast Sulawesi districts in organizing Climate Smart Agriculture activities. These were aimed at increasing the resilience of corn farmers to extreme weather and climate threats by promoting good agricultural practices and weather- and climate-information training. Thus, farmers can maximize their agricultural output and reduce the impact of extreme weather and climate risks. This will increase the sense of security for the bank to distribute microcredit products, which are covered by insurance protection. Another example is Multi Bintang Indonesia, a beverage producer in East Java through a program called Nabung Banyu (Save Water), water- conservation and risk-mitigation initiatives in the Brantas watershed. The watershed is vulnerable to landslides, flooding, and other disasters, largely as a result of years of unsustainable land use. The program includes regreening on the slopes of Mount Welirang, as well as education and income-generation initiatives.[40,123]

Business owners in the tourism sector have also played a role in mitigating tsunami disasters by providing evacuation-route facilities, training to surrounding communities, and implementing evacuation SOPs for all employees whenever early warning information from BMKG is issued. Bali has succeeded in encouraging cooperation with Bali's PHRI (the hotel union throughout Indonesia) to certify hotels for disaster preparedness.[124] This agreement was also followed by West Nusa Tenggara, where the DRR Forum in NTB was a catalyst. Finally, the example of how Susi Air successfully distributed aid in an isolated area during the 2004 Indian Ocean Earthquake and Tsunami is instructive. Shortly after the earthquake and tsunami struck Aceh Province, Ibu Susi Pudjiastuti (owner of PT ASI Pudjiastuti Aviation, which operates Susi Air), together with her husband and their team, led a humanitarian flight via Cessna Caravan to the tsunami-affected area of Simeulue Island, which had not been reached by commercial aircraft. They were the first team to successfully distribute aid in an isolated area. After that, many other aid agencies, including foreign agencies, used their services to distribute other assistance.[125,126] Pudjiastuti would later serve as Indonesian Minister of Marine Affairs and Fisheries.

HOUSEHOLD PREPAREDNESS

- No assessments or surveys of Indonesian household or individual disaster preparedness are

conducted, or if they are, less than 25% of households report adequate preparedness.

- Starting with the 2019 Disaster Preparedness Day event with the theme "Women become Disaster Preparedness Teachers, Houses become Schools," the role of women as pillars in the household was assessed in an effort to respond to family-level disasters. This was followed by the Disaster Resilient Family program (KATANA), which was launched in December 2019 as a form of family preparedness in facing disasters. However, due to the COVID-19 pandemic, progress has been hampered.[127,128]

DISASTER GOVERNANCE MECHANISMS

PLANS & PROCESSES

DM PHASES ADDRESSED IN PLANS

- Indonesia's formal plans and DM standard operating procedures address the phases of response, disaster risk reduction (mitigation), and long-term recovery/reconstruction.
- The Government of Indonesia is committed to implementing the Sendai Framework for Disaster Risk Reduction. All phases are addressed in the RENAS-PB 2015-2019[18]. Recognizing that there are millions of people still living in disaster-prone areas, the national and local governments jointly address mitigation through increased disaster preparedness and mitigation efforts in the community. DRR (mitigation) is the focus of the DRR Forums consisting of representatives from the national government and businesses and community leaders.[130] To further the country's DRR strength, these forums have also been formed at the lower governmental levels.[5,61] The government's commitment to DRR is evident in its establishment of long-term as well as medium-term development plans.[95,104]

COORDINATION OF GOVERNMENT DISASTER PLANS

- Plans guide disaster management activities across all of Indonesia's DM agencies.
- Law Number 24 of 2007 is the main legal document guiding disaster response in Indonesia.[1] National and regional governments are required to obligate staff to implement harmonized disaster management planning. The DM structure includes the integration of BPBDs at the provincial, regency, and city levels, recognizing that this decentralized government structure strengthens Indonesia's overall DRR capability.[61] DRR Forums at national and lower government levels were created and promote DRR awareness and encourage mainstreaming, coordination, and sharing of data and information.[130] However, there are more than 500 BPBDs, and many still

don't have disaster management plans. As a result, the synchronization of government programs and activities with local governments exists but is very weak. Efforts to increase the number and capacity of BPBDs to strengthen DRR capacity are greatly hindered by a limited budget.

CONTINUITY OF OPERATIONS (COOP) AND CONTINUITY OF GOVERNMENT (COG)

- COOP and COG planning are required but plans in Indonesia remain under development or are untested.
- Given the broadest sense of the definition of COOP and COG, Law 24 of 2007 sets the foundation for the establishment of the BNPB, whose authority is equal to other federal government ministries.[1] Given this level of authority and mandate to manage emergency response and disasters, this agency's operations play the biggest role in ensuring Indonesia's COG. Through BNPB collaboration with the National Standardization Agency (BSN), the Disaster Management Technical Committee was created providing guidelines for incident preparedness and operational and governmental continuity.[130] The compilation of these guidelines represents the consensus of various expert, government, non-government and private consumer stakeholders. Included in this guidance document is the strategy to test and practice through realistic, simulated scenarios via tabletop exercises. One of the BNPB strategic goals is to strengthen preparedness and the resilience of emergency-response operations.[61] This strategy to strengthen coordination acknowledges the need for contingency planning by articulating the importance of building a database and framework for all resources.[130]

ROLES AND RESPONSIBILITIES DEFINED BY PLANS

- Indonesia's DM plans and SOPs identify roles and responsibilities for each level of government from local, to regional and national actors.
- Although BNPB doesn't have authority over the subnational BPBDs, all are part of one system and play a vital role as an extension of BNPB's reach into the communities. Information, including event-situation reports, are passed between the BNPB Emergency Operations Center (EOC) and the provincial BPBD EOCs. In turn, the provincial BPBDs push/pull information with the district BPBDs. All BPBDs serve as field offices when BNPB staff are deployed to support disasters in those communities.[131]

  The National Disaster Management Plan details the leadership model of Sapalibatism. The model acknowledges that the intent is not to strengthen the central government so as to create a dependency or to take over the local government, as this will ultimately weaken the strength of the local government. Practicing this model, all stakeholders are expected to participate in discussions, as Sapalibatism embraces coordination and interdependence to achieve a common goal.[61] This mirrors the global UN, IFRC, et al., focus on what is termed "localization."

DEFINITION OF THE DECLARATIONS PROCESS

- A declarations process exists in Indonesia's disaster management plans, SOPs, or other official documentation, but in practice declaration remains ad hoc.
- Indicators for determining the status and level of national and local disasters include the number of victims, loss of material possessions, damage to facilities and infrastructure, the extent of the affected area, and socioeconomic impacts.[1] The declaration process begins at the local government (district/regional) level, where officials can declare a disaster when warranted. Governors in the provincial government can declare a "Governor's Decree," which indicates that they need national government assistance. The decision to declare a national disaster resides with the President; however, a declaration at the national level is very rare. The last two declarations were the 2004 Indian Ocean earthquake/tsunami in Aceh and the 2020 COVID-19 pandemic.[131] Law Number 24 of 2007 provides a foundation for the declaration process that drives DRR plans and SOPs.[1]

ACCESSIBILITY OF PLANS AND PROCESSES

- Some, but not all of Indonesia's plans and processes are publicly available.
- The BBNPB website hosts a wealth of information, including a variety of publications and national plans. However, there don't seem to be regular website updates, resulting in broken links to some documents. Though BNPB largely shares the national plans and processes with the public, subnational plans and processes are not easy to find on publicly available websites.[132]

GOVERNMENT PROMOTION AND COORDINATION OF DM PLANS WITH DM STAKEHOLDER COMMUNITY PLANS

- The Indonesian DM stakeholder community maintains sectoral and/or facility plans that are coordinated with government DM plans, e.g., for hospitals, schools, power plants, and prisons.
- Law Number 24 of 2007 sets the basis for the participation and partnership of public and private sectors in DM activities and acknowledges that including the private sector in the government process strengthens DRR overall throughout the country. A paradigm shift mandated in Law 24/2007 gave rise to the increase of community participation and partnerships with NGOs.[1] Businesses are an integral part of disaster management in Indonesia and are expected to adjust their activities to adhere to national DM policy, including transparency with the public.[61]

  In practice there are numerous network forums at the national, provincial, district, and city levels that also include community-based business members. Through these networks, community partners participate in activities such as DRR planning, implementation, monitoring, and evaluation, and are very much a part of the DRR process.[61] Planning guidance regarding the educational sector can be found in the Head of BNPB Regulation 4 of 2012 and 33 of 2019.[133,134] A program called SPAB (Disaster Safe Education Unit) highlights an effort to prevent and mitigate the impact of disasters in schools. Guidance for the health sector is found in Ministry of Health Regulation 64 of 2013 Concerning Health Crisis Management.[135] BNPB continues to actively advance coordination with stakeholders as during a recent 2020 National Disaster Management

Coordination Seminar, where multi-agencies were invited to discuss solutions and strategies for disaster management in Indonesia.[136]

MUTUAL AID AGREEMENTS

- Mutual aid agreements exist to support DM efforts in Indonesia, but they are informal, unwritten, or unsigned.
- Throughout Indonesia, the common underlying DM approach is that when one region is affected by disaster, others will reach out to help. The government encourages "one country and nation." Government and communities are encouraged to cooperate and not compete with one another by providing assistance, which will ultimately build national resilience. According to the National Disaster Management Plan, when disaster events happen, each district/city government is responsible for DM in its area. Each local-level government has its own DM budget (typically annual) that includes the BNPB operational budget and all pre-disaster activities.[61]

  Concurrently, provincial governments mobilize their assets to potentially help the affected areas. Governments in the surrounding regencies/cities are expected to provide assistance to the affected area. The national government is available to support every disaster, as needed, and allocates funding to support the local governments, especially during the response period. Guidance for mutual-assistance agreements is provided by the national government,[137] which recommends written, reviewed ,and signed agreements that detail funding and costs. In practice though, most DM agreements are informal.

INTERNATIONAL MUTUAL AID AGREEMENTS

- Formal mutual aid agreements have been established at the bilateral/global/regional level with Indonesian DM and DRR stakeholders.
- Receiving international assistance is not dependent on a presidential declaration. The 2018 Palu earthquake/ is an example, where international assistance was received without the President making a declaration.[131] As an ASEAN Member State, Indonesia can receive international assistance from assisting Member States. The BNPB, as the national DM agency, has the responsibility for using and keeping account of international and national contributions and aid.[61]

EXTERNAL DISASTER-ASSISTANCE PROTOCOLS

- Processing of external resources (e.g., customs and immigration) is facilitated but not streamlined during disasters. Implementation challenges prevent efficient use of external disaster assistance despite the existence of protocols and procedures.
- International and foreign NGOs that participate in DM activities during a response receive government protection for their workers.[1] At the Asia-Pacific Economic Cooperation (APEC) 2012, Indonesia proposed the Emergency Response Travel Facilitation (ERTF), a mechanism that supports entry of personnel and goods to areas affected by large-scale disasters. Through this process, members of APEC can register for an APEC Business Travel Card (ABTC), which allows

cardholders access to other APEC economies without having to apply for a visa with each visit.[61] It is not evident if the ERTF was later integrated into policies or the legal framework by Indonesia after APEC 2012.

VOLUNTEER AND DONATIONS-MANAGEMENT CAPACITY

- Utilization of donated goods and volunteer resources is managed through informal processes in Indonesia.
- The BNPB has the responsibility to carry out the mandate of Law No. 24 of 2007.[130] This includes the management (use and accounting) of national and international donations and assistance. Article 60 of 24/2007 further states that the source of funds for DM can come from community participation.[1] Implementation procedures for pre-disaster, emergency response, or post-disaster activities are highlighted in the Head of BNPB Regulation 4 of 2014 and include the process for the utilization of funding sources for DM, including domestic and foreign grants.[55] Though the process is well defined, there doesn't seem to be a formal central tracking system, although the informal processes being used seem to work.

COMMAND, CONTROL, AND COORDINATION STRUCTURES

INCIDENT COMMAND SYSTEMS

- The Incident Command System (ICS) has been incorporated as a formal component of disaster response operation in Indonesia and is used as a standard of practice in events of all size and scope.
- The use of the ICS is an important component in the strategy for strengthening Indonesia's overall emergency- response coordination. The BNPB is the lead government agency that has the mandate to coordinate, command, and execute disaster management.[61,130] As such, according to BNPB staff, ICS or variations of this command system are written into plans and used at all levels of the government after statutory/emergency declarations for disaster events. As an example, when a national command post is established, the Head of BNPB, as directed by the President of the Republic of Indonesia, serves as the Commander.[131]

INCIDENT COORDINATION SYSTEMS

- Incident coordination is guided by a standardized incident-management system that has been implemented at all levels of government in Indonesia; this enables transparent and expedited integration of non-governmental and private-sector resources into response activities. However, implementation challenges remain.

- Mandated in Law 24 of 2007, the BNPB has the responsibility for coordination, command, and execution of DM.[1] According to BNPB staff, the practice and use of the ICS is advanced and clear at the national government level. However, challenges remain as the capabilities of implementing ICS vary greatly within the 34 provincial and 518 district BPBDs.[131]One example occurred during the peak of the February-March 2014 smoke and haze events, during which the President of Indonesia named the Head of BNPB as Incident Commander as the situation was spreading and disrupting neighboring countries. BNPB began pushing the local government to carry out emergency-disaster management, eventually handing over command to the governor in mid-July while still providing national financial, logistical, and post-disaster support.[131] Understanding the importance of involving all levels of government, BNPB has made great efforts to improve coordination by engaging partners through a coordination workshop that focused on lessons learned in the SKPDB command system.[138]

LEGAL BASIS OF COMMAND AND COORDINATION STRUCTURES

- Incident command, management systems and structures, and decision-making authority and reporting hierarchies are defined by Indonesia's legal and planning instruments.
- At the national level, BNPB Regulation No. 3 of 2016 mandates the use of the ICS and serves as the foundation that supports Indonesia's DRR planning.[138] In the effort to have integrated activities and a united command, all levels of government, as well as the multi-levels of command posts (from the field through the national government level) are encompassed in this mandate.[131]

COMMAND AND COORDINATION BY FUNCTION

- Plans and procedures delineate leadership, and coordination for disaster and emergency support functional areas, such as search and rescue, public health, and shelter.
- The BNPB is the key coordinating agency in disaster response, and the BNPB structure is organized and defined by five functional areas that directly support directorates: Systems & Strategy, Prevention, Emergency Response, Rehabilitation & Reconstruction, and Logistics & Equipment. Deputies are assigned to lead each of these areas. As an example, the Directorate for evacuation and all its associated planning, policies and activities fall within the responsibility of the Deputy of the Emergency Response functional area.[130,131]

  The proposed NDRF tags one ministry as the coordinator (or sometimes leadership is shared), and associated ministries and agencies are assigned as members of the various task forces. Emergency response for provinces is organized by clusters that align with the United Nations international cluster approach. Though similar, the proposed NDRF describes the differences between clusters versus task forces and clarifies the roles to be played by involved parties.[129]

FACILITATION OF INTERAGENCY COORDINATION

- Standard procedures exist for interagency coordination in Indonesia, including interagency

agreements, requests for assistance, mission assignments, reporting requirements, and reimbursement.

- Law 24 of 2007 drives all of the DM plans in Indonesia, and the BNPB holds the primary responsibility for carrying out this mission. Having the BNPB reside at the ministerial level allows for stronger coordination between institutions.[1] Information flow to and from BNPB is through the 34 provincial Badan BPBDs. BPBDs are responsible for the push and pull of data and information to the lower levels of government; however not all BPBDs are fully equipped with a 24/7 capability.[131] To further facilitate coordination, BNPB created a National Risk Reduction Forum that consists of representatives from government, business, and community at the national level, and encouraged the regional government partners to establish similar forums. The intent of these forums is to promote DRR awareness and facilitate DRR mainstreaming, coordination, and data and information sharing.[130]

GOVERNANCE INFRASTRUCTURE

EMERGENCY OPERATIONS CENTER

- BNPB maintains a sole-use and purpose-built EOC.
- The BNPB occupies multiple levels within the government office building and is used for daily office activities by the BNPB staff. Within this facility is a large, dedicated operations area specifically designed and equipped to function as the emergency operations center (EOC) to support activation operations.[131] This EOC area is inclusive of the BNPB operations control center (Pusdalops PB), which operates 24/7. This team provides continuous monitoring and reporting through all phases of the disaster, including the post-disaster phase.[130]

DEDICATED EOC FACILITY

- BNPB's EOC is not in a dedicated facility.
- The BNPB EOC resides in a shared government office building where EOC staff conduct their daily office business, including 24-hour operations (Pusdalops PB), and support activation of the EOC when warranted. Though not a dedicated facility in and of itself, one of the floors in the office building has a dedicated area designated specifically for EOC operations during activation.[130,131]

EOC RESOURCES

- BNPB's EOC is equipped for minor incidents but may need additional equipment and resources for large-scale events.
- The BNPB EOC is adequately equipped with the tools needed to respond to and support disaster events. However, when a major event occurs, the facility has very limited space to accommodate a large number of outside multi-agency staff.[131]

EOC ACTIVATION READINESS

- BNPB's national EOC is capable of no-notice activations.
- BNPB has 24/7 staff that can respond to no-notice activations immediately. When notified by the authoritative agency, the BNPB 24/7 Operations Control Center (Pusdalops PB) provides notification to the appropriate BNPB staff, other involved national government agencies, and to the regional (subnational) BPBD. WhatsApp is utilized as the main mode for notification.[131] To improve emergency-response speed, the Rapid Reaction Unit (SRC) was formed consisting of the BNPB in cooperation with the Indonesian National Army (TNI), the Indonesian National Police (POLRI), multiple ministries, and NGOs. The SRC serves as reinforcement to the regional government to carry out technical assistance, equipment, and logistical support when the local government's ability is exceeded.[61]

EOC ACTIVATION DURATION

- Indonesia's EOC is staffed and equipped to ensure continuous operations.
- BNPB Regulation No. 15/2012 concerning Guidelines for Operation Control Center (Pusdalops) regulates ideal and minimum requirements for building facilities and infrastructure used for EOCs at the central government (BNPB) and local government level. Every EOC building must be equipped with electricity, including support from a backup power supply (generator or UPS).[139] Minimum staffing requirements can be met to maintain the BNPB EOC for 24/7 operations, and the facility is equipped to run on backup-generator power for the electrical network as needed.[131]

EOC RESILIENCE

- Indonesia's national and regional EOCs are physically protected from most hazards.
- According to the BNPB Regulation No. 15/2012, minimum and ideal requirements for the building that houses the BNPB facility should be earthquake resistant and safe from the threat of known natural and non-natural disasters.[139] The BNPB facility is built with earthquake-resistant construction. In addition, as the BNPB is located within a tall office building, its upper floors are protected from flooding. The building's generators are located on the ground level and are mostly protected; however, there may be impacts during an extreme flood event. The BNPB facility is not located in a tsunami zone. Although the building itself and EOC are elevated and flood

resistant, flooding can impact access to the BNPB and AHA Centre facility.[131]

EOC ACCESSIBILITY

- Indonesia's national EOC is easily accessible for key government officials.
- BNPB Regulation 15 of 2012 specifies that the building must be easily accessible by all involved parties. The BNPB EOC certainly meets this guidance, as it is in a centrally located government building in Jakarta.[131,139]

BACKUP EOC

- BNPB maintains backup National EOC facilities.
- Three provincial BPBDs are identified as backup EOCs for the BNPB. All three are fully equipped similar to the EOC at BNPB.[131] On direct orders from the President of the Republic of Indonesia, the BNPB established the Indonesia-Disaster Relief Training Ground (INA-DRTG,) which serves as the headquarters and secretariat of the Disaster Management Rapid Response Unit; a center for disaster information and monitoring and assessment of disaster risks; a backup operation control center (Pusdalops); a center for training and simulation of the Pusdalops; and an international disaster management training academy.[61] The INA-DRTG is fully equipped with multimedia equipment and has an auditorium that can accommodate 400 people.[79]

FIELD-LEVEL COORDINATION CENTERS

- BNPB has plans, procedures, and resources to establish multiple field-level coordination centers.
- If a field-level coordination center is needed, the practice is for the BNPB staff to use of any BPBD that is already equipped and can be established quickly as a field-coordination center.[131] One limitation is that the level of readiness to serve as a field office varies among the BPBDs, as some have limited capabilities, some don't have an established office, and most are not equipped for 24/7 operations.[61] In 2019, 88.97% of the provinces/cities prone to disasters were prepared with available logistics and equipment technical capabilities This is a great improvement from 2018 where only 51.76% of the district BNPB facilities were equipped.[5]

LONG-TERM COMMUNITY RECOVERY FACILITATION CAPACITY

- Indonesia has the plans, procedures, and resources to support long-term community recovery, but they are untested and implementation challenges remain.
- Recovery, both short- and long-term, is integrated into national/regional laws, plans, and procedures. Mandated through Law 24 of 2007, the responsibility at the national level falls on the BNPB, which is responsible for addressing rehabilitation and reconstruction in their plans, and also serves as the lead agency in post-disaster coordination.[1] Working together with the Ministry of Finance and the Ministry of Home Affairs, the BNPB coordinates post-disaster funding for

recovery activities.[5] The Disaster Management Plan (RPB) is a regional master plan that captures the DM activities required for all involved local government agencies and is used as the framework used for planning. This document also serves as the foundation for the Term Development Plan Intermediate Regions (RPJMD) and the Regional Long-Term Development Plan (RPJPD).[18] Although plans exist, in reality not all levels of government are compliant or able to meet all expectations. According to the BNPB staff, each district BPBD has the responsibility to open post-disaster recovery centers. For various reasons, their efforts are often not well coordinated, and people often go straight to the regional BPBDs for support.[131]

COMMUNICATIONS INTEROPERABILITY

- Partial communications interoperability exists amongst Indonesia DM stakeholders.
- The BNPB and BPBDs are highly dependent on high-speed information technology infrastructure. Communications are reliant on government websites for the delivery of disaster information to the public. Social media sites, such as Twitter, Instagram, and Facebook, are widely utilized to support communication of disaster- event information to the public. WhatsApp and telephones are the primary methods of communication used by BNPB for notification within the government. Using group distribution messages on WhatsApp could be crudely construed as "interoperability." A solid alternate communication method is BNPB's use of high frequency (HF) radios; however, it is not clear how widely available HF capability is beyond the BNPB.[5,131]

RESPONDER CREDENTIALING

- Credentialing processes and systems exist but have not been tested in past disaster events.
- The BNPB staff are responsible for managing responder credentialing and have made some effort in keeping records in past disasters. BNPB Regulation 1/2019 covers application of the Indonesian National Work Competency Standards (SKKNI) in disaster management.[140] The Disaster Management Training and Education Center (Pusdiklat PB) also has an information system that records and maintains training data (including of participants) in a centralized system called SiDIKLAT (confirmed by Head of Training Center). This system has not been fully utilized or tested for credentialing purposes during past disasters.[131]

CAPABILITIES & RESOURCES

FACILITIES & EQUIPMENT

EMERGENCY-SERVICES FACILITIES CAPACITY

- Less than one fire station per 100,000 population and fewer than one fire station per 50 square

miles in Indonesia.

- Despite regulation from the Ministry of Home Affairs stipulating minimum-service standards, the distribution of fire stations, according to the most comprehensive resource on fire and rescue services in Indonesia, indicated fewer than one fire station per 50 square miles.[141] In addition, in 2020 PDC conversations with BNPB officials in Jakarta indicated that there is greater deficiency in rural areas, and that overall shortages exist. Until early 2020, fire services operated under the auspices of the Ministry of Home Affairs. In 2020, the ministry announced that the Fire Service was preparing to become an institution unto itself.
  In terms of a regional overview, a 2019 news article states that "Less than half of subdistricts in Jakarta [1] have fire stations…Of Jakarta's 267 subdistricts, only 110 have fire stations";[142] Jakarta has approximately one station per 87,000 people. In 2016, Banten Province [2] BPBD and the governor (Rano Karno) said that the quantity and quality of human and material resources for firefighting were insufficient.[143] In 2019, Serang (the capital city of Banten Province) BPBD said it only had eight fire truck units but needed at least 29.[144] In Lebak (regency in Banten Province), the "number of hydrants in Lebak is very minimal."[145] In Bandung (the capital city of West Java Province [3]), a fire department official said that they have 18 fire engines but require a minimum of 31.[146] Depok City (West Java Province) lacks sufficient fire-fighting infrastructure, and 50% of hydrants there were not functioning.[147]

  PDC's onsite engagement and communication with BNPB operations and planning teams in February 2020[131] revealed that most fire stations are located in urban areas. Riau is a problem hotspot for wildfires typically during May, and farmers typically start fires to control their fields. These agricultural fires sometimes burn out of spread wildfires to areas that have limited fire stations and sources of water.

MATERIAL RESOURCES AVAILABLE FOR DM

- More than 75% of emergency-services and civil-protection entities in Indonesia are equipped with resources appropriate to manage known hazards.
- Regarding whether emergency services and disaster management entities in Indonesia are properly equipped with resources to manage known hazards, according to a BNPB report,[5] the percentage of regencies/cities adequately prepared for disaster events has risen sharply in the last year: "Percentage of districts/cities prone to disasters that have adequate logistics, equipment and capabilities, and technical means for emergency preparedness = 88.97%."[5(p21)] This number represents a sizable percentage increase documented in a BNPB report from 2018: "Percentage Regency/City is prone disaster that has logistics and availability equipment as well technical ability to preparedness and disaster emergency = 51.76%."[121(p36)]

SUPPLEMENTAL DM RESOURCES

- Supplemental DM resource and equipment requirements across Indonesia are secured through

a comprehensive blend of formalized private-sector partnerships, relationships with the NGO sector, and other means.

- Indonesia's Ministry of People's Welfare helped establish the public-private Disaster Resource Partnership (DRP)[148] in order to provide comprehensive services and equipment for all phases of DM activities, whilst connecting the Engineering & Construction (E&C) sector and humanitarian organizations. National and international partners include: Amec Foster Wheeler, Arup Group Ltd, Asian Development Bank, DRP Global Secretariat, DRP Indonesia, Fluor, HCC, International Committee of the Red Cross (ICRC), Kokusai Kogyo, Palantir Technologies, United Nations Office for the Coordination of Humanitarian Affairs (OCHA), World Economic Forum.[149]

  The purview of the DRP Indonesia Network include:

  - Pre-disaster
    - Provide training, developing disaster response/contingency plans
    - Community-based DRR programs around project sites (mapping hazards and critical infrastructure, developing response plans)
  - Immediately after a disaster (72 hours-2 weeks)
    - Temporary repairs to critical infrastructure, provide emergency shelter, engineering first responder
    - Strategic technical assistance (e.g., advice on rubble clearance)
  - Relief (2-12 weeks)
    - Temporary repairs to critical infrastructure, provide emergency shelter, secondments of staff
    - Needs assessment (leads to implementing programs)
  - Recovery (12 weeks-3 years)
    - DRP Indonesia helps facilitate activities such as building permanent housing (through company fundraising/CSR programs), implementing recovery programs
  - Ongoing Activities
    - Building relationships
    - Strategic technical expertise to inform decision making
    - Attending fora/coordination mechanisms
    - Acting as an honest partner
    - Project management

- The Red Cross Society (Palang Merah Indonesia or PMI) provides the most assistance among civil society organizations in Indonesia.[131] PMI has a legal arrangement with the Indonesian government and the BNPB that allows for its close participation in many DM capacities, including provisioning of supplies and equipment.[150(p67)] This mirrors the status of many UN agencies regarding DM in the country. Because of PMI's many satellite offices, it can partner with local

BPBDs and assist in community-based DRR activities.[150,151] Strategically, Indonesia participates in the ASEAN Joint Disaster Response Plan. Logistics, equipment, supplies, immediate shelter items, etc., are provided through the AHA Centre and ASEAN channels.[152]

DM EQUIPMENT INVENTORIES

- Accurate and up-to-date Inventories of disaster-relevant equipment are maintained.
- According to the BNPB, inventories are maintained across 33 provinces.[5(p95)] Responsible parties include Head of Storage Section of the Equipment Storage and Maintenance Sub-Directorate, and BNPB Deputy of Logistics and Equipment.

SHELTER CAPACITY

- Emergency shelters with the capacity to serve at least 50% of anticipated shelter needs have been identified, but alternate sheltering capabilities will likely have to be identified to address all requirements.
- The BNPB maintains a shelter cluster as part of its Evacuation and Protection Cluster (PP Cluster). The Ministry of Social Affairs (MSA), per the MSA Regulation 26/2015 Guidelines for the Evacuation and Protection Cluster Coordination,[153] works in concert with the International Federation of Red Cross and Red Crescent Societies (IFRC) to manage the Shelter Sub-Clusters . The Ministry of Public Works and Public Housing (PUPR) is statutorily obligated to provide support to disaster victims whose homes have been damaged or destroyed.[154] In 2019, "The Ministry of Finance channeled funds in the amount of 1.97 trillion [Rupiah] for construction of housing settlements both in situ and relocation of 101,859 housing units for October 8, 2019."[155]

  Nevertheless, it appears that the Indonesian government relies heavily upon a myriad of domestic and international NGOs, religious organizations, UN agencies, and especially the IFRC to assist with sheltering capacities.[59(p52)] Therefore, although statutory and operational commitments clearly exist, the government is apparently unable to fulfill needs sufficiently. Moreover, even with outside assistance, we see data points to indicate serious shortages in sheltering capacity.[156] In 2020, PDC communicated with Humanitarian Open Street Map (HOTOSM), BNPB EOC experts who were collecting shelter data for RVA needs. BNPB officials confirmed that they did not have comprehensive data for shelters. However, for non-permanent shelters, local government entities in Indonesia usually shelter in public facilities, such as athletic fields, public halls, government buildings, places of worship (mosque, mushalla, church), etc. Previously, school facilities were used as ad hoc shelters, but that is currently not permitted by the Ministry of Education. For fortified and elevated shelters for tsunami evacuation, the local government (BPBD or Public Works) typically takes the lead. Tsunami risk assessments are still limited, so only a few local governments have analyzed the location of shelters and evacuation routes for tsunamis (e.g., Denpasar, Padang, Gorontalo, Cilacap, Painan).

The proposed NDRF puts the Ministry of Social Affairs (MSA) in charge of the Evacuation and Protection Task Force, which is responsible for sheltering activities in disaster situations. This task force also includes the Ministry for Public Works and Human Settlements. In addition, there are clusters with similar mandates that are still operational and share membership. The MSA (as recently as 2020) discussed its role in the "National Cluster coordinated by the National Disaster Management Agency (BNPB) in which the Ministry of Social Affairs is in charge of the Protection and Evacuation Cluster and Logistics Cluster."[157] This is notable since the proposed NDRF differentiates clusters and task forces: A *cluster* is an "Institutional grouping of agencies based on proximity or similarity of function of the organization…It is non-binding (voluntary)… Formed by an organization aid provider (donor)";[129] whereas, a *task force* is an "Institutional grouping of agencies based on assignments and inherent responsibility at the institution…the nature of obligation is binding (mandatory)…established by an institution or parties who have duties responsibility (government)."[129]

Evacuation and Protection Task Force
Coordinator: Ministry of Social Affairs; Members: BNPB Directorate for Refugees Management; BPBD; Ministry of Education and Culture; Ministry of Women's Empowerment and Child Protection; Ministry for Public Works and Human Settlements; the Indonesian Child Protection Commission.[129]

National Shelter Cluster
Ministry of Social Affairs directs the Protection and Refugee Cluster and the Logistics Cluster.[129]

SHELTER-SUITABILITY ASSESSMENTS

- Throughout Indonesia, some, but not all, shelters have been assessed for suitability.
- Minimum standards for shelters are extensively codified by different entities.[59,154,158] The IFRC's thoroughly documented standards for shelter are relevant here, since IFRC operates so closely with the Indonesian government in providing shelter for DM in Indonesia. The IFRC has at least three designs specific to Indonesia, each relative to the raw materials available in respective areas.[159] Given the clear statutory commitment to providing suitable shelters, as evidenced by the well documented and thorough minimum standards, it is apparent that not all shelters are assessed to meet those standards.

WAREHOUSING CAPACITY

- Purpose-built warehouse and staging facilities exist to meet logistics operations requirements during a major disaster event.
- Regarding the proliferation of purpose-built warehouse and staging facilities for disaster management in Indonesia, BPBDs are expected to establish and adhere to warehousing location guidelines and specifications codified in BNPB's Regulation Number 06 of 2009 Concerning Warehousing (BNPB Regulation 6/2009). According to the BNPB, every BPBD has a dedicated

Operation Control Center (Pusdalops).[160] BNPB requires that data on logistics and equipment shall be maintained by each BPBD Pusdalops facility. These minimum requirements are codified in BNPB Regulation Number 15 of 2012 Guidelines Operation Control Center Disaster Management (PUSDALOPS-PB).[139] Lastly, the BNPB's central logistics and equipment warehouse is in Jakarta, and BNPB is committed to building three more major warehouses in the Java region.[131,161]

INTEGRATION OF PUBLIC HEALTH AND MEDICAL FACILITIES WITHIN THE NATION'S DISASTER MANAGEMENT SYSTEM

- Integration is informal with expanded integration efforts underway.
- Acknowledgement of the need for integration of public health and medical facilities into Indonesia's DM system is strong, as evidenced throughout the BNPB's 2019 Performance Report.[5] The Ministry of Health (MoH) is involved with the BNPB's mission, including mental health services (psychosocial recovery) for disaster victims.[5] Medical services are an integral component of post-disaster needs assessment in Indonesia.[162] However, in 2016 the Ministry of Health issued an extensive report profiling its capacities regarding crisis management. MoH targeted 179 disaster-prone provinces/cities from 2015-2019 for improvements to their respective abilities to reduce risk and increase capabilities for coping with disaster.[163(p7)] Risk mapping was identified as an important first step. Community Health Indexes (IPKM) were calculated, and it was determined that 76.5% of provinces/cities are below average. Overall, the average district/city met 38% of indicators.[163]

  The major issues discovered were as follows:

  - 91.2% of provinces/cities have not developed SOP/guidelines for involvement of institutional/non-institutional government in crisis management health
  - 82.4% of provinces/cities have not compiled coordination mechanisms related to countermeasures health crisis
  - 73.5% of provinces/cities do not have related regulations overcoming health crises
  - All provinces/cities lack specialists, 97.10% lack general practitioners, and 61.8% lack nurses
  - As many as 88.2% provinces/cities lack beds, and 85.3% do not have a hospital disaster plan
  - 70.6% of provinces/cities do not have HR-capacity planning related to routine and ongoing PKK
  - 64.7% of provinces/cities have not done related community empowerment overcoming the health crisis
  - 73.5% of regencies/cities have not compiled contingency plans
  - 88.2% of provinces/cities have not used the applicable minimum standard of reference for health services
  - 79.4% of provinces/cities have not done safe assessment of health facilities against disaster

  Clearly a lot of work has been done toward integration efforts with national and regional DM

systems. However, it is apparent that satisfactory integration and capacities will require more focused efforts. The MoH is plainly aware of this and working on it.

HUMAN RESOURCES

EMERGENCY-SERVICES STAFF

- Indonesia has fewer than one firefighter per 5,000 population.
- The Ministry of Home Affairs oversees the nation's fire service, which represents a primary source of public-sector emergency-services staff. Indonesia has at least two statutes from the ministry[164,165] that establish the government's aim to achieve minimum service standards (MSS) at every administrative level regarding fire services based on response times and/or distance. The ministry determined that in 2008, fire services met 25% of coverage and 75% of response-rate goals.[164] In addition, PDC conversations with BNPB headquarter officials indicate that there is greater deficiency in rural areas.

  Low-density coverage of fire-services facilities is matched by low service staffing. At the same time, the logistical remoteness of the country means that local first responders will need to serve as the primary response force for the initial hours and, depending on location and days of the incident. In the meantime, staff rosters remain low and depend heavily on partner support.[166]

MAINTAINING STAFF DEDICATED TO DISASTER PLANNING OR CIVIL PROTECTION

- A cadre of trained staff with job functions dedicated to pre- and post-disaster emergency management activities and programs in Indonesia exists, but challenges exist in meeting programmatic needs relative to disaster planning.
- Regarding human resource capacities at every municipality, BNPB[5] uses six key performance indicators (KPI) to assess capacities and in 2019 determined that of the six, targets have been exceeded in two KPIs, one has been met, and three have not been met. The unmet targets are (1) provinces/cities integration of disaster-risk studies into regional development; (2) percentage increase in community capacity DM; and (3) disaster-prone cities have available logistics, equipment, and technical capability for preparedness and emergency response.[5(pii)] According to BNPB, the "percentage of disaster-prone provinces/cities with logistics, equipment capabilities, and technical preparedness levels suitable for all hazards emergency response = 88.97% [5(p20)] " – a large increase from 2018 to 2019.

  Regarding trained staff nationally, according to BNPB, "there are dedicated BNPB EOC staff who are trained for their pre- and post-disaster emergency management job functions. The BNPB EOC staff receive guidance from the head of the Operation Control Center, Mr. Bambang Surya

Putra. His entire staff are dedicated to their specific emergency-management job functions."[131] Staffing resources at the national level, namely at BNPB, are generally highly trained, adequate in number, and diversified in terms of job function. At the local and provincial levels, staff availability is impacted by high staff turnover which heavily impacts staff knowledge and skills.[166]

SURGE-STAFFING NEEDS

- Surge-staffing needs are formally addressed in the Indonesia's disaster plans and procedures, but the adequacy of staffing resources is not at desired levels.
- Regarding the level of preparedness for the identification and mobilization of surge-staffing resources, BNPB initiates a rapid assessment of needs in the event of an emergency.[5(p64)] The assessment includes the identification of human resource needs and the activation of personnel, including a wide range of stakeholders from government, military, business, NGOs, and volunteers.[5(pp65, 67, 73)] Further to PDC's personal communication with BNPB leadership in February 2020, BNPB staff are often deployed to field locations to augment regional BPBDs and conduct needs assessments.[131]

  Indonesia's DM resources are bolstered by the integration of NGO, INGO, private sector, and other partners into the country's DM system. A 2016 assessment of response capacity found that there exists the potential for surge-capacity shortfalls if partners are facing competing commitments or restrictions (as have since been highlighted by the ongoing COVID-19 global pandemic).[166] Surge resource needs are assessed by BNPB or the relevant BPBD and resource requests are made of partners at that time.

SURGE STAFF SOURCE

- Surge-capacity staff are drawn from throughout the Indonesia DM stakeholder community, including NGOs, the private sector, and other government agencies.
- Surge staffing is a standard component of response. The BNPB's rapid- needs assessment protocol includes the identification of human resource needs and the activation of personnel from a wide range of stakeholders, including government, military, business, NGOs, and volunteers.[5(p65,67,73)]

  The Ministry of Social Affairs deploys "TAGANA personnel (Disaster Preparedness Cadets) and the TAGANA Companions" upon declaration of state of emergency.[167] TAGANA is a community-based program that trains and educates people in "basic disaster response skills" so that in the event of an emergency, members are able to respond in their neighborhoods and communities quickly.[153]

ROSTERS OF TRAINED PROFESSIONALS

- Rosters of trained professionals are maintained for all or most relevant technical needs by BNPB.

- At the BNPB, the Deputy for Rehabilitation and Reconstruction is responsible for identifying and commandeering critical personnel in a post-disaster situation. Serving the Deputy for Rehabilitation and Reconstruction are; 1) a Director of Social Economic Recovery and Improvement and 2) a Director of Physical Recovery and Improvement, and 3) Damage Assessment Directorate (among others).[5,33] Under these directorates are professional staff for critical post-disaster needs in different fields, such as civil engineers, architects, disaster experts. BNPB also has good tools for conducting post-disaster analysis, such as Ina-SAFE. If there is insufficient expertise, BNPB can easily recruit additional centers if needed.

  For rehabilitation and reconstruction activities at the local level, if the regional budget is insufficient, the local government can request an on-call budget via BNPB. In the reconstruction process, for example, the local government is given the right to manage funding, including the provision of construction services in the area. This process is the same as the common construction-project process that goes through the tender administration process (e.g., shortlisting three bidders). Thus, the central and regional governments do not need to have a special list for building inspectors or engineers. For the evaluation process, BNPB has the right to evaluate the implementation of rehabilitation and reconstruction carried out by the local government every three months.[168,169]

ROLE OF PAIRING ARRANGEMENTS, SECONDMENT SCHEMES, OR OTHER SIMILAR MECHANISMS TO ADDRESS DISASTER-RELATED TECHNICAL STAFFING REQUIREMENTS

- To a limited degree, BNPB leverages innovative pairing and public-private partner modalities.
- Regarding mechanisms that address disaster-related technical staffing requirements, there are cooperation agreements between: (1) DKI Jakarta and Tangerang Regency Government of Banten Province on Fire and Rescue Management in Border Areas; and (2) DKI Jakarta and Gandaria City on Fire and Rescue Service in the Area of Gandaria City and Surrounding Areas.[170,171] In addition, there are multiple inter-organization agreements that address a range of issues that do not exclusively or explicitly address staffing requirements; for example, the Yogyakarta Special Region BPBD Office, the Muhammadiyah Disaster Management Center (MDMC), and Hizbul Wathan (HW) (youth organization) cooperate via the Disaster Safe Education Unit (SPAB) initiative.[172] The Padang Panjang Geophysics Station BMKG Sumbar and Padang City BPBD collaborate via the Utilization of BMKG Information for disaster management in the Padang City area.[173]

  In 2019 a DRR Forum was established as a mechanism for monitoring and measuring achievement of DRR and implementation efforts, and to facilitate knowledge sharing related to the effectiveness and development of DM systems in the area. The DRR Forum has 25 provinces and 76 regencies/cities participating. However, there is no specific mention of mechanisms for staffing requirements.[5(p52)]

COMMODITY & SUPPLY INVENTORY

GENERATING ESTIMATES OF POST-DISASTER COMMODITY NEEDS

- Estimates of post-disaster commodity needs in Indonesia (e.g., food, water, pharmaceuticals) are developed using scenario-based planning.

  Establishing the disaster logistics minimum standards for national and regional commodity capacities, BNPB Regulation 23/2014 includes formulas for calculating logistics needs based on different factors, such as types of disaster threats.[174] Research, employing the use of monitoring technology, and susceptibility mapping are key components in scenario-based planning for post-disaster commodity needs.

  In addition to pre-disaster planning, initial post-disaster needs assessments (PDNA) are conducted through the local BPBD immediately when it is safe after disaster impacts. Typically, the BNPB sends staff to the disaster site where they work with the BPBDs, translating any needs back to BNPB. The BNPB 24/7 Operations Control Center (Pusdalops PB) staff make regular contact with the provincial BPBDs for situation reports to BNPB management, as well as tracking in their EOC logbook.[131] Included in the estimation process are post-disaster rebuilding efforts. These activities are carried out in a planned, coordinated, controlled, and integrated manner at the national and regional levels. Using the method of JITU PASNA (Post Disaster Needs Assessment), an action plan is formulated which is aligned with the strategy to 'build back better and safer'.[61]

COMMODITY STOCKPILE QUANTITIES

- Commodity stockpiles are maintained at levels that do not meet estimated needs. Commodity stockpiles are maintained at predetermined levels. Support for the overall strategy for DRR, utilization, and allocation of resources is based on risk studies and contingency planning. In alignment with the effort to decentralize government, the regional government has the responsibility to build resilience to disasters.[61] The provincial government allocates and mobilizes resources to the district/city as needed. While reinforcing these regional government efforts, the BNPB works in parallel at the national level to allocate and mobilize needed resources through coordination with relevant ministries and institutions.[131] Pre-disaster activities also include funds from the national government to be used for stockpiling supplies and the preparation of supply goods. If needed, social-fund grants are available to assist local governments with post-disaster financing through application to the Government through BNPB.

  Government Regulation 21/2008 Article 18 "BNPB and Badan Penanggulangan Bencana Daerah (BPBD)" sets requirements to develop logistics and management-systems equipment. This serves to ensure preparedness in the supply, storage, and distribution of logistics and equipment to disaster zones.[3] Further, Regulation of the Head of BNPB 23/2014 sets the standardization

of disaster management logistics to provide guidance for BNPB and BPBD in determining the minimum logistical supply during a period of emergency. Article 8 specifies four main categories in these logistics packages: food (including water), clothing, shelter, and other supplies (e.g., medicine, tools, utensils). Formulas for calculating the logistics needs are based on population, estimated percentage of disaster victims, date, local consumption patterns, and disaster threat.[174] Even with all these planning efforts, and given these guidelines and regulations, there were documented instances where commodity stockpiles did not meet the needs due to the wide scope of the disaster.[175]

LOCATION OF COMMODITY STOCKPILES

- Indonesia's commodity stockpiles are kept in locations that require repositioning in rapid-onset events.
- In 2010-2014, the BNPB provided a "buffer stock" for 33 provinces and 427 district/city BPBDs for disaster preparedness. Trucks, field kitchen cars, ambulances, water tankers, boats, and other equipment were also distributed. Distribution was based on vulnerability scoring based on topography, number of disasters, availability of resources, and budget.[130] The BPBD supports Logistics and Equipment Resource Maps, a compilation of resources spread in provincial, district, and city BPBDs that was completed in 2014. These maps illustrate the conditions of logistics and equipment in each BPBD and strengthen overall disaster preparedness for local governments. In addition, this augments BNPB's decision-making process for mobilizing assistance.[61] Most BPBDs have supplies co-located in the same building. However, depending on available space, stockpiles are sometimes located in a different local government-owned building, usually strategically placed with consideration to mobilization accessibility and range. In addition to the various local stockpiles maintained at the regional/provincial government levels, there are several warehouses containing supplies for the national stockpile in the capital region of Jakarta and West Java. If one warehouse region is affected by the disaster, the second warehouse serves as a backup.[131]

BASIS OF COMMODITY STOCKPILE DISTRIBUTION

- Indonesia's commodity stockpile locations are based primarily on the location of warehousing facilities.
- Resources are repositioned to support disasters in different locations as needed,[131] with easy access to military airports for ease of distribution. Based on the results of the Deliberation on National Planning and Development (Musrenbangnas), in 2019, the BNPB led the contingency-planning efforts for 28 priority provinces/cities. Taken into consideration were the type of threats faced in these areas (flood, tsunami, earthquake, etc.). Activities included "institutional strengthening" aimed to strengthen the BPBDs' capacity to understand and inventory available resources to manage threats in their areas.[5]

COMMODITY CONTRACTS

- Contracts with Indonesian commodity providers exist but are not assessed for reliability during disasters.
- Per communication with DM experts at BNPB Jakarta, all portions of civil society assist during a disaster response. In practice, it is typically military equipment that is first deployed to assist the local government. Heavy machinery for debris clearance is usually borrowed from private companies to support the response. It is unknown if formal contracts exist.[131,176]

DM RESOURCE AND SUPPLY INVENTORIES

- DM resource and supply inventories spanning all Indonesian national and local agencies, facilities, and jurisdictions exist.
- BNPB Regulation 23 of 2014 sets a minimum standard for BNPB and BPBDs regarding logistics inventory for supplies that need to be available to disaster victims within 72 hours. A minimum inventory of logistics supplies include: food packages (staples, ready-to-eat food, nutritional supplements), clothing packages (for families), shelter packages (tents, mats, mattresses), and other logistics (medicine, tools, utensils, first aid, cleaning supplies, body bags, household appliances). In addition to the minimal inventory supplies, BNPB warehouses and some BPBD warehouses contain small machinery, small boats and trucks, forklifts, backhoes, and jet skis.[131,177]

HOSTING OF RESOURCE AND SUPPLY INVENTORIES

- Indonesia's DM resource inventories are managed through multiple (individual) information systems and/or a centralized system that is not yet fully operationalized.
- BNPB Government Regulation 21/2008 specifies that BNPB and BPBDs are required to provision for a storage-, logistics-, and equipment-management system for the disaster site. This serves to optimize the logistics and equipment required of each agency/institution in the BNPB network.[3] Sistem Logistik Nasional Penanggulagan Bencana is a national logistics system accessible to the BNPB; however, it is not evident if it is fully utilized as the core central information system for resources and supplies, or if partner resources are also tracked through this system.[176]

MAINTAINING A DEFINED DISASTER-LOGISTICS PROGRAM

- BNPB maintains a national disaster-logistics program.
- Functionally, Logistics and Equipment is one of five dedicated sections within the BNPB.[3] The Deputy for Logistic and Equipment leads the logistics program and activities. BNPB is the coordinating agency for this function.[129] Regulation 23 of 2014 provides standardization policies concerning disaster management logistics, including a minimum standard for delivery of goods

to the community affected by the disaster.[174]

FUNCTIONAL CAPABILITIES

PSYCHOSOCIAL RECOVERY CAPABILITY

- National-level support for psychosocial recovery is comprehensive and effective in Indonesia. Both national- and subnational-level governments provide psychosocial recovery services. Article 52 of Government Regulation 21/2008 concerning the Implementation of Disaster Management states that psychosocial services (along with clean water, sanitation, food, clothing, health services, and shelter) are Basic Needs to be provided by the government. Part 6 of Article 53 speaks to the protection of vulnerable groups. Priority is given to disaster victims who are seriously injured and/or part of a vulnerable group. Psychosocial services are provided along with other essential services such as rescue, evacuation, security, and health services.[3]
  Further, psychosocial recovery is intended to help affected communities restore social life and psychological conditions to what was normal before the disaster. Psychological social services are carried out by an agency or institution in coordination with BNPB in the form of family counseling, trauma-recovery assistance and/or psychological condition recovery training. In addition, the district government provides "mourning money" (10 million Rupiah or approximately USD 687) to the families of victims.[131] Specifically, the Head of BNPB Regulation 17 of 2010 explains the General Guidelines for the Implementation of Post-Disaster Rehabilitation and Reconstruction. Post-Disaster Needs Assessment (PDNA) and analysis activities form the basis for preparation of action plans and contain humanitarian targets, including social/psychological.[177]

EVACUATION FUNCTIONAL CAPABILITY

- Comprehensive evacuation support capacity exists at the national level via BNPB to facilitate the evacuation efforts of subnational and/or local governments, but implementation challenges remain. Evacuation procedures are unique to each type of event. Dedicated evacuation sites are very specific for certain disasters such as tsunamis. At times, there's a need for ad hoc evacuation sites in which existing public facilities are typically utilized. For example, during floods or earthquakes, evacuation sites are typically public spaces, such as mosques, fields, schools, halls, etc., or somewhere tents can be erected on flat ground.[178] In an effort to improve community preparedness toward threats such as volcanic eruption, BNPB, together with local governments, installed signage and information boards to improve community preparedness through early warning. In 2016, seven areas with active volcanoes were the focus of these capacity building and alerting efforts.[179,180]

  One implementation challenge concerns the many areas across Indonesia lacking clearly defined

tsunami evacuation zones. Indonesia only has approximately 10 "tsunami evacuation centers," which are buildings with phone lines, running water, telephones, and electricity. Built specifically for tsunami evacuations, these buildings are for the most part not maintained and, therefore, not in complete working condition.[131] Immediate evacuation actions fall on the local government, and BNPB at the national level has and continues to provide training for local government authorities to lead evacuation activities as needed. Formal and informal leaders are trained to guide their communities to safer areas.[176]

POST-DISASTER WATER, SANITATION, AND HYGIENE (WASH) FUNCTIONAL CAPABILITY

- WASH is addressed in plans, strategies, and BNPB policies, and information regarding the mechanisms for support to impacted areas is accessible.
- Article 53 of BNPB Law 24 of 2007 and Article 52 of BNPB Government Regulation 21 of 2008 specify that clean- water and sanitation are considered basic needs that must be met by the government.[13] Further, to support an effective and efficient process during the disaster, emergency procurement/direct purchasing of goods and services (including equipment) is warranted, as specified in Article 40 of Regulation 21 of 2008. Clean water is one of the nine staples identified by the national government. [3] Logistic-assistance management laws and national government plans provide guidance on how to meet this need. Specific guidance on quality and adequate quantity are provided in BNPB Regulation 10 of 2008.[181]

SAFETY AND SECURITY CAPABILITY

- Safety and security is a defined DM function included in plans, policies, and procedures, and is assigned to an appropriate ministry, office, or stakeholder by BNPB.
- Restoration of security and order is one of the post-disaster rehabilitation activities included in the list of the actions necessary to speed up recovery in the community, as listed in BNPB Law 21 of 2008.[3] Further, BNPB Law 17 of 2010 specifies security and order as a substantial rehabilitation and reconstruction target.[177] According to the National Disaster Management Plan 2015-2019, budgeted post-disaster funds may be used for planning and implementation of rehabilitation activities, including the restoration of security and order.[61] The National Police, in coordination with BNPB, is responsible for providing security and order services, as stated in the BNPB Strategic Plan.[130]

NATIONAL HAZARDOUS MATERIALS (HAZMAT) RESPONSE CAPABILITY

- HAZMAT response is supported through Indonesia's centralized HAZMAT-response capacity.
- HAZMAT-response capabilities are well supported at the national level. Recognizing that events such as earthquakes sometimes have other cascading effects, plans such as the Disaster Management Masterplan 2015-2045 describe a planning scenario for a large earthquake occurring in the Sunda

Strait Megathrust segment. The area most threatened by a tsunami is the industrial area in the city of Cilegon. If this area is hit by a tsunami, it is feared that one of the cascading effects could be a technological failure, such as a hazardous chemical release, which would further threaten the community.[18] A Disaster Pocket Book was compiled by the Badan Nasional BNPB for readers from all audiences to gain preparedness knowledge. This book outlines the steps needed for addressing a disaster or potential disaster. Showing the importance of its commitment to supporting HAZMAT, this pocketbook dedicates an entire section to hazardous- and toxic-materials information.[182]

BNPB's commitment to supporting HAZMAT is most evident in practice. In December 2018, BNPB participated with the Singapore Civil Defense Force in an exercise to bolster HAZMAT disaster management with the Civil Defense Academy in Singapore. Recognizing the need for building DRR capacity and capability in HAZMAT, BNPB sent 20 individuals (18 BNPB staff and two Central Java Province BPBD staff) to participate in this training.[183] Another example of BNPB's commitment to support HAZMAT is their participation in ARDEX 2018, which took place in Royal Krakatau, Cilegon, Banten. ARDEX 2018 was an ASEAN Regional Disaster Emergency Response Simulation Exercise, where a series of activities took place both indoors and at field locations. The exercise scenarios included an earthquake disaster that triggered tsunami and chemical-industry disasters. Urban Search and Rescue (USAR), Emergency Medical Teams (EMT), and HAZMAT)Teams from ASEAN countries participated in the exercise.[184]

SEARCH AND RESCUE FUNCTIONAL CAPABILITY

- Search and rescue (SAR) capabilities exist throughout Indonesia.
- The national government fully supports search and rescue activities, which is evident in practice as well as written laws. The BNPB has Response Rapid Assessment Teams and SAR Teams supported by the National SAR Agency (Basarnas) that augment the regional government's SAR capabilities.[61,131] BNPB Law 24 of 2007 specifies in Articles 48 and 52 that humanitarian services during emergency response include SAR services for disaster victims.[1] BNPB provides financial assistance, which is ready-for-use to support SAR activities.[130] Law 21 of 2008 specifies guidance for procurement of goods and services, including equipment and services for SAR of disaster victims. This law, as stated in Article 51, gives authority to BNPB to provide support to BPBDs for rescue and evacuation.[3]

AGRICULTURE PREPAREDNESS, RESPONSE, AND RECOVERY CAPABILITY

- Support for the disaster-related needs of Indonesia's agriculture sector are comprehensive and are addressed in plans, policies, and strategies, with some implementation challenges.

- The national government certainly recognizes the role of the agriculture sector in Disaster Risk Reduction Management (DRRM). The Ministry of Agriculture is listed as a support agency in many of the program indicators throughout the Disaster Management Plan 2015-2045.[18]

Drought is recognized as an increasingly common hazard threat in the BNPB Strategic Plan 2015-2019 and is listed as one of 12 types of disaster threats to warrant a place in the master plan for disaster-risk mapping. This plan highlights the community dependency on food crop production, so when drought occurs, a cascading effect is an increased poverty rate amongst the people whose livelihood is dependent on agriculture, plantations, and farming. Though not specifically referring to agriculture, but undoubtedly having the most impact on it, the plan also addresses the use of weather- modification technology that is used operationally to increase rainfall in the dry season and vice versa to reduce rainfall during the rainy season.[130]

Through BNPB working together with the Ministry of Agriculture, post-disaster assistance for the agriculture sector typically comes in the form of rice seeds, corn, rice, fertilizer, fisheries assistance, and equipment.[185] In addition, assistance may include using the national budget to recover farmlands – including patty and sugar cane fields – to help restore the livelihood of farmers. Should affected settlements need to be relocated to a safer location, the national government may assist farmers who wish to switch professions via re-skilling and education, with support in the form of financial assistance.[130] Though the agriculture sector is recognized at the national and local government levels, implementation at the lowest level is still a challenge. Although the government disseminates climate-warning information (example: El Niño or La Niña seasonal forecasts), that information does not necessarily reach the farmers.[178]

CAPACITY DEVELOPMENT

FORMALIZED CD PLANS & STRATEGIES

TRAINING AND EXERCISE REQUIREMENTS AND/OR RECOMMENDATIONS

- Training and exercise requirements and recommendations are established for all staff active in disaster management, for leaders, and for the media in Indonesia.
- In accordance with Head of BNPB Regulation 4/2016 concerning The Education and Training, DM education and training is encouraged for government entities, public (general public, community organizations, and NGOs), and business institutions (state/local government-owned companies and the private sector) consisting of levels of operators, technicians/analysts, and experts. In addition, simulations and rehearsals on a national and international scale can also be carried out. Article 4 of Head of BNPB Regulation 4/2016 addresses the DM education and training curriculum. The curriculum must be developed based on the results of needs analysis by BNPB's Disaster Management Training and Education Center (Pusdiklat PB).[100] From 2010-2014, BNPB conducted capacity building training for ±3,500 people. Five types of structural education and training were provided for 348 participants, as well as 13 types of technical education and training

for 3,181 participants. For capacity building, BNPB collaborates with various stakeholders, including ministries, institutions, businesses, donor agencies, local governments, and the community. In implementing these collaborations, BNPB acts as the director and provider of training resources. A total of 33 Rapid Response Teams (TRCs) formed at the provincial BPBD level and 127 at the regency/city BPBD level have participated in capacity building training since 2010. By 2015, BNPB had conducted eight trainings for TRCs. With this training, local TRC personnel are expected to have good knowledge, skills, and attitudes for carrying out rapid assessment and assistance during emergency response.[101] Training was always carried out during the DRR Month ("Bulan PRB") held annually.[5] During this series of activities, participants from all BPBDs throughout Indonesia and representatives from DRR stakeholders are invited. In October 2019, leadership training and basic training in DM were carried out and attended by 40 heads of provincial/district BPBD executive leadership from across Indonesia.[186,130]

Types of Activities organized by Pusdiklat PB: [187,188]
(1) Structural Training
(2) Technical Training
(3) Preparation of DM Training Curriculum
(4) Monitoring and Evaluation
(5) SRC Capacity Development
(6) Table-top Exercise Training (TTX)
(7) Command Post Exercise (CPX) Training
(8) Field Training Exercise (FTX) Training
(9) Field Rehearsal
(10) Incident Command System (ICS) Training
(11) Training of Trainer (TOT)

POSITION-SPECIFIC COMPETENCY REQUIREMENTS

- Position-specific competency has not been addressed by DM entities in Indonesia.
- According to Mr. Berton Panjaitan, position-specific competency has not been addressed. Currently, recruitments are based on a candidate's university degree and major. In the future, BNPB endeavors to have position-specific competency requirements identified and serve as a requirement for employability for staff positions.[186] The curriculum of each education and training program will be prepared based on competency and professional standards of the Indonesian National Qualification Framework (KKNI).[140] The DM education and training curriculum will include competency standards, basic competencies, and competency-achievement indicators. Competency standards must be mastered by participants at every level of material for qualifying levels of operators, technicians/analysts, and experts at the pre-disaster, disaster response, and post-disaster stages.[99,189,190,31]

DISASTER MANAGEMENT BUDGETS AND CAPACITY DEVELOPMENT

- BNPB is tasked with coordination and support of DM and DRR capacity development.
- The 2017 budgeting document stated that the Disaster Management Education and Training post in 2017 had reached 77.37 billion IDR (~USD 5.18 million).[73] At the national level, capacity building is implemented and organized by BNPB. Other ministries and agencies can support these efforts, depending on the specific capacity building e.g. geophysical, meteorological and climatological via BMKG, volcanology and ground movement by PVMBG. Other thematic trainings can also be conducted by the Geospatial Information Agency (BIG), Indonesian Science Agency (LIPI), or the Agency for the Assessment and Application of Technology (BPPT). Although the budget comes from the national government, the beneficiaries are local government staff through training at the local level. The establishment of the Center for Disaster Management Education and Training (Pusdiklat PB) enabled all types of capacity building to be organized. Local, provincial-, city-, and regency-level governments via BPBDs maintain a capacity building role using local government budgets.[100]

STRATEGY-DRIVEN EFFORTS

- Indonesia's capacity-development plans and strategies are used to drive CD efforts.
- Capacity building through education and training is one of the highlights in the 2015-2019 National Disaster Management Plan (RENAS-PB), which is part of the chapter on Disaster Risk Reduction in the Institutional Arrangement.[61] In the 2015-2045 Disaster Risk Reduction Master Plan (RIPB), it is stated that the governance support for managing disasters shall be professional, transparent, and accountable. To achieve the goals of the RENAS-PB plan, it is necessary to improve the quality and quantity of professional DM human resources, formed through education and technical training on sustainable DM principles, professional certification, and with the provision of moral and humanitarian knowledge. The document also states that BNPB can use pre-disaster funds to conduct DM education and training during the interim between major disasters.[18]

  Carrying out DM education and training with the Indonesian National Work Competency Standards (SKKNI) organization is also one of the strategies that needs to be carried out to realize the implementation of an emergency response that is fast and reliable.[31,140] Additional strategies include the preparation of guidelines, SOPs, the implementation of socialization, and building knowledge of the Incident Command System (ICS) to all DM actors. In the RIPB document, one of the indicators of an earthquake disaster management program is to develop a comprehensive, integrated and sustainable Indonesian Territory Earthquake and Hazard Map. One of the priorities of the strategy is to provide financial incentives for research and education in seismic fields, including to develop postgraduate programs and scholarships in tertiary institutions.[190,189]

DM AND DRR CAPACITY- AND RESOURCE-NEEDS ASSESSMENTS

- Indonesia's DM and DRR capacity and resource needs are periodically assessed through

deliberative planning.

- Within the Disaster Risk Assessment Framework, capacity needs are measured by combining the components of the Regional Resilience Index and the Village Preparedness Index, which need to be assessed in every city/district in Indonesia.[191] The Regional Resilience Index of a regency or city is compiled based on 71 indicators contained in the Regional Capacity Assessment Toolkit.[192] As of December 2019, the assessments were carried out in 34 provinces and 246 cities/regencies throughout Indonesia.[193,5]

  The Regional Capacity Assessment Toolkit targeted seven priorities including:
  (1) Strengthening Policies & Institutions
  (2) Risk Assessment & Integrated Planning
  (3) Development of Information System, Education, Training & Logistics
  (4) Thematic Management for Disaster-prone Areas
  (5) Improving the Effectiveness of Disaster Prevention and Mitigation
  (6) Strengthening Disaster Preparedness and Emergency Management
  (7) Development of Disaster-recovery System

  The following indicators and questions are examples of needs assessment:

  - Indicator 7: Local Disaster Management Agency (BPBD): Have the BPBD's resource requirements (funds, facilities, infrastructure, personnel) been met in terms of quality or quantity?

  - Indicator 16: Cross-agency disaster communication consists of at least institutions from the government, community, and business sectors, which examine:
    (1) Are joint mechanisms that play the role of sharing disaster data and information supported by adequate rules and resources?
    (2) Are certified resources trusted as key stakeholders in disaster response?

  - Indicator 19: Training and certification of the use of DM equipment including:
    (1) Has capacity building, training, certification of the use of response equipment been carried out regularly/periodically?
    (2) Have the results of the training and certification of the use of DM equipment been tested in a preparedness exercise (drill, simulation, post rehearsal, or field rehearsal)?
    (3) With the certification, can personnel respond to disasters?
    (4) Are certified resources trusted as key stakeholders in disaster response?

  - Indicator 24: Periodic maintenance of equipment and logistics supply chain:
    (1) Does the agency in the government (one of the bureaus/technical units) have sufficient resource capability (budget, personnel, equipment, mechanisms, and procedures) for handling equipment maintenance and availability of logistics supply chain for disaster-emergency needs in the area?

- Indicator 63: The deployment of a rapid assessment team to the location of the disaster: (1) Have volunteers and trained personnel conducted rapid assessments during the crisis?

- Indicator 64: Mobilization of victims' rescue and relief teams: (1) Have volunteers and trained personnel carried out rescue and victim assistance during the crisis and disaster response?

- Indicator 66: Mobilization of assistance to the farthest communities: (1) Are there volunteers and personnel distributing humanitarian assistance to the community, including those difficult to reach during times of crisis and disaster response?

COORDINATION WITH REGIONAL/GLOBAL CD EFFORTS

- BNPB's capacity-development efforts are coordinated with regional and global efforts.
- Much of Indonesia's training and capacity building in DM and DRR is carried out or in collaboration with foreign stakeholders, including international organizations, universities, research institutions, NGOs, private parties, and government institutions. USAID, PDC, UNOCHA, UNDRR, UNDP, GFDRR, AusAid, GIZ, JICA, and DMI Innovation are examples of foreign institutions that have collaborated with BNPB and BPBD in carrying out capacity building both at the national and local levels. The training topics are quite diverse, such as the use of certain software, GIS applications, modeling, Post Disaster Need Assessments (PDNA), Disaster Coordination and Rapid Assessment, etc.[101,194,186,123,195,196,197,198]

  Since 2009, UNISDR has designated October 13 as the International Day for Disaster Risk Reduction. This DRR Commemoration Day is a collective reminder of progress, success, and achievements in improving disaster resilience.[199] In Indonesia, DRR Month has been on the national agenda since 2013. Previous national DRR Month commemorations were held in Mataram City, NTB (2013); Bengkulu City, Bengkulu (2014); Surakarta City, Central Java (2015;, Manado City, North Sulawesi (2016); Sorong City, West Papua (2017); Pangkal Pinang City, Medan City, North Sumatra (2018); and Pangkal Pinang City, Bangka Belitung Province (2019), which was attended by around 2,500 people from 34 provinces throughout Indonesia.[200] The DRR Month for 2020 was planned to be held in Ambon City, Maluku; however, due to the COVID-19 pandemic, the event was postponed. In DRR Month 2018, BNPB, GETI, and UNISDR initiated UNISDR's Making City Resilience training. This activity targeted BPBD, Regional Development Planning Agencies (BAPPEDA), NGOs, and national facilitators to implement city-resilience assessments using the UNISDR Scorecard, and to introduce and invite regencies/cities to participate in the Making City Resilience program.

NATIONAL SCIENCE AND TECHNOLOGY (S&T) AGENDA

- Indonesia's national science and technology agenda addresses DM and DRR needs.
- Disasters have become one of the 10 focus areas of the 2017-2045 National Research Master Plan with the theme of Technology and Management of Geological Disasters, Hydrometeorology Disasters, Land and Forest Fires Disasters, and Environmental Management.[201] The Indonesian Institute of Sciences (LIPI) and the Agency for the Assessment and Application of Technology (BPPT) often play a role in DM and DRR. LIPI has been active in publishing research in the fields of disaster and climate change. LIPI also actively participates in BNPB activities, such as Disaster Preparedness Day.[202] Through various opportunities, such as media briefings, LIPI has also actively campaigned for community and business-sector participation in reducing disaster risks. By providing knowledge of Earth science, LIPI also participates in producing policy briefs for local government as a background for conducting spatial planning and development. Both the Deputy of Earth Sciences and the Deputy for Social Sciences and Humanities have reviewed social and humanitarian aspects in the field of disaster and climate change.[203]

  LIPI – together with the Ministry of Public Works and Public Housing (PUPR), BMKG, the Ministry of Energy and Mineral Resources (ESDM), and the Bandung Institute of Technology (ITB) which are members of the National Center for Earthquake Studies - has compiled the National Earthquake Zoning Map, which was initiated in 2009 by nine researchers known as Team-9. The study results were first published in 2010. The map is reviewed every three years and was last updated in 2017.[204] The Indonesian National Standard SNI 1726-2012 for earthquake resistance planning for building and non-building structures refers to the National Earthquake Zoning Map as its scientific basis. From a technological aspect, LIPI researchers in the field of disaster instrumentation at the Physics Research Center revealed alternative tsunami early warning systems to complement extant buoys using the Laser Tsunami Sensor. Related to landslides, LIPI has also developed a ground-motion monitoring system based on the LIPI Wireless Sensor Network for Landslide Monitoring (WISELAND).[205] The technology will be used to monitor the danger of deep and shallow soil movements on natural slopes, cuts and piles.

  BPPT has a special Disaster Risk Reduction Technology Center to support DM and DRR activities,[206] and the Center for Weather Modification Technology which often helps in handling forest fires, floods, and drought. BPPT also has a marine fleet, including the Baruna Jaya Research Vessel, which contributes to underwater research, including tsunami incidents caused by underwater landslides in Palu in 2018.[207] BPPT has disaster- related products, such as earthquake-resistant houses, flood early warning systems, and tsunami buoys. During the recent COVID-19 pandemic, BPPT produced portable ventilators, rapid diagnostic test kits, and mobile hand washers. According to the Center for Strategic and International Studies (CSIS), future S&T and DRR efforts should focus specifically on the national S&T agenda, and on how intergovernmental entities view R&D and innovation can serve the needs of DRR and DM capacity.[208]

TRAINING & EDUCATION

CONDUCT OF DM AND DRR TRAINING

- BNPB maintains a formal DM and DRR training program with one or more facilities, a dedicated staff, and a recurring budget.
- The Education and Training of Disaster Management guidance is written into the BNPB Head Regulation 4/2016. This guidance covers facilities, a dedicated staff, and a recurring budget.[100] To support the organization of training, BNPB established a Disaster Management Training and Education Center (Pusdiklat PB) tasked with carrying out the coordination and implementation of general policies in the field of education and technical disaster training. Pusdiklat PB has developed a structured curriculum based on the results of needs analysis that includes; competency standards, indicators of competency achievement, education and training methods, learning media, and learning resources.[188] The training provided by the Training Center is not only for government officials but also available for public- and private-sector experts. Pusdiklat PB works with agencies, institutions, and organizations that carry out DM on a national and international scale. Business institutions involved with the implementation of DM activities can thus collaborate with allied experts in the field of DM for capacity building. Capacity building is facilitated via both BNPB and BPBDs through seminar forums, technical guidance, and education and training.[209,210,101]

  The funding for DM education and training is sourced from: (1) the state revenue and expenditure budget (APBN); and (2) local income and expenditure budget (APBD). Additional financing is available from other non-binding sources, such as foreign aid or private-sector actors. As stated in the 2017 budgeting document, the Disaster Management Education and Training budget in 2017 reached 77.37 billion IDR (~USD 5.18 million). At the national level, capacity building is organized by BNPB.[73] Other ministries and agencies can lend support depending on the area of capacity building (e.g., geophysical, meteorological, and climatological by BMKG; volcanology and ground movement by PVMBG). Other thematic trainings can be conducted by the Geospatial Information Agency (BIG), Indonesian Science Agency (LIPI), or the Agency for the Assessment and Application of Technology (BPPT). Although the budget comes from the national government, the beneficiaries are local government staff through training at the local level. Local-, provincial-, city-, and regency-level governments implement capacity building using local budgetary resources through their respective BPBDs.[186]

SCOPE OF TRAINING AND EDUCATION CURRICULUM

- The BNPB DM and DRR training curricula address a comprehensive and expanding set of training and education requirements that closely track all typical and emerging needs across a diverse audience of stakeholders.
- To maintain consistency in service quality, a Minimum Service Standard (SPM) is required in

the administration of DM. The implementation of DM MSPs for the national and regional governments is based on agreed needs maps. SPM is the basis for increasing the capacity of government-apparatus resources related to DM in a structured, tiered, and continuing manner based on competence supported by (1) a certified curriculum; and (2) regular training for DM management that is accountable, transparent, and based on established guidelines and procedures. Increasing the resource capacity of government agencies also depends on the DM.

Article 4 of Head of BNPB Regulation 4/2016 expands upon the BNPB DM education and training curriculum. The curriculum must be developed based on the results of needs analysis by Pusdiklat PB. Position-specific competency requirements have been identified and serve as a requirement for employability for staff positions. The curriculum of each education and training program is based on the professional standards of the Indonesian National Qualification Framework (KKNI).[31] The DM education and training curriculum includes competency standards, basic competencies, and competency achievement indicators. Competency standards must be mastered by participants at every level of material for qualifying levels of operators, technicians/ analysts and experts at the pre-disaster, disaster response and post-disaster stages.[211]

At present there are 24 types of curriculum, including:[188]

- Post-Disaster Need Assessment/Jitu Pasna (2018)
- DM Logistic & Equipment Management (revision) (2018)
- Basics of Disaster Management (2017)
- DM Operation Control Center/Pusdalops (2015)
- Radio Communication System (2011)
- Contingency Plan (2009)
- Basic Disaster Management Volunteers (2011)
- Rapid Response Unit (SRC) (2012)
- Field Technical for Disaster Management (2012)
- DM for Disabilities (2014)
- Psychosocial Support during Disaster (2015)
- DM for Reporters (2014)
- Climate Change Adaptation (2013)
- Disaster Resilient Village Facilitator (Destana) (2013)
- Coordination & Rapid Assessment (K2B) (2012)
- Urban SAR (2015)
- Disaster Shelter Management (2013)
- Navigation and Mapping (2013)

- Leadership in Disaster Management for the Chief Executive of BPBD (SMT) (2018)
- DM Training Design (2018)
- Disaster Risk Assessment (2018)
- Field Hospital
- Commander for Disaster Emergency Management (PDB) (2018)
- Disaster Preparedness for Woman (Srikandi Siaga Bencana) (2019)

TRAINING METHODS

- DM training is delivered via geographically distributed in-person training facilities with supplemental online resources.
- Pusdiklat PB was established in 2009 and conducts DM education and training under the coordination of BNPB through Head of BNPB Regulation 14/2009 concerning Disaster Management Education and Training.[92] With the increasing role of education and technical training in the field of disaster management, in 2014 the Pusdiklat PB occupied its new office in the Indonesia Peace and Security Center Complex (IPSC) in the Sentul area of Bogor - West Java.[101] The inauguration of the new Pusdiklat PB building was carried out by President Susilo Bambang Yudhoyono. The building was subsequently inaugurated as a flagship center for DM training and DRR, and designated as the Indonesia-Disaster Relief Training Ground (INA-DRTG). The INA-DRTG complex is equipped with excellent facilities to ensure that it is a center of excellence for enhancing the capacity and competence of human resources, and a leading center for DRR at national, regional, and international levels.[210]

  In addition to being centralized in INA-DRTG, capacity building and training are partially carried out at the local level, usually with coordination from the local BPBD or other institutions, such as BMKG, PVMBG, Forum PRB, KOGAMI, universities or NGOs (PMI, etc.). At local levels, the audience typically consists of volunteers, DRR forums, communities located in disaster-prone areas, MSMEs, and other potentially exposed individuals, including farmers and fishermen. Capacity building can be in the form of indoor training, table-top exercises, or field activities, such as simulations (SimEx) and rehearsals.[187] The themes presented are quite diverse; e.g., risk assessment, participatory vulnerability assessment, utilization of communication tools and sensors, and access to weather information. There is also training on disaster- information writing for journalists.[198] In addition to BPBD staff, speakers are usually invited from BNPB and other relevant institutions, such as BMKG, PVMBG, PUPR, NGOs, universities, or research institutions.[186,212]

TRAINING CATALOG AND SCHEDULE

- BNPB maintains a structured annual training schedule and catalog of available courses and

dates that support comprehensive training throughout the year.
- Yes, a training schedule and catalog exists.[188,187,186]

MAINTENANCE OF TRAINING RECORDS

- Training records are maintained by BNPB in a centralized system.
- The website http://pusdiklat.bnpb.go.id/participants has information on capacity building activities that have been carried out, including the name of the activity, place, time, resources used, and a list of participants who attended the event. At least 95 activities carried out between 2011-2020 were recorded in the system. Alumni records are also maintained for training programs.[213,214]

PROGRAM TO SUPPORT EXERCISES

- A formal exercise program with a dedicated staff is maintained by BNPB.
- Currently there are 42 Pusdiklat PB employees consisting of 31 civil servants (PNS) and 11 supporting staff. Of the 31 civil servants, 11 are functional officials (Widyaiswara) covering specialization on Disaster Prevention, Disaster Emergency Management, Disaster Logistics and Equipment, Disaster Rehabilitation and Reconstruction and Disaster Basic Knowledge. Educators and trainers in DM training activities typically are recruited from the pool of trainers, instructors, and Widyaiswara, with additional staff recruited internally or external to BNPB. The trainer or instructor is assigned as a motivator or educator of certain skills based on experience, competence, and according to her or his authority. Functional officials function as professionals who facilitate the learning process based on competence and according to their authority. The resource person functions as an expert who provides academic insight based on her or his qualifications and competencies. Trainers, instructors, and functional officials must have a "Training of Trainers" graduation certificate in accordance with their area of competence.[100,187,209,186,194,101]

EXERCISE EVALUATION STANDARDS

- Exercise standards are common throughout the BNPB AOR.
- Monitoring and evaluation (M&E) is specifically discussed in Chapter 7 in the Head of BNPB Regulation 4/2016. Implementation — including organizing, curriculum, teaching materials, learning, assessment, teaching staff, participants, and facilities and infrastructure — is done by Pusdiklat PB and/or ministries, institutions, and organizations that conduct DM education and training. M&E of alumni is conducted periodically after the completion of six months of DM training and education.[100,188,186,194,101]

STRUCTURED ANNUAL EXERCISE SCHEDULE

- BNPB maintains a structured annual exercise schedule.
- Training is carried out on a regular basis during the DRR Month ("Bulan PRB") activity held

annually. During this series of activities, participants from all BPBDs throughout Indonesia and representatives from DRR stakeholders are invited. [100,188,186,194,101,187,215]

NATIONAL-LEVEL EXERCISE

- Indonesia conducts a national-level exercise annually.
- DRR Month ("Bulan PRB") has been on the national agenda since 2013 [see page 111].

SUPPORT FOR SUB-JURISDICTIONAL EXERCISES

- BNPB provides comprehensive technical, advisory, financial, and material support to sub-jurisdictions.
- BNPB supports regional exercise and capacity building efforts via standards, collaboration, and funding [see page 110].

EXERCISE PARTICIPATION REQUIREMENTS

- Indonesian government agencies with DM functions are required to participate.
- BNPB routinely conducts several training and capacity building exercises for its own staff. BPBDs at the local level government also routinely send their staff to Pusdiklat PB to participate in DM training and exercises.

STAKEHOLDER INVOLVEMENT IN TRAINING AND EXERCISES

- Indonesian NGO and private-sector stakeholders are invited to participate in BNPB training and exercises.
- In accordance with Head of BNPB Regulation 4/2016, disaster managers are obliged to undergo education and training for public (general public, community organizations, and NGOs), and business institutions (state/local government-owned companies, and the private sector). These cohorts consist of all levels of DM operators, technicians, analysts, and experts. In addition, simulations and rehearsals can also be carried out. These trainings are an effort to mitigate disasters by increasing the capacity of DM actors and potentially affected subjects, such as the community.[100,186]

DM PROGRAMS IN THE HIGHER-ED COMMUNITY

- BNPB incorporated a robust, formally organized community of higher-education institutions into its DRR efforts, many of which offer programs that support DM professionalization.
- Higher-education and community members are involved in governmental DM efforts through the Higher Education Forum for Disaster Risk Reduction (FPT-PRB) established in 2008. The FPT-PRB is expected to carry out the risk-assessment and monitoring agenda, develop and implement early warning systems, increase the use of knowledge, encourage innovation, and

expand disaster education to build a culture of safety and resilience at all levels. The mission of FPT-PRB is academic excellence, capacity building, and advocacy. FPT-PRB also regularly holds "Members' Annual Scientific Meetings." As of 2017, 38 universities have been incorporated in this forum. [7,48,46,41]

HIGHER EDUCATION DM AND DRR

- Indonesian Universities offer a broad range of DRR and DM higher education options, including PhD, DSc, Master's, and Bachelor's degrees, as well as professional certificates.
- Currently, there is no university that provides a specific bachelor degree in the field of disaster, but there is a special curriculum in the field of disaster in several departments for undergraduates, such as the Faculty of Medicine Gadjah Mada University (UGM).[216] There are several universities that provide a Master's degree for DM majors, including UGM,[217,218] Airlangga University (Unair),[219] UPN Veteran Yogyakarta,[220] and Syah Kuala University.[221] A doctoral program in the field of disaster management is not specifically available, but many topics in this field are included in other doctoral programs at various faculties, such as the Faculty of Social and Political Sciences, University of Indonesia.[222]

NATIONAL DM CURRICULUM

- Currently, a nationwide Indonesian DM and DRR curriculum for K-12 is under development.
- The basic and secondary education curriculum does not explicitly contain disaster education. However, disaster education has been accommodated in the 2013 Curriculum currently in use. In this curriculum, teachers have flexibility in preparing learning-activities plans commonly called Learning Implementation Plans (RPP). Currently, there are teachers who implement disaster education in the classroom, for example when teaching about mountains, beaches, or other themes. In several regions, such as DKI Jakarta, Yogyakarta, and North Central Timor, disaster education has become an integral part of local content. Disaster content and guidance has also been taught via geography courses in senior high school lessons on "Geosphere Dynamics and Its Effects on Humans and Disaster Mitigation." But not all students in senior high school study geography, as only social studies are required. In the natural sciences, geography is only taught as an elective subject (not mandatory), while in vocational schools it is not taught at all.[223,224,225]

PUBLIC AWARENESS, PREPAREDNESS, AND RESILIENCE-BUILDING PROGRAM

- Formal public awareness, preparedness, and resilience-building programs are routinely carried out annually by BNPB as a national DM actor, or by the BPBD at the local level.
- "Disaster Risk Reduction Month" is held every year in different locations filled with a variety of activities, including seminars, actions, jamborees, creativity contests, disaster-writing competitions, field trips, fun walks, and others. In 2016, BNPB recruited and trained 620 volunteers for DRR Month. Capacity building for disaster risk reduction has also been carried out

at the community level through disaster exhibitions and the establishment of 110 disaster-resilient villages in provinces/cities along the National Medium-term Development targets. Disaster-safe school has been another effective program to build early understanding for students in 16 local governments including Aceh, Bengkulu, Tanggamus, Bogor City, Pacitan, East Lombok, Ende, Kolaka, Gowa, North Minahasa, North Halmahera, Samarinda City, and Sleman. Disaster management socialization with a cultural approach also occurs through the media and traditional arts, such as shadow puppet shows (Wayang) held in disaster-prone areas in Banyuwangi, Sukabumi, Karanganyar, and Magelang. The community is enthusiastic about attending such "edutainment" events. [35,215,226,36]

PUBLIC EDUCATION METHODS

- DM public education is provided on official websites, through media, and other campaigns (targeting a generalized audience), and through multi-modal methods (to targeted groups) in Indonesia.
- Multi-modal disaster-preparedness information has been disseminated to different targeted sectors, stakeholder groups, and audiences. These modalities include electronic mass media (news sites & video channels), private television stations, government television broadcasts, government websites, social media (Twitter, Instagram, Facebook, and YouTube channels), direct socialization in academic environments (schools and campuses), and community and commercial radio. BNPB Public Relations routinely produces visual educational material in the form of documentary films, public lectures, coverage, cartoon animations, animated disaster events, and other creative material uploaded to a YouTube channel. BNPB often invites school and campus communities to the BNPB offices and Pusdiklat PB (INA-DRTG) complex that are equipped with educational facilities, such as a Disaster Diorama and interactive multimedia facilities. BNPB also produces educational materials in the form of books, comics, and booklets that are routinely distributed to the school environment when conducting visits. Educational materials that utilizes mobile technology and virtual reality (VR) and 3D are also growing in popularity. Other grassroots educational innovations include dramas and shadow puppet (Wayang) shows. Such exhibitions are routinely held during the annual Disaster Month activities with themes such as the socialization of disaster-prone areas, exhibits of early warning system tools, and other innovative vehicles.

  Complementing national efforts, local and regional BPBDs also have innovative ways of delivering education to the community. Some provincial BPBDs often interact with schools in activities such as the Scout Jamboree, Car Free Day, or exhibitions. Denpasar City BPBD has a 3D simulator vehicle in its office that educates stakeholders regarding what to do when fires, earthquakes, or tsunami events occur. Elementary school children are routinely invited to conduct disaster-preparedness educational activities at the BPBD office.[36,35]

DISASTER-PREPAREDNESS INFORMATION FOR THE PRIVATE SECTOR

- Business institutions in Indonesia are provided with informational and resource support for preparedness and resilience efforts.
- Business institutions and civil society have the opportunity to carry out disaster management, both individually and jointly with other parties, as clearly mentioned in Chapter VI Law 24/2007.[1]
- Business institutions are also given the opportunity to participate in developing a national action plan for DRR (under government regulation Article 8.3) and conduct preparedness activities (Article 16.3).[3] In accordance with Head of BNPB Regulation No. 12/2014,[34] pre-disaster activities that can be undertaken by a business entity include the following:

    - Disaster-risk identification and monitoring;
    - Participatory disaster management planning;
    - Development of a culture of disaster awareness;
    - Organizing, installing, and testing early warning systems;
    - Organizing, counseling, training, and rehearsing about the mechanism emergency response;
    - Disseminating information on disaster warnings preparing evacuation routes; and
    - Other activities to reduce or eliminate disaster risk.

- Business institutions also share capacities with parties in the field of DM through capacity building activities, such as seminar forums, technical guidance, and education and training (Head of BNPB Regulation No 12/2014 Article 24.4). Head of BNPB regulation 14/2009 concerning Guidelines for Disaster Management Training Implementation states that business institutions are also part of the Disaster Management Training effort, wherein participating businesses via the "train the trainer" modality can develop curricula and supporting materials tailored to the needs of the organizing agencies (Articles 12 & 15).[99] In addition to materials provided during the training, in 2017 BNPB also published the Disaster Preparedness Training Manual, which aims to ensure that central/provincial/regency /city governments, NGOs, business entities, and related parties who wish to carry out preparedness training have a common reference that is understandable.[227] The training manual covers natural disasters that often occur in Indonesia – earthquakes, tsunamis, volcanoes, floods, landslides, and building fires. BNPB also publishes the 2019 Disaster Preparedness Pocketbook, a concise guide on acting responsive, agile, and resilient in dealing with disasters.[182]

  In addition to providing information about different types of disasters and warning-service efforts, the purpose of holding disaster-preparedness exercises is to help stakeholders:

    - Plan and implement preparedness exercises in accordance with the threats in each region, especially in the activation of early warning sirens and self-evacuation exercises in schools, hospitals, buildings, and settlements; and
    - Encourage preparedness exercises carried out by the government, both national and local, and other stakeholders (such as NGOs, communities, schools, universities, hotels, companies, mall managers) who act according to their respective functions.

  Broadly speaking, the objectives of preparedness exercises are:

- Assess the response/reaction of individuals, families, and communities in carrying out planned evacuations;
- Increase the capacity of human resources in implementing Standard Operating Procedures (SOPs);
- Review the capabilities of communication-support equipment for early warning systems, evacuation support, and emergency-response support
- Assess cooperation between local institutions/organizations; and
- Evaluate and identify preparation and planning sections that need to be improved.

CAPACITY DEVELOPMENT MONITORING & EVALUATION

STANDARD-EVALUATION PROCEDURES

- The evaluation and revision of BNPB plans, strategies, and SOPs occurs, but procedures and practices are not standardized.
- Article 14 Law 24/2007 states that one of the duties of the BNPB Steering Element is to evaluate the implementation of disaster management at the national and local level.[1] Articles 7b and 9b also states that the authority of both national and local government in the implementation of DM involves developing plans that incorporate the elements of DM policies. Articles 34 and 35 also state that DM planning is one of the activities in implementing DM in situations where no disaster has occurred and is included in pre-disaster activities. Guidelines for completion of a disaster management plan is thoroughly described in BNPB Head Regulation 4/2008.[97] However, there are no standardized procedures and practices for the evaluation and revision of plans, strategies, and SOPs.

  In the 2015-2045 Disaster Management Master Plan (RIPB), Chapter 5.3 elaborates on the monitoring and evaluation framework. The implementation of the RIPB Monitoring, Evaluation & Reporting (MEP) aims to (1) continuously monitor the RIPB implementation process, (2) anticipate obstacles and problems in implementing RIPB as early as possible, (3) achieve minimum standards and improve DM performance, (4) compile information and report on the achievement of activities in a rapid, precise and accurate manner and (5) preparation of recommendations for improving the implementation and planning of DM in a comprehensive, integrated and sustainable manner.[18] In 2016, BAPPENAS issued an Evaluation of Cross-Sector Disaster Management Plans in Achieving Development Targets.[228] The report was prepared to fulfill the implementation of the Development Monitoring and Evaluation Program, which evaluates the efficacy of planning and DM efforts in achieving development both at the regional and national levels. The evaluation is based on obstacles and problems often encountered in the field and that have the potential to hamper the synchronization process between sectors related to DM. Based on the problems and constraints that exist, BNPB and partners will seek alternative solutions and improvements to the

implementation of program planning and activities in the coming year.

REVIEW OF PLANS, STRATEGIES, AND SOPS

- BNPB's plans, strategies, and SOPs are reviewed and revised as needed on a regular but less-than-annual basis.
- Articles 6.5 and 6.6 of Government Regulation 21/2008 state that the DM plan is determined by the regional government in accordance with its authority for a period of five years, and is periodically reviewed every two years or at any time if a disaster occurs.[3] Article 8.7 states that the national action plan and the local action plan for DRR are set for a period of three years and can be reviewed as needed.

REVIEW OF DM LEGISLATION

- Indonesia's DM-relevant legislation is reviewed and updated only after major disaster events or developments.
- Since 2007, there has been no amendment to the Law 24/2007 on Disaster Management. However, the plan to revise Law 24/2007 has been included in the 2020-2024 National Legislation Program (Prolegnas), which has been proposed since 17 December 2019. As of September 2020, the process has reached the stage of the Proposal for the House of Representatives.[229] In addition, in 2020 several presidential decrees were issued regarding the formation of the COVID-19 Task Force and the determination of the COVID-19 pandemic as a National Disaster.[135]

REQUIREMENTS FOR POST-DISASTER REVIEWS

- Post-event reviews occur after all major disaster events in Indonesia, irrespective of whether or not requirements exist.
- Government Regulation No 21/2008 Chapter IV on Post-Disaster Article 56 states that within the rehabilitation process, officials must set rehabilitation-action priorities based on damage and loss assessment.[3] Article 59 paragraph 3 also states that the use of assistance provided by the national government (GoI) to regional governments is monitored and evaluated by a team of non-departmental government ministries and agencies involving various BPBDs and coordinated by the Head of BNPB. In terms of institutionalizing after-action reviews and evaluation, the BNPB structure includes a Rehabilitation and Reconstruction Division with a Directorate of Damage Assessment. This directorate has the task of coordinating the formulation of general policies, working relations, planning, and implementation, as well as monitoring, evaluation, and reporting analysis in the field of damage assessment. Furthermore, Chapter V of Head of BNPB Regulation 17/2010 concerning Rehabilitation and Reconstruction Guidelines also mentions monitoring and evaluation specifically for the rehabilitation and reconstruction process.[177]

INCORPORATION OF EVALUATIONS INTO PLANS, POLICIES, AND SOPS

- Evaluations are conducted and outcomes are used to improve or otherwise modify plans, policies, and SOPs used by Indonesian DM stakeholders.
- For example, the 2015-2019 National Disaster Management Plan (RENAS PB)[61] plan was based on the results of the 2010-2014 RPJMN evaluation,[103] the 2010-2014 RENAS PB study and evaluation,[94] and the 2010 National Action Plan for Disaster Risk Reduction (RAN PRB) 2010-2012.[93]

COMMUNICATION & INFORMATION MANAGEMENT

HAZARD & RISK ANALYSIS

RISK-ASSESSMENT PROCESSES AND STANDARDS

- Indonesia institutes a standard risk-assessment process at national and provincial levels, which are generally adhered to.
- In 2012 the BNPB formally established risk-assessment guidelines. The mandate concerns "Ministries/Institutions, Regional Governments, and Communities."[191 (Section 2)] The regulation aims to: (1) provide adequate guidance for each risk for each region; (2) optimize the implementation of DM in an area with focus on treating several risk parameters on a clear basis; and (3) align the policy direction of the implementation of DM among central, provincial, and district/city governments in a united goal. BNPB Regulation 2/2012 delineates its scope of assessment to include: (1) assessment of threat level; (2) assessment of the level of vulnerability; (3) capacity-level assessment; (4) assessment of the level of disaster risk; and (5) DM policies based on the results of studies and disaster risk maps. Each risk assessment is considered valid for five years from time of assessment study (Section 2.6); risk assessment may be carried out by any institution under the auspices of national, provincial, or city governments, provided they adhere to the BNPB's guidelines (Section 2.7).[191 (Section 2.7)]

  Additional codification towards standardization of risk assessment is in place via the National Standardization Body of Indonesia. National standard SNI 8182: 2017 (National and Provincial Level Disaster Risk Assessment Guidelines)[230] "establishes technical and practical requirements for national and provincial disaster risk assessments in the form of general concepts, methods and results of studies for the benefit of national and provincial level disaster management planning."[230] Moreover, BNPB has issued numerous publications stipulating in comprehensive detail the processes and standards required for risk-assessment activities, including at least eight Technical Modules for risk assessment with

protocols and standards relating to specific hazards: (1) extreme wave and coastal erosion, 111 pp; (2) extreme weather, 96 pp; (3) tsunami, 101 pp; (4) forest and land fire, 67 pp; (5) volcano, 98 pp; (6) earthquake, 101 pp; (7) flood, 107 pp; and (8) landslide, 100 pp.[231] Other examples of documentation of processes and standards include, but are not limited to, the Indonesia Disaster Risk Index (IRBI) (2018),[29] Disaster Risk Indonesia (RBI) (2016),[232] and SNI mandates from the National Standardization Body of Indonesia, e.g., SNI 8182: 2017, national- and provincial-level disaster risk-assessment guidelines.[230]

RISK-ASSESSMENT REQUIREMENTS FOR PLANNING

- BNPB mandates risk assessments, but there are no enforcement mechanisms.
- Regarding risk-assessment requirements for DM and DRR planning, BNPB Regulation 2/2012 (About Disaster Risk Assessment Guidelines)[191] specifies that risk assessments shall be the foundation for DM and DRR policies and plans.[191 (Chapters 3, 6 & Section 2.4)] Chapter 6 dictates that this foundational approach is a continuum from national to district/city level plans.[191]

  In addition, the Technical Instructions (TI) for The Development of Regional Disaster Management Plan District/City Levels (2015) from BNPB reconfirms that all district and city disaster management plans shall use risk assessment as a foundation upon which to build.[233(p5)] The Technical Instructions further establish that all Regional Long-Term Development Plans (RPJPD) and Regional Medium-Term Development Plans (RPJMD) must incorporate their respective district/city DM plans (ibid.) Funding recommendations in the TI refer users to provincial and district/city budgets (APBDs) but do not specifically tie funding mechanisms to risk-assessment requirements.[233(p79)] Rather, the BNPB assumes that all APBDs allocate 1% of total budgets for DM purposes (ibid.). Historically this has not been the case: the average regional budget for BPBDs was 0.38% of regional APBDs, whilst actual DM funds averaged 0.1% (well below the requisite amount).[54(p38)]

RISK-ASSESSMENT STAFFING CAPACITY

- BNPB and regional BPBDs require outside assistance to perform risk assessments as required.
- Regarding the management of risk-assessment needs in Indonesia, reliance on outside consultants is a necessity.[127] Consultants appointed by the BNPB are acknowledged in the Introduction to Disaster Risk Assessment and Stages Compilation of the 2019 Disaster Risk Map[193] and have assisted with many activities relating to risk assessments across organizations and are regularly utilized.[5,127]

VULNERABILITY MEASUREMENTS IN RISK ASSESSMENTS

- Vulnerability is measured using complex and comprehensive assessment criteria by BNPB and partners.

- Risk-assessment methodologies in Indonesia integrate vulnerability as a major component of the data analysis methodology used in the construction of their risk index (weighted component values are vulnerability 30%, capacity 30%, and hazard 40%).[29(p14)] The Indonesian Disaster Risk Index (IRBI) is calculated based on the following formula: disaster risk ≈ hazard (vulnerability/capacity) (note this is a general approach and does not represent the totality of calculations that go into the disaster risk index).[29] Components of the vulnerability index are (1) socio-cultural, (2) physical, (3) economic, and (4) environmental (ibid. p. 5).[29(p5)] Socio-cultural vulnerability parameters measure density ratios of vulnerable populations based on gender, age, poverty level, and special needs (parameters are analyzed using methodology dictated by BNPB Regulation 2/2012 for social vulnerability). Each parameter is then mapped spatially.[232(p48)]

  Physical vulnerability parameters are based on the monetary value of houses, public facilities, and critical facilities, and then measured against the specific hazard class(es) relevant to the area; parameters are analyzed using methodology dictated by BNPB Regulation 2/2012 for physical vulnerability. Parameters are then mapped spatially.[232(p49)] Economic-vulnerability parameters are Gross Regional Domestic Product (GRDP) and productive land using a methodology dictated by BNPB Regulation 2/2012 for economic vulnerability.[232(p50)] Environmental- vulnerability parameters include protected forests, natural forests, mangrove forests, scrub, and swamp identified using land-cover data analyzed using methodology dictated by BNPB Regulation 2/2012 for environmental vulnerability.[232(p51)]

  Each hazard has different standardized parameters for vulnerability; e.g. for landslide vulnerability, the National Standardization Agency (SNI) Preparation of maps of ground-motion vulnerability zones provides guidelines for uniformity of calculations in the mapping of vulnerability of land movements.[234] Moreover, BNPB's Tech Modules on specific hazards dedicates a chapter to explicating vulnerability as it relates to and can be measured in each individual hazard.[231]

CLIMATE CHANGE INCLUDED IN RISK ASSESSMENTS

- Climate change criteria are limited in scope, and inclusion of climate change measures is hindered by implementation challenges in Indonesia.
- The first priority of the Sendai Framework for Disaster Risk Reduction (SFDRR) is Understanding Disaster Risk, wherein "the conduct of comprehensive surveys on multi-hazard disaster risks and the development of regional disaster risk assessments and maps, including climate change scenarios" shall be incorporated.[50] Indonesia is a signatory to the SFDRR. Evidence of the inclusion of climate change in risk-assessment activities in Indonesia, specifically concerning the risk index of DKI Jakarta, is found in the Indonesia Disaster Risk Index (IRBI).[29(p94)] In addition, according to the National Standardization Agency's SNI, *Disaster Resilient Villages*,[235] climate change factors shall be incorporated into the scientific process of risk assessment. However, despite documentation that shows a commitment to the inclusion of climate change factors, specific methodologies for the inclusion of climate change in risk assessments are not apparent

in literature from BNPB.

LOCAL AND INDIGENOUS KNOWLEDGE IN RISK ASSESSMENTS

- Local and indigenous knowledge is included in risk assessments in Indonesia.
- On principle, the BNPB advises in its regulation 2/2012: "Doing integration analysis of probability of occurrence of threats from experts with the local wisdom of the community."[191 (Section 2.2)] This is reiterated in each of the BNPB's Tech Modules for specific hazards.[231] In addition, according to *Disaster Resilient Villages*,[235 (Section 4)] local wisdom shall be incorporated into the scientific process of risk assessment.

  Two projects that support the incorporation of local and indigenous knowledge are Yayasan Peta Bencana (Disaster Map Indonesia Foundation known as Peta Bencana) and InaSAFE. Peta Bencana is a collaborative public platform supporting collective research committed to "partnerships and training programs with various local communities, agencies, and universities across Indonesia."[78] InaSAFE is an open-source risk-mapping site providing a "simple but rigorous way to combine data from scientists, local governments and communities to provide insights into the likely impacts of future disaster events."[236]

HOSTING OF RISK-ASSESSMENT INFORMATION

- BNPB leverages a centralized GIS system to support risk-assessment reporting, and all sub-jurisdictions have access to and training support on this system.
- InaRISK is Indonesia's premiere risk-assessment portal using ArcGIS server web-mapping technology. Each of BNPB's eight Technical Modules on specific hazards contain detailed, step-by-step instructions for risk mapping using InaRISK tools.[231] As of December 2018, 34 provinces (100%), 231 cities (45%), and 134 district/city locations (98.5%) have completed risk assessments, including all risk-mapping requirements facilitated by the BNPB.[193(p42)]

RISK-MAPPING REQUIREMENTS

- Risk-mapping requirements exist at all levels of Indonesia's government (national, subnational, local) with support provided and enforcement mechanisms utilized.
- Risk mapping is a requisite component of risk assessment in Indonesia.[191 (Chapter 5)] Mapping requirements include levels of detail required for risk mapping that are incumbent upon the entity doing the mapping; e.g., the national government must provide city-level detail, provincial governments must provide district-level, and city governments must provide keluraha/village/kam-pung/nigari-level details.[191 (Section 3.1)] There are minimum scaling requirements (e.g., "1: 250,000 for the province; 1: 50,000 for regencies/cities on the islands of Sumatra, Kalimantan and Sulawesi; map with scale 1: 25,000 for regencies/cities in Java and Nusa Tenggara"),[191] and

mapping must provide potential (and actual) number of people exposed, potential losses in value of property , and potential environmental damages.[191] For public-facing maps, three levels of risk are indicated: high, medium, and low.[191] In addition, using geographic information systems (GIS) requires a computer-assisted grid analysis of 1 hectare.[191] Geospatial Information Agency (GIA) Regulation Number 8 2015 (Regulation 8/2015) establishes mandates for "Norms, Standards, Procedures, And Quick Mapping Criteria for Earthquake Disaster, Mountain Fire, Tsunami, and Flood."[237]

RISK-MAPPING CAPACITY

- Adequate risk-mapping capabilities and resources are maintained by BNPB and regional BPBDs.
- BNPB, in cooperation with the United Nations Development Program (UNDP) and other NGOs, has developed sophisticated capabilities with InaRISK, a GIS risk-mapping and assessment site.[28] InaRISK is available to all entities, including the general public.

Specifically, InaRISK is a web-based risk-assessment portal leveraging the ESRI ArcGIS server platform to field geospatial and interactive data relating to:

1. Potential hazards

2. Potential population affected

3. Potential physical losses (Rupiah)

4. Potential economic losses (Rupiah)

5. Potential environmental damage (hectare)

6. Monitoring tool for disaster risk-reduction index

Strategically, InaRISK as a portal for the sharing of spatial data that accomplishes the following:

1. Tool dissemination of disaster risk assessments.

2. Supports central government, local government, and other parties to strategize the implementation of programs, policies, and activities to reduce disaster risk at the national and subnational levels.

3. Provides spatial data for further analysis, such as MHEWS, Global Centre Disaster Statistics (GCDS), and spatial planning.

In addition, BNPB, the Australian government, and the World Bank Global Facility for Disaster Risk Reduction (GFDRR) have developed an open-source site – InaSAFE - that "produces realistic natural hazard impact scenarios for better planning, preparedness and response activities,"

providing a "simple but rigorous way to combine data from scientists, local governments and communities to provide insights into the likely impacts of future disaster events."[236]

RISK-ASSESSMENT LINK TO DEVELOPMENT PROCESSES

- Risk assessment is integrated with development processes in Indonesia.
- In terms of incorporating risk assessments into development processes in Indonesia, according to the Internal Auditor (BPKP), Government of Indonesia (GOI) Regulation Number 60 Year 2008 (Regulation 60/2008),[238] concerning the System of Government Internal Control (SPIP), all government agencies and ministries must implement the following SPIP:

  1. Environmental control

  2. Risk assessment

  3. Control activities

  4. information and communication

  5. Monitoring international controls

  As such, the Ministry of National Development Planning (BAPPENAS) operates under that SPIP mandate. BAPPENAS has extensively explicated and codified these obligations in their Implementation Guidelines for Operational Risk Assessment (Regulation 3/2018).[239] BAPPENAS and the BNPB Disaster Management Master Plan (RIPB) 2015-2045 are stipulated to be the reference points for the RIPBs for 2020-2024 and 2025-2029.[18(piv)] The RIPB is a regulatory document to guide implementation, oversight, and evaluation procedures for development planning that incorporates DM planning.[18(pp147-161)] In addition, BNPB's Regulation Number 2 of 2012 About General Disaster Risk Assessment Guidelines stipulates that the results of risk assessment shall be mainstreamed to inform development plans (Section 2.2).[191 (Section 2.2)] Regulation 2/2012 also mandates that infrastructure development projects incorporate risk assessment into plans.[191 (Section 4.5)]

MONITORING & NOTIFICATION

EXISTENCE OF HAZARD MONITORING

- Monitoring of all major hazards is occurring throughout Indonesia.
- BNPB is a well-regarded global entity for hazard monitoring, information management, and

innovation, leveraging multi-hazard early warning systems (e.g. http://mhews.bnpb.go.id/) with InAWARE, the Pacific Disaster Center DisasterAWARE platform for Indonesia.[240,241]

COORDINATION OF HAZARD MONITORING

- Several entities are involved in monitoring efforts including BMKG, PVMBG, BIG, KLHK, BPBDs, and EOC/Pusdalops with BNPB coordinating.
- Based upon Indonesia Law No. 24 of 2007 concerning disaster management and the BNPB's longstanding hazard data-information systems efforts, the BNPB Operations Center in Jakarta leverages the PDC InAWARE platform for all-hazards situational awareness. The InAWARE systems, built upon the PDC's DisasterAWARE suite of EOC, desktop, and mobile tools, incorporates legacy data from DIBI, the Multi-Hazard Early Warning System MHEWS http://mhews.bnpb.go.id/, and hundreds of local, regional ,and global authoritative hazard-alerting sources. [1,120,242,243]

POPULATION IN AREAS SERVED BY MONITORING EFFORTS

- Monitoring hazards benefits between 25% and 75% of Indonesia's population.
- For the past decade, DRR and DM have been top priorities for Indonesia. Monitoring all hazards across 17,504 islands and a 81,000-km coastline with 13% (127) of the world's active volcanoes is why BNPB has leveraged InAWARE with the latest web-based, common-operational picture capabilities built on PDC's DisasterAWARE suite of cloud-based tools. According to the International Working Group on Satellite-Based Emergency Mapping (IWG-SEM 2018), " DisasterAWARE uses authoritative national and international sources to automate hazard detection and alerting for earthquakes, tsunamis, tropical storms, high winds, high surf, tornados, volcanos, and wildfires and leverages a network of analysts and partner organizations to manually trigger alerts for floods, droughts, landslides, biomedical and other hazards. It provides alerts via email, SMS and the Telegram app as well as via CAP" – Common Alerting Protocol, an ISO and OGC standard (https://www.wmo.int/pages/prog/amp/pwsp/CommonAlertingProtocol_en.html). The use of InAWARE by BNPB and a broad swath of GoI (Government of Indonesia) stakeholders ensures that all of Indonesia's jurisdictions benefit from BNPB's collaborative local, provincial, national, and international hazard monitoring.[244,245(p9),246]

DOPPLER RADAR COVERAGE

- Between 75% and 100% of Indonesia's land area has Doppler radar coverage.
- As of 2013, there are 27 Doppler radar installations covering most of Indonesia. The only concerns lie in urban areas where the height of certain buildings can interfere with Doppler data acquisition, according to a February 2020 onsite communication in Jakarta.[247,248,249]

HAZARD-MONITORING RESPONSIBILITY

- Hazard monitoring is managed by relevant Indonesian agencies with relevant or hazard-specific missions.
- In Indonesia, a variety of governmental agencies – e.g., BNPB (http://mhews.bnpb.go.id/) and BMKG (http://inatews.bmkg.go.id/light/?act=realtimeev) – monitor various hazards in conjunction with in situ Indonesian centers of excellence (e.g., the University Gadjha Mada landslides early warning system: https://ugm.ac.id/en/news/15877-ugm-landslide-early-warning-system-becomes-international-standard) and global all-hazards academic partners (e.g., the Pacific Disaster Center and InAWARE: https://reliefweb.int/report/indonesia/inaware-system-boosts-disaster-risk-reduction-indonesia).[250]

HAZARD-MONITORING METHODS

- Indonesia uses up-to-date hazard-monitoring methods and technologies for some hazards.
- Indonesia's BNPB and BPBD district-level DRR experts leverage a variety of hazard-monitoring platforms across all hazards via the Pacific Disaster Center InAWARE platform (which builds upon the same platform as the ASEAN AHA Centre DMRS system: https://ahacentre.org/disaster-monitoring/) incorporating the MAGMA (VONA) volcanic alerts, InaSAFE earthquake alerting, InaRISK and MHEWS (Multi Hazard Early Warning System), and hydrometeorological phenomena. Universities also assist BNPB with hazard research and alerting. [47,251,252] [28,253–255]

ASSIGNMENT OF NOTIFICATION/EARLY WARNING RESPONSIBILITIES

- For some hazards across the archipelago of Indonesia, notification and early warning functions are consolidated and assigned to various Indonesian government agencies with DM communications responsibilities.
- While Indonesia is lauded as a regional and global leader in multi-hazard early warning systems (e.g., from MHEWS InaTEWS to InAWARE via PDC), Chief of BNPB Operation Control Center Mr. Bambang Surya Putra has admitted that the early warning system is far from meeting expectations: "Warning should be received by individuals. This means everyone has the right to such information. But if we look at the current condition, apparently it is still far from that expectation." Across the broad archipelago, improvements in tsunami early warning are underway, and messaging is being consolidated among regional BPBDs, BNPB, and BMKG. [256–258]

STANDARD PROCEDURES FOR EARLY WARNING

- Standard early warning procedures exist for all hazards in Indonesia.
- Via collaboration with UNDRR, GFDRR, UNESCAP, ADB, and various scientific and academic centers of excellence, BNPB and regional/local partners have made a concerted all-hazards early warning preparedness effort since 2004 with resultant Standard Operating Procedures (SOPS) for the BNPB EOC in Jakarta and major urban areas.[259]

TARGETED EARLY WARNING CAPABILITIES

- Early warnings are issued through a range of communication channels, including cellular phones, land-line phones, sirens, radio, television, and social media.
- Early warning in Indonesia incorporates the following entities: Meteorological, Climatological and Geophysical Agency (Badan Meteorologi, Klimatologi dan Geofisika – BMKG), local governments, national and local television and radio stations (public and commercial), the National Disaster Management Agency (Badan Nasional Penanggulangan Bencana – BNPB), the Indonesian Military, the National Indonesian Police, cellular service providers, and hotels/tourist sites. "Pursuant to Articles 46 and 47 of Law 24/2007, Article 19 of Government Regulation 21/2008, and Chapter 2 of the Decree by the Head of the BNPB 3/2008, local governments are responsible for issuing immediate public announcements containing clear directions and instructions to help the inhabitants of, and visitors to, an area react quickly and appropriately to a tsunami threat."[259(p22)]

EARLY WARNING SYSTEMS TARGET SPECIFIC LOCATIONS ACCORDING TO RISK

- Indonesia targets early warning according to risk for only some hazards (where georeferenced warning is possible) and locations.
- Indonesia's local, provincial, national, and UN/NGO/academic DRR stakeholders have been at the forefront of global innovations in alerting for all hazards. While georeferenced early warning capacity is under development, not all hazards and communities have georeferenced warnings. Beyond certain no-warning hazards (e.g., earthquakes and tsunamis) that have impacted Indonesia, most notably in 2004 and 2018, there have been ongoing flood early warning innovations at the BPBD-level via the Jakarta Flood Information Platform (JAFIP) and the noteworthy NGO, Petabencana.id. [260–262]

EARLY WARNING SYSTEMS COVERAGE AREA

- At least 75% of Indonesia's population is served by early warning systems.
- Television, SMS, radio, sirens, etc. are used to alert well over 80% of Indonesia's population across one of the world's largest archipelagos, according to the ITU and WMO. [263–265]

TESTING OF EARLY WARNING SYSTEMS

- Some of Indonesia's early warning systems are tested, and testing occurs on a non-routine basis.
- Building upon lessons learned from the 2018 Sulawesi earthquake and resultant tsunami, early warning systems for all hazards are being improved but are not consistently tested to ensure efficacy. [261,266–268]

TRAINING AND EDUCATION FOR WARNING RECIPIENTS

- Indonesian populations served by early warning systems are provided with pre-disaster training and education about message meaning and appropriate response.
- Mindful of the variances in hazards, exposure, and the diverse geography of Indonesia, a variety of UN, international, BNPB/BPBD, and NGO entities are involved in capacity building and training for messaging an appropriate response. [256,260,269]

POPULATION TARGETING OF EARLY WARNING MESSAGES

- BNPB and regional BPBDs can provide warnings to specific vulnerable groups in major population centers and in geographic areas.
- In major population centers and/or in specific geographic areas, various public-private, BNPB, BPBD, NGO, and UN collaborative efforts are helping further DRR and alerting to those who are vulnerable across Indonesia's vast expanse of islands and dynamic urban areas. For example, via Yayasan Mercy Corps Indonesia, Perkumpulan Lingkar, and Indonesia University Forum for DRR and CARDNO, with funding by the United States Agency for International Development (USAID), the Arbeiter-Samariter-Bund (ASB) program "has facilitated the creation of a Disability Inclusion Service Unit for Disaster Management within LDMO (Local Disaster Management Offices) in Central Java. The unit personnel are representatives of LDMO officials, DPOs, and non-government DRR actors. The function of the unit includes monitoring and evaluation, as well as disaggregated data management to support DiDRR realization and scaling up, including replication of good practices at district level areas."[270(p33)]

DISASTER ASSESSMENT

DISASTER-ASSESSMENT CAPABILITIES

- Indonesia DM entities have the capabilities to conduct assessments.
- Via the Disaster Risk Reduction-based Rehabilitation and Reconstruction (DR4) project, "UNDP has been working with partners to develop an Indonesia-specific Post Disaster Needs Assessment (I-PDNA) methodology and tools, based on the global PDNA framework jointly developed by the World Bank, European Union and United Nations Development Group (UNDG). The methodology and tools serve as important references for the development of post-disaster action plans for rehabilitation and reconstruction. The I-PDNA not only captures the physical damage and losses, but also incorporates an assessment of human recovery needs."[271,272]

DISASTER-ASSESSMENT REQUIREMENTS

- Assessments are required for disaster declaration and are regularly used to inform declarations decision making.

- According to Articles 11 and 12 of the Government Regulation Of The Republic of Indonesia Number 21 of 2008, both BNPB and local BPBD are required to implement disaster assessments before, during, and after disasters occur. [1,3,273]

NATIONALLY AUTHORIZED ASSESSMENT METHODOLOGY

- A nationally authorized assessment methodology exists in Indonesia and is adhered to.
- According to the IFRC, "though provisions under law are limited, in practice a significant amount of mapping of risks and vulnerabilities has taken place in Indonesia, led by a number of actors. In particular, the production of a detailed and comprehensive Risk Index provides a clear foundation for the integration of risk information into planning processes."[150(p7)] To complement these strategic risk-mapping initiatives, Indonesia's in situ and domestic (BNPB, et al.) capabilities to conduct after-action assessments are bolstered by regional ASEAN (AHA Centre) efforts.[274]

ASSESSMENT-RESOURCE CAPACITY

- Disaster assessments in Indonesia typically require the intervention of international organizations and NGO partners.
- As was the case during the recent Sulawesi earthquake and tsunami and in the broader context of the Aceh Tsunami of 2004, BNPB and GoI stakeholders, along with UN and NGO partners (such as UNDP, UNDRR/UNISDR, GFDRR) have made focused improvements in the Post Disaster Needs Assessment capabilities throughout Indonesia (e.g., DR4).[275]

ASSESSMENTS AND INCIDENT ACTION PLANNING

- Assessment outcomes are conducted by BNPB, but challenges exist that limit their utility in incident action planning.
- According to the BNPB and BMKG Indonesia Disaster Resilience Initiatives Project (2015), "stakeholder engagement will inform the project through: (1) consultations and community participation during project implementation (e.g., communities will participate in the planning and design of community preparedness programs and people-oriented early warning systems); (2) transparent feedback and grievance redress mechanisms; (3) communication campaigns and capacity building; and (4) development of risk-management processes and engagement required under the World Bank's Environmental and Social Framework (ESF)."[276(p7),277]

STAKEHOLDER ENGAGEMENT IN THE ASSESSMENT PROCESS

- Multi-stakeholder engagement is required for assessments in Indonesia.
- According to the BNPB and Indonesian Agency for Meteorological, Climatological, and Geophysics (BMKG) Indonesia Disaster Resilience Initiatives Project (P170874) Stakeholder Engagement Plan of 2019, "stakeholder engagement will inform the project through: (1) consultations and community

participation during project implementation (e.g., communities will participate in the planning and design of community preparedness programs and people-oriented early warning systems); (2) transparent feedback and grievance redress mechanisms; (3) communication campaigns and capacity building; and (4) development of risk-management processes and engagement required under the ESF."[278(p7)]

INFORMATION COLLECTION, MANAGEMENT, & DISTRIBUTION

DATA COLLECTION AND STORAGE

- Data in Indonesia are collected, standardized, and stored based on individual agencies' standards and procedures.
- The One Map Policy was conceived in 2011 to establish a single database for all government maps to eliminate disparities between the various maps currently in use by different government agencies. The INA-SDI Network, a nationwide standards-based coalition to promote geospatial data and information, supports data and information accessibility through integrated ICT infrastructures, and the provision and enforcement of laws and regulation. Thus, the INA-SDI has evolved from a "rowing" to a "steering" role in order to lend support to the country's geospatial commerce and industry.[279]

FORMAT OF DATA

- Data in Indonesia are primarily digital at the jurisdictional level and mixed at the sub-jurisdictional levels.
- Data are available in digital format; however, access restrictions exist. Data in digital format at the local government are mostly not standardized. Data are available in web application; however, they are not easily downloaded or shared. BNPB provides some data through its geospatial-data website that includes map services, links to the various web apps, and some downloadable data.[279]

DATA SHARING

- Data are freely shared among Indonesian government levels, with NGO disaster management stakeholders, and with the public.
- Though data are shared with the public, they are not always easily accessible.[280]

GIS-BASED DATA-MANAGEMENT SYSTEMS TO LEVERAGE A COMMON OPERATING PICTURE

- Indonesia leverages GIS-based data-management systems.
- There are many systems available to BNPB to solve different issues and problems. InaSAFE provides scenario assessments for emergencies. InAWARE is used by BNPB and some jurisdictions to

improve early warning and disaster management decision-making outcomes, enhance access to automated hazard information, improve information-sharing between agencies, and provide for effective dissemination of alerts and warning to at-risk communities. Also, there is a Web-GIS portal that provides web map services and data to download.[279]

DISASTER DATABASE LINKED TO THE NATIONAL STATISTICS AGENCY

- Disaster loss information is linked to Indonesia's national statistics system.
- The historical disaster database in Indonesia is called Data Dan Informasi Bencana Indonesia (Indonesia Disaster Information and Data/DIBI) and is managed by BNPB. Objectives are to provide data for risk identification, policy formulation, and decision making, ultimately ensuring that funds are channeled to risk reduction based on the trends and patterns identified through DIBI analysis.[281]

FACILITATION OF INFORMATION SHARING

- In Indonesia, an internet-based platform to share information on all DM phases exists and is available to all relevant DM stakeholders, but implementation challenges remain.
- Regarding geospatial data, coordination is made between line ministries. Data and information are shared and coordinated between the National Geospatial Agency (Badan Informasi Geospasial/BIG), Ministry of Environment, and the Ministry of Public Works. InAWARE is used at the BNPB as a Common Operating Picture; however, its potential to be utilized as an information-sharing system with other stakeholders is not fully capitalized on at this time.[280]

MEDIA & PUBLIC AFFAIRS

PUBLIC INFORMATION OFFICER

- BNPB utilizes a single point of contact for public affairs across all government DM functions.
- The Ministry of Communication and Informatics requires every ministry and agency to appoint spokespersons in their respective organization. BNPB has a spokesperson, namely the Head of the Disaster Data, Information, and Communication Center of BNPB. However, in certain situations,

a spokesperson for disaster management can also be determined directly by the President of the Republic of Indonesia, e.g., during the earthquake and tsunami disaster in Central Sulawesi and the handling of the COVID-19 pandemic. These spokespersons and public information officers (PIOs) can be reached via email and telephone for public relations matters. In addition, BNPB and various BPBD entities use social media (Instagram, Facebook, and Twitter) to communicate with the public. Another method used is through the Operations Control Center (Pusdalops), which can be contacted via telephone with service number 117. As a form of public-information disclosure, there is also a formal Information Management and Documentation Officer (PPID) service that can be accessed by the public to request various disaster management needs.[119]

DOCUMENTED COMMUNICATIONS STRATEGY

- BNPB has a documented communications strategy.
- The BNPB Disaster Communication Work Unit is responsible for maintaining the organization's internal communication strategy. Given the many hazards encountered across Indonesia and the variety of agencies and civil-society actors involved in preparedness, response, and recovery operations, BNPB coordinates its communications strategy with partners, such as BMKG.[119,282]

DEDICATED MEDIA-BRIEFING SPACE

- BNPB has procedures in place to set up a media-briefing space when required.
- Currently, there is no dedicated media-briefing space, and BNPB uses the auditorium and lobby at the BNPB Central office to conduct press conferences.[119,283]

MEDIA TRAINING

- Media training on disaster-specific communication is offered to key Indonesian DM officials and government leadership.
- This training has been obtained through other organizations working with BNPB, such as ADPC and the AHA Centre, but not on a regular basis. BNPB offers training to members of the media to improve reporting during disasters. In adherence to the Incident Command System (ICS), BNPB coordinates with BMKG and allied response entities via the BNPB Media Center to strengthen formal engagement with the media, capacity building where needed, and harmonizing of messaging across all hazards.[45,119,283,284]

INFORMATION-DISSEMINATION FORMATS

- BNPB and regional BPBDs disseminate public information in multiple formats and through multiple channels.
- Public information is conveyed through various channels, such as press conferences, websites, social media, messenger groups (WhatsApp), or printed material. Some information requires submitting a request for information (RFI) through the Information Management and

Documentation Officer (PPID) in advance. The government has invested in improvements to its communication infrastructure to better support its reach and access to the public regarding disaster information.[119,283,284]

PRE-SCRIPTED INFORMATION BULLETINS

- BNPB, in coordination with partners such as PVMBG and BMKG, issues pre-scripted information bulletins for all hazards.
- Given both the frequency and diversity of disasters faced by the disaster management community across Indonesia, BNPB, BMKG, civil-society partners, alerting authorities, and the media coordinate their activities via the BNPB Media Center. Per discussions with BNPB's Communications Division, all-hazard bulletins are coordinated with BMKG and PVMBG (Pusat Vulkanology dan Mitigasi Bencana Geologi).[119,282]

PUBLIC INFORMATION AUDIENCES

- BNPB's public-information capacity includes capability to communicate with special-needs and vulnerable populations.
- Provision of information for an all-of-society and special-needs audience; e.g., the use of sign language experts during BNPB press conferences or other live media engagements before, during, and after disaster responses. Further enhancement of this capability will be developed as a component of resilience-building efforts inclusive of an early warning information dissemination center that seeks to address all populations regardless of age, gender, or ability.[119,283,285]

TRACKING PUBLICLY GENERATED INFORMATION

- Publicly generated information via BNPB and other official DM stakeholders is tracked and used, but no dedicated policies or procedures exist to do so.
- BNPB does not have enough resources to monitor social media produced by the public; and thus, BNPB engages with third parties to analyze content on social media. There are no specific policies regarding this. Social media monitoring is an annual strategy that is used to set agendas and/or anticipate negative news about a situation.[119]

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