PROGRAM IMPACT ASSESSMENT

I. Introduction

1. The Disaster Resilience Improvement Program (DRIP) is part of coordinated assistance provided by the Asian Development Bank (ADB) to support Indonesia’s policy actions in disaster risk management (DRM) and health services, and provide a source of contingent disaster financing (CDF) for timely disaster response, early recovery activities and health-related emergencies. It will help manage the fiscal risk arising from disasters triggered by all types of natural hazards and pandemics. ADB will only provide financing under the facility following a natural hazard event or health emergency that occurs during the facility availability period and leads to a national or subnational declaration of a state of disaster or other qualifying trigger in Indonesia; or at the end of the facility availability period if all conditions for exercise of the deferred disbursement option have been met. The policy actions will strengthen disaster resilience of the institutions and communities through three reform areas: (i) policy and institutional arrangements for disaster risk management and health-related emergencies, including social protection; (ii) resilience of physical assets to disaster and climate risks; and (iii) disaster risk and pandemic response financing.

II. Summary

2. The Program Impact Assessment (PIA) estimates the cumulative economic benefits of DRIP. The economic benefits are derived from the enhanced disaster resilience resulting from improved DRM associated with reforms accomplished under DRIP.\(^1\) Using the International Disaster Database of the Centre for Research on the Epidemiology of Disasters (CRED), the reform achieved under DRIP is expected to mitigate economic losses accrued over the period of 2020–2025 by $562.5–$1,069.3 million at present value. The benefits emanate from the government’s rapid access under DRIP to resources to enable the government to initiate disaster response and early recovery efforts with minimal delay. Improved preparedness and speed of responses to natural hazards will mitigate a disaster’s indirect economic and social impacts. The impact of the reforms is reduced vulnerability to climate change and natural hazards, including health-related emergencies, and strengthened integration of disaster resilience in various sectors of the economy in line with National Medium-Term Development Plan (RPJMN) 2020–2024.\(^2\)

III. Background

3. Disaster risk. From 1999 to 2018, 264 disaster events were reported in Indonesia, 792,106 people per year on average were affected, 186,758 lives were lost,\(^3\) and average annual losses of $1.5 billion were recorded from 2000 to 2016.\(^4\) Climate-related extreme events such as landslides, floods, and droughts have increased in frequency and magnitude, with which much of the existing infrastructure is inadequate to cope. Indonesia has experienced a succession of deadly disasters in the past 2 years alone: (i) in August 2018, a 7.0 magnitude earthquake hit Lombok in West Nusa Tenggara; (ii) in September 2018, a 7.4-magnitude earthquake triggered

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a near-field tsunami, landslides, and major liquefaction in Central Sulawesi; (iii) in December 2018, another tsunami caused by a volcanic eruption struck Sunda Strait; and (iv) in November 2019, a magnitude 7.1 earthquake hit near the Maluku Islands and North Sulawesi. Previous disasters in Indonesia have shown women and girls to be at a greater disadvantage due to limited involvement of women in disaster monitoring and rapid response, and religious and cultural norms that do not encourage their readiness for natural disasters.

4. **Indonesia’s public health system and its exposure to coronavirus disease (COVID-19).** Indonesia has significantly improved its health status since the 1980s. Life expectancy at birth rose from 58.0 years in 1980 to 71.3 years in 2017 and is expected to reach 72.4 by 2035. The prevalence of tuberculosis decreased from 263 per 100,000 people in 2015 to 202 per 100,000 people in 2018. Indonesia’s polio-free status was maintained for 13 years before the disease returned in 2019 because of the low vaccination coverage in the Papua region. The COVID-19 pandemic presents a new health challenge for Indonesia. As of 13 July 2020, Indonesia had 76,981 positive cases and 3,656 deaths. East Java is currently the hardest hit region with 16,658 cases and 1,208 deaths, followed by the Special Capital Region of Jakarta. There is concern that these figures may not reflect the complete picture due to the low number of tests administered. As of 30 June, Indonesia has tested over 782,383 cases with 52,812 testing positive (equating to a 7.2% positivity rate). On 13 April 2020, the government declared COVID-19 a non-natural national disaster, and large scale social restrictions were enforced across 4 provinces and 24 districts. Additionally, the WHO recommends that the Ministry of Health (MOH) support sentinel surveillance of severe acute respiratory infections and influenza-like illness as part of the surveillance strategy to increase the likelihood of detecting COVID-19.

5. **Sector Context.** Climate change looks set to exacerbate levels of disaster risk, increasing the frequency and severity of extreme climate events. Meanwhile, rapid urbanization and concentration of economic activity in hazard-prone areas is expected to increase exposure to natural hazards and contribute to increasing severity of damages and losses. As such, disaster risk is expected to continue to grow in Indonesia, resulting in rising damage to physical infrastructure and assets as a consequence of natural hazards. Disaster risk modeling estimates indicate that, over the longer term, Indonesia experiences an average annual loss of around $9.2 billion as a consequence of natural hazards, equivalent to 0.9% of 2017 gross domestic product (GDP), mostly from floods, volcanoes and earthquakes. In addition, Indonesia is highly vulnerable to pandemics, and has the highest COVID-19 related fatality rate of any country in Southeast Asia. Public health measures to mitigate the spread of COVID-19 have seriously disrupted economic activity, and the government projects 2020 to produce the lowest economic growth level in 21 years (2.3%), down from an original estimate of 5.2%. ADB estimates that the

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6 World Bank. World Development Indicators (accessed 2 April 2020).


10 [https://www.worldometers.info/coronavirus/country/indonesia/](https://www.worldometers.info/coronavirus/country/indonesia/)

11 [Sector Assessment (Summary): Health (COVID-19 related) (accessible from the list of linked documents in Appendix 2).](https://www.worldometers.info/coronavirus/country/indonesia/)

COVID-19 will result in economic losses of about $60.1 billion or 5.8% of GDP. In the health sector alone, these damages have been estimated in the range of 1.8% to 5.0% of health sector's GDP. Additionally, 1.8% to 5.1% of health sector employment is also expected to decline.

IV. Rationale for Reform

6. Development constraints. While the magnitude of natural hazards and pandemics is outside the control of any government, their impact is dependent on the exposure and vulnerability of its economy and people. First, insufficient prioritization of climate resilience, disaster risk management, health and social protection measures in national development plans through action plans, policies, specific targets and indicators at national and subnational levels restrict climate and disaster resilience, and limit the provision of healthcare facilities, information technology, financial, policy and human resources to respond to pandemics and disasters. Further, women and other marginalized groups are rarely in positions of power at the household or community level to influence and contribute to disaster response and recovery decisions. These constraints ultimately result in delays in early recovery and rehabilitation, and exacerbate the economic and social impacts of physical losses following disasters and pandemics. They also cause a strain on health services, limiting testing, case management and reporting capacity, which cause onward transmission of disease. Second, inadequate climate- and disaster-resilient planning, intra- and inter-agency coordination, construction of priority innovative public infrastructure, and information systems ultimately delay the achievement of sustainable development goals. Third, limited financing capacity and sovereign debt management for disaster risk and pandemic preparedness and response, as evidenced by the limited use of risk transfer (insurance) and capital market instruments, lead to reallocation of core development spending or the requirement of supplementary budgets, which delay achievement of development targets.

V. Program and Policy Formulation

7. Policy reform. DRIP will provide rapid access to resources to enable the government to initiate disaster response and early recovery efforts, and respond to the health and economic impacts of prevalent diseases with minimal delay. The program is aligned with ADB’s Strategy 2030 operational priorities: addressing remaining poverty and reducing inequalities; tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability; and strengthening governance and institutional capacity. The policy actions will strengthen disaster resilience of institutions and communities through three reform areas.

8. Reform area 1: Policy and institutional arrangements for disaster risk management. Under this reform area, the government strengthened institutional policies and action plans and adopted its RPJMN 2020–2024, which identifies specific climate resilience, disaster risk management, and gender goals, indicators and targets. Following a government regulation mandating the tagging of climate-related budgets at the subnational level, a group of 4 provinces

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14 National budget allocations for the disaster contingency fund averaged IDR 3.1 trillion ($300 million) per annum between 2005 and 2017, while disaster losses averaged IDR 22.84 billion ($1.5 billion) over the period 2000–2016.
15 2024 targets at the national level include: (i) improved delivery time of disaster early warning systems to the public from 5 minutes to 3 minutes; (ii) increased investment in disaster risk management in the state budget, from 0.04% to 1.36% of GDP; (iii) a decrease of 1.25% of GDP in climate and disaster damage and loss. The RPJMN’s appendices include specific gender and climate commitments including: (iv) institutional strengthening to ensure the protection of women’s rights in emergency situations and special conditions; (v) services to empower women in emergency situations and special conditions; (vi) guidelines to support disaster resilient women; and, (vii) communication, information and education materials on disaster resilient women disseminated through various media.
and districts embarked on climate budget tagging projects. The government, led by the Ministry of Finance (MOF), has embarked on a plan, with the help of ADB and other development partners, to ensure that more subnational budgets are climate-tagged in the medium-term. Climate budget tagging will strengthen public financial management, allowing the government to plan, identify, prioritize and report climate-related expenditures, identify funding gaps and under-resourced priorities in the RPJMN, and is a key element in mobilizing financing through green bonds.

9. **Policy and institutional arrangements for health-related emergencies, including social protection.** The government institutionalized action plans that provide financial and human resources to respond to pandemics. First, to promote effective coordination of the government’s response and its efforts to prevent and mitigate the COVID-19 pandemic at national and subnational levels, the government established the Task Force for the Acceleration of the Handling of COVID-19, which directly reports to the President of Indonesia. It is led by the head of BNPB, and includes key stakeholder agencies such as the MOH, the Indonesian National Police, the Indonesian National Army, the Ministry of State-owned Enterprises, the Ministry of Human Development and Culture, the Ministry of Public Works and Housing (MPWH), regional governments, and the Ministry of Women's Empowerment and Child Protection (MOWECP). Second, led by the MOH, the government strengthened pandemic and epidemic reporting capacity across government agencies, by issuing guidelines for a single reporting system, which integrates disaggregated data from hospitals, provinces, and the MOH Centre for Data and Information. Strengthened reporting will improve case management and data transparency, and elicit appropriate levels of government intervention and public response. To standardize testing protocols and processes, the government issued guidelines for testing and treatment for COVID-19, future pandemics and disease outbreaks. To strengthen social protection measures to support women in the workplace during the COVID-19 pandemic, the MOWECP issued Regulation No. 1 of 2020, which outlines procedures for the protection of female workers. The MOWECP also allocated $19.5 million budget for referral services to women victims of violence and to children in need of special protection, and strengthened its provision of essential services to women, children, the elderly and migrant workers during the COVID-19 pandemic. Finally, the MOH adopted Decrees no. 214, 216 and 234 of 2020, to establish a national laboratory network and increase the number of laboratories to improve the country’s testing capacity as a prerequisite to normalizing the economy.

10. **Reform area 2: Resilience of physical assets to disaster and climate risks.** Ensuring the resilience of infrastructure and coordinating disaster response across key ministries, while considering the gendered impacts of disaster and climate change, are imperative to reduce the cost of replacing or restoring public infrastructure. To promote protection to vulnerable groups following disasters and effective coordination within the MPWH and across government agencies involved in disaster response, the MPWH revised its Disaster Committee decree (Keputusan Menteri PUPR No. 1176/KPTS/M/2019). This revised decree assigned key personnel and task forces to critical disaster response roles such as Chief of the Disaster Committee, Disaster Task Force Secretary, and provided resource coordination for highways and provinces. Finally, to account for and enhance disaster and climate resilience of water resource infrastructure, following the ADB-supported development of a national asset management inventory and upgrading of the information system platform for irrigation infrastructure, the MPWH signed a memorandum of understanding with ADB, completed key milestones for similar projects for river and water supply

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16 Presidential Decree no. 7 of 2020 was issued on 13 March 2020 and revised on 20 March 2020 (Presidential Decree no. 9 of 2020). On 20 July 2020, Presidential Regulation No. 82/2020 was issued, replacing Presidential Decrees No. 7 and No. 9 of 2020.

infrastructure, and established 136 community-based disaster management organizations in Banten and Maluku provinces, with women holding 20% of managerial positions.

11. Reform area 3: Disaster risk and pandemic response financing. Building resilience through insured infrastructure, improved healthcare, and targeted social spending, complemented by the use of financial mechanisms, ensure effective disaster and pandemic preparedness and response.\(^{18}\) In 2019, the government, supported by the World Bank, established a state-owned asset indemnity insurance pilot project to insure the MOF’s buildings against disasters. Following this, the government expanded the scope of the public asset insurance program to include the participation of two additional government agencies: the National Public Procurement Agency (Lembaga Kebijakan Pengembangan Barang/Jasa Pemerintah or LKPP) and the National Government Internal Auditor (Badan Pengawasan Keuangan dan Pembangunan or BPKP). For its COVID-19 response, the government announced a $45.7 billion emergency stimulus package focusing on: (i) health; (ii) social protection; and (iii) economic assistance to businesses and local government programs. To support this, the government adjusted its fiscal rules by relaxing the state budget deficit policy to allow the fiscal deficit to exceed 3% of GDP for three fiscal years.

VI. Measuring Economic Benefits of Disaster Risk Management

12. The PIA employs the main economic project appraisal technique commonly used by governments and public authorities for public investment, in this case, disaster risk management (DRM). The idea is to measure the reform benefits in terms of economic losses mitigated by comparing economic losses between with- and without-reform scenarios (figure). Then, the costs of implementing the DRM reforms are examined. The benefits arise due to the savings in terms of avoided direct, indirect and macroeconomic costs. Only those costs and benefits that can be measured are included in the calculation.

13. There are three main channels through which the three reform areas under DRIP contribute to mitigated economic losses from natural hazards. First, strengthening policy and institutions for DRM will ensure adequate public resources for and coordinated responses to natural hazards. Second, the reforms will mainstream investment in climate resilience infrastructure and disaster risk reduction initiatives at the local and national levels, thereby strengthening resilience against natural hazard shocks and, thus, reduce less damages and losses to the Indonesian economy. Disaster risk management plan in public infrastructure projects by including seismic standards, building recovery procedures, highways and bridges, information system and disaster risk management portal. Third, DRIP helps the national government agencies strengthen financial resilience of public assets against disasters by strengthening the public asset insurance program.

\(^{18}\) Climate Change Assessment (accessible from the list of linked documents in Appendix 2).
VII. Data and Model Assumptions

14. The PIA utilizes the International Disaster Database of the Centre for Research on the Epidemiology of Disasters (CRED) for the Indonesia during the period in 2015–2019. The database covers a wide range of natural hazard events including earthquakes, volcanic activity, storms, drought, landslide, tsunami, and epidemic, among others. The benefits of the program are estimated based on the following assumptions:

(i) The social rate of return is 9%;

(ii) The inflation rate is 3% which is approximately the average inflation in Indonesia in 2015–2019;

(iii) Given more severe climate change and the rise in sea level, the annual severity adjustment factor—the rate at which each natural hazard incurs economic losses—is assumed at 5%;

(iv) The benefits are accrued during the implementation period of DRIP in 2020–2025;

(v) Two with-reform scenarios are examined: (i) economic losses mitigated by reforms at a rate of 5%; and (ii) economic losses mitigated by reforms at a rate of 10%.

VIII. Program Benefits

15. The PIA employs the scenario analysis in which the program benefits are measured and derived from comparisons of with- and without-reform scenarios. The baseline scenario is the environment where the government did not undertake reform actions described in Section V. The PIA considers two possible reform scenarios: (i) reform scenario with a 5% economic loss mitigation rate (reform scenario 1); and (ii) reform scenario with a 10% economic loss mitigation rate (reform scenario 2). Both reform scenarios capture the environments in which the government achieved the reform actions described in Section 5. The difference between the two reform scenarios is that the former assumes a relatively flat mitigation rate. In contrast, the latter

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20. This represents the social opportunity cost of public investment.
captures the circumstance where the reform implementation is more effective in mitigating economic losses from natural hazards. The comparison of the two with-reform scenarios also aims to provide a sensitivity analysis for different levels of program effectiveness.

16. **Estimating economic benefits of DRIP.** Table 1 summarizes economic benefits in terms of economic losses mitigated by improved DRM under DRIP. The avoided damages and losses from natural hazards are estimated at $562.5–$1,069.3 million\(^{21}\) at present value, accrued over the period 2020–2025.

IX. **Cost of the Reforms**

17. The costs of the reforms include: (i) the costs of designing and introducing revised laws, new regulations, roadmaps and strategies; (ii) the design and introduction of an enhanced project screening and appraisal for climate resilience infrastructure; (iii) the institutional strengthening of line ministries and subnational governments for reform implementation; (iv) the capacity building of subnational government for DRM and pandemic preparedness and responses; and (v) regular meetings of the Ministry of Finance, Ministry of Health, Ministry of National Development and Planning (BAPPENAS), and other agencies relevant with the reform measures.

18. Assumptions have been made about the opportunity costs of public servants in the relevant ministries to design and implement the reforms, mainly in the form of time taken away from other tasks.\(^{22}\) The total is estimated at 800 person-months per year, over the reform period of 2019–2020, at $2,400 per person-month.\(^{23}\) The costs of data collection and publication of the required budget-related documents is estimated at $300,000 per year. The cost of capacity building and training is estimated at $700,000 per year over the reform period.

19. **The total cumulative costs of the Program** are $5.84 million accrued over the reform period of 2019–2020.

X. **Impact and Sustainability of the Reform**

20. **Post-program Partnership Framework (PPPF) for disaster risk management.** To ensure the continuity of reforms and to strengthen policy and institutional arrangements, the program incorporates a PPPF. The climate-tagging of subnational government budgets, gender- and climate-tagging of national government agency budgets, and DRR-tagging of national government expenditures will be strengthened. The MPWH will improve flood risk management and investment by preparing gender-responsive risk management plans for at least six river basins. The government will finalize the legal process to adopt standards for seismic loading (*Badan Standardisasi Nasional* or Seismic Design Code, SNI 1726) and reinforced concrete structural design (SNI 2847), and also revise its technical standards for earthquake resilience of irrigation infrastructure. Finally, the government will strengthen disaster resilience of national highways and bridges and develop a gender-responsive emergency road response plan. The program will support the strengthening of the fiscal resilience of subnational governments to

\(^{21}\) The reduction in losses does not explicitly capture the economic benefits of reforms in the context of COVID-19. Although GDP might have included these impacts at macro level, they are not being captured through the proposed program. As such, the range of expected benefits are conservative in nature.

\(^{22}\) It is assumed that the international and local expertise required for aspects of the DRIP will be contracted under the ongoing ADB technical assistance and will be at no cost to the government. Opportunity costs for counterpart staff have been included in the estimates.

\(^{23}\) The estimated number of person months is based on the number of government officials who worked on the reforms under DRIP.
disasters, to eventually provide sustainable and efficient disaster risk financing mechanisms for timely, well-targeted, and transparent post-disaster recovery and reconstruction. This will include the management of sources of financing for disaster relief and recovery (including fiscal transfers) and improve the quality of subnational government asset registers and country disaster risk data. ADB has secured $1 million in funding for technical assistance, provided by the Department of Foreign Affairs and Trade of Government of Australia (DFAT), to support the PPPF.  

Table 1: Baseline and Reform Scenarios

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<td>Total economic damages ($ million)</td>
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Source: Asian Development Bank estimates.