

## Challenge 10

# Strengthening Resilience to Natural Disasters, Tackling Climate Change, and Managing Natural Resources

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Indonesia's constitution stresses that economic development must be sustainable. Indonesia needs to develop a resilient, sustainable, and prosperous society. Indonesia and Japan should consider three global commitments or pillars: the Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction, and climate change adaptation and mitigation. This section explores the key elements of future challenges: strengthening resilience to natural disasters, tackling climate change, and managing natural resources.

### Strengthening Resilience to Natural Disasters

Strengthening disaster resilience by mainstreaming disaster risk reduction into sustainable development and poverty reduction is essential and urgently needed in Indonesia. The country, geologically and geographically, is prone to natural and man-made calamities. Earthquakes, tsunamis, floods, and landslides have frequently occurred in recent times in most parts of the country. Indonesia is vulnerable to coastal hazards, hydro-climatic hazards, and the effects of climate change. This condition is exacerbated by inappropriate development activities, including rapid resource exploitation, forest degradation, and urbanisation.

A huge number of lives and enormous amounts of property have been lost to disasters, which have increased by about 10% in the last 10 years. About 155 people die every year, mostly women and children. The large number of victims is closely related to their socio-cultural – particularly their socio-religious – background. Women face enormous problems during and after disasters, including meeting female-specific needs

(reproductive health and cultural and religious practices) and swapping gender roles, especially for those who have lost their husbands. Gender is still an important issue in disaster management.

Mainstreaming disaster risk reduction addresses risk issues in strategic development frameworks, legislation, sector strategies and policies, and budgets. The main objectives are to (a) reduce disaster risk accumulated from previous development; (b) avoid creating new disaster risk; and (c) build the capacity to respond to any type of emergency based on social, economic, and environmental impact assessment; land-use policy and planning; and building codes and standards.

The initial stage of mainstreaming disaster risk reduction focuses on increasing disaster preparedness and strengthening risk culture. However, the terrible loss of life during disasters shows that the people and the government are not prepared. This condition also indicates that previous disasters have not increased community awareness and preparedness.

Various initiatives to increase community awareness and preparedness have been executed throughout Indonesia since the Aceh tsunami of 2004. Education and preparedness activities and channels, formal and non-formal, have been developed by disaster education groups and stakeholders. Although their knowledge has increased, however, it is still insufficient and mostly not followed by preparedness actions because the risk culture has not been fully established even amongst those who live in high-risk areas.

Awareness and preparedness are also lacking amongst policy planners and decision makers. The Indonesian Institute of Sciences (Lembaga Ilmu Pengetahuan Indonesia [LIPI]) found that seven out of nine districts and cities had limited capacity to increase preparedness. They had inadequate policies and guidelines; lacked a warning system, particularly in communities; and had limited training, drills, technical resources and materials, and institutional and financial arrangements. They had emergency plans but none that

achieved the 'prepared' level. Increasing preparedness was not a priority because the main concern was still post-disaster management.

Enhancing disaster preparedness and strengthening risk culture remains critical. What is being learned is the capacity to live with uncertainty and risk. Public education and community preparedness need to be developed based on integrated sciences and life skills, joyful learning, local needs, and a community participatory approach. A more comprehensive action plan needs to be carried out to meet people's urgent requirements, enliven local wisdom, and utilise local resources.

Local wisdom can increase community efforts to find relief and recover from disaster. Knowledge, values, and action need to be developed in harmony to enhance individuals' and groups' capacity to reduce disaster risk and build disaster resilience. *Smong*, for example, is a natural warning system that saved most of Simeulue Island, Aceh, from the giant tsunami in 2004.

Previous disasters show that most victims are poor and vulnerable and that building their resilience is important. The main objective is to prevent future disasters from pulling more people into poverty, to protect their livelihoods and assets, and to help them recover from disaster. Resilient infrastructure, especially houses and basic services, must be built. These measures can be implemented through inclusive policy design, which is critical to reducing poverty and achieving the Sustainable Development Goals.

Increased capacity and social protection initiatives are likely to reduce poverty and risk. These efforts must be integrated into policies and programmes for sustainable development and poverty reduction. The Javanese in the district of Bantul, Yogyakarta, used local wisdom such as community self-help (*tolong menolong*), mutual help and cooperation (*gotong royong*), and fund raising (*jimpitan*) to survive the devastating earthquake in 2006 and reduce the risk of further disaster impacts. Social capital can be applied to strengthen a community's disaster preparedness and potential to recover.

Developing mitigation strategies with clear links to functional lead institutions is crucial. Disasters inflict great damage on infrastructure and property, especially buildings that do not meet code standards, interrupting vital services and threatening the sustainability of economic activities. Strategies should be based on land use and physical, socio-economic, and investment plans within a development framework. Policy guidelines and planning measures need to be developed through a national framework and disseminated to the regional and local levels.

Developing a mitigation framework remains a challenge for the national, regional, and local governments. Despite the wide-ranging and multi-sector nature of disaster risk reduction, its elements have not been integrated into development planning. Disaster risk management is included in the 2015–2019 National Medium-Term Development Plan and in Nawa Cita, a nine-pillar development programme, and is supported by Law No. 24 (2007) and Government Regulations (2008). However, implementation is limited, mainly because disaster mitigation is still viewed as the responsibility of the National Disaster Management Agency (Badan Nasional Penanggulangan Bencana [BNPB]) rather than a cross-cutting sector issue that should be integrated into national, regional, and local government development plans.

Building resilient infrastructure, especially essential facilities (schools, hospitals, water, roads, power, communication), is a basic requirement of sustainable development. The structural designs of the built environment and hazard-based land use should be improved to avoid or manage risks. The fact is that many development and investment (public and private) plans are not designated in the spatial plan. Revision of land use, regulations, and building codes is essential. Enforcement of the laws requires inter-sector coordination and alignment of plans.

After the Aceh tsunami, Indonesia shifted from post-disaster management to prevention, preparedness, and mitigation, but the new paradigm has not been fully implemented. The disaster management agency and other government institutions still rely heavily on

emergency response and post-disaster rehabilitation and reconstruction. The role of government and agencies in charge, as the primary stakeholders, in increasing community preparedness and mitigation is still limited, especially at the regional and local levels, mainly due to their limited capacity, including inadequate understanding and awareness of the hazards and the importance of community preparedness and risk reduction, and their limited budget and staff.

A close correlation between disaster events and poverty underlines the need for an overall national framework to reduce disaster risk, especially casualties and economic damage and losses. Development policies and programmes should clearly define risk reduction objectives, commit to gender sensitivity, and ensure that policies and programmes do not create new risks.

These policies and programmes of work need to be included in government budgets. The budget for disaster management is provided for in Article 5 of Law No. 24 (2007) and in Government Regulation No. 22 (2008) concerning funding sources. However, the implementation of disaster risk reduction programmes is still lacking, with only a few national, regional, and local institutions explicitly noting it in their work programmes or budgets. Budgetary allocations for post-disaster response require a new scheme for handling large-scale disasters that require substantial funding, especially for rehabilitation and reconstruction.

Disaster risk reduction can be mainstreamed into sustainable development with support from regional and international partnerships, especially with Japan. Japan and Indonesia are both disaster prone, often experiencing earthquakes, tsunamis, and volcanic eruptions. Japan and Indonesia could share data, set up regular seminars or discussion forums, develop assessment approaches and tools, and conduct risk assessments. Japan might also help Indonesia strengthen its tsunami early warning system by providing technologies for communities; build a risk culture embedded between the people and government; increase women's participation in disaster management and raise awareness of gender relations in

disaster risk reduction; enhance the capacity of policy planners and decision makers; and strengthen disaster risk prevention, mitigation, preparedness, response, recovery, and rehabilitation at the national, regional, and local levels.

### Tackling Climate Change

Climate change is a significant challenge to development. Its impacts are twofold: meteorological hazards could undermine development achievements and degrade the quantity and quality of natural resources. Projections show that Indonesia's average temperature would increase at a similar rate as average global warming, while the average annual precipitation would not change significantly. Indonesia would benefit from less rain, but increased evaporation due to higher temperatures would decrease surface water. Indonesia will need to pay greater attention to potentially more extreme meteorological events that could increase risks of climate-related disasters.

Indonesia also has limited land, with intensely competing demands to use it for settlement and development or to maintain the ecosystem services that are vital to support people's lives and livelihoods and protect them against the changing climate.

Indonesia has many policies and initiatives to tackle climate change. The most significant are the following:

- **National Action Plan for Climate Change Adaptation.** Published in full in February 2014, it aims to establish a national adaptation plan of action to implement sustainable development with high resiliency to climate change.
- **First Nationally Determined Contribution (NDC).** Submitted to the United Nations Framework Convention on Climate Change in 2016, it expresses commitment to low-emission and climate-resilient development, joining the effort to avoid a global temperature increase of 1.5°C above the pre-industrial level. Indonesia is committed to reduce greenhouse gas

(GHG) emissions by 29% by its own efforts and by 41% with international support, against the business-as-usual trajectory baseline, by 2030.

Indonesia has developed adaptation-supporting data and tools to facilitate community and regional climate change adaptation plans and vulnerability assessments. The important ones are climate change projections based on representative concentration pathway (RCP) 4.5 and RCP8.5 scenarios, and the Data Inventory System of Vulnerability Indices (Sistem Informasi Data Indeks Kerentanan [SIDIK]).

Based on the NDC, national GHG emissions in 2010 were estimated at 1.33 GtCO<sub>2(eq)</sub>. With business-as-usual trajectories, emissions are expected to reach a level of 2.869 GtCO<sub>2(eq)</sub> in 2030. Sectors that significantly contribute to reducing emissions are forestry (17.3% under 29% commitment, and 22.7% under 41% commitment) and energy (10.9% under 29% commitment, and 13.9% under 41% commitment).

Ecosystem services provide economic and livelihood opportunities at the community and industrial levels. A suggestion is to shift the economy from natural resources (ecosystem) exploitation to ecosystem services adding value to ensure more sustainable development. Many ecosystem services are site specific, providing an opportunity to become globally competitive.

The following are recommended sector initiatives and actions:

#### *Climate Change Adaptation*

- **Health.** Enhancement of disaster risk reduction, including development of infrastructure for better protection and stronger disaster, land, and sustainable forest management.
- **Ecosystems.** Enhancement of the ecosystem's adaptive capacity to reduce the potential loss and damage of ecosystem services resulting from extreme events and changing climatic conditions. This can be promoted as an integral part of ecosystem-based adaptation, which involves sustainable

management; conservation and restoration of ecosystems; introduction of technology to increase ecosystem functional capacity; and social aspects, including socio-economics, culture, individual and societal capability to adapt, institutional capacity, amongst others.

- **Clean water.** In addition to better water resources management, water purification technology to optimise use of water, including recycled water.
- **Agriculture.** Enhancement of agriculture productivity through intensification, and wide introduction of integrated farming that promotes self-supported production of organic fertiliser for small-scale farming.
- **Fisheries and marine production.** Development or introduction of technology and advanced tools of safer fishing boats. Promotion of fish domestication and aquaculture to increase productivity.
- **Forestry.** Enhanced conservation and forest adaptive capacity, and domestication of forest products to avoid or reduce potential loss of forest-provisioning services.

#### *Climate Change Mitigation*

- **Forestry.** Strengthening and extension of existing policies described in the NDC. Options are continuing the forest moratorium policy to 2030 and expanding it to include secondary forests and forest areas under concession licenses, and restoring an additional 4.6 million hectares of degraded forest and peatland.
- **Energy.** Implementation of the National Energy Policy and the Energy Conservation Policy.

#### **Managing Natural Resources**

Indonesia has abundant natural resources but they are not distributed uniformly across the regions. Indonesia has not fully managed its natural resources in a sustainable way. Rapid



depletion of natural resources and environmental degradation have reduced long-term prospects of economic growth.

Natural resources still contribute about 25% of gross national product. This can bring several risks. First, the benefit of natural resources depends on global commodity prices. Second, increasing production of natural resources, especially coal and palm oil, raises environmental concerns. Finally, increasing commodity exports has limited impact on employment. Other risks include 'boom and bust,' Dutch disease, being trapped in low-value-added production, and rent-seeking behaviour.

Generally, economic development needs to take into account the availability of land, water, energy, forests, food, and fisheries because they can constrain demand and impede economic and social change. Carrying capacity must, therefore, be internalised or even mainstreamed into the development model. Government needs to pursue policies that encourage natural conservation and efficient use of resources.

Indonesia has comprehensive institutions to promote sustainable development, but the challenge is how to integrate and consistently implement regulations. Lack of law enforcement and ecology education is a problem. Four policy interventions are needed: increasing reforestation and decreasing deforestation, increasing the quality of natural resources, developing efficiency in agriculture and in the use of natural resources, and increasing the use of renewable energy and energy efficiency.

Indonesia needs to widen and broaden its pursuit of sustainable economic development by creating institutions that mainstream sustainable development and by involving all members of society. Survey data in 2017 show, however, that provinces with higher incomes were less concerned about the environment. Only leadership concerned with long-term development rather than a narrow political agenda can transform a mentality of exploiting natural capital to one that is open to innovative ways of developing sustainable renewable resources. In the current economic structure, this is a challenging task.

In agriculture, it is imperative to increase economies of scale by promoting cooperative or village farming, scaling up farmers' technology capability, developing seeds for highly productive crops and foods, and supporting land management, especially of neglected land. Smart and precision farming can produce maximum yields. These principles aim to create a supply chain that can bring small-scale farmers into the mainstream regional economy. The new ecosystem depends on collaboration amongst multiple actors, and collaboration requires trust.

Promoting renewable biological resources to reduce dependency on fossil fuel, as well as food, animal feed, and other bio-based products is the basis for a bio-economy. Biotechnology and biomass can solve global resource shortages. Further advances in biotechnology, digital technology, nanotechnology, neurotechnology, green technology, and others need to be developed. Two options can be promoted in the electricity sector: (a) stabilise the growth of steam coal power plants and (b) increase the share of new and renewable energy.

As people become more mobile on a massive scale, they will need public transport, clean water, telecommunication, sanitation, waste management, and energy. The challenge is how to expand economic benefits not only in the cities but also in the periphery and rural areas. Two upstream elements need to be prepared: application of geospatial policies that consider the resources and capacity of every region; and estimation of data analysis risks, which is important in preparing insurance due to potential damage.

Cities' expansion has increased paddy-field conversion for other purposes, especially housing, business districts, and industry. To maintain and increase environmental services and to control conversion of fertile land, the government needs to monitor land use and strengthen law enforcement against violations. Promoting the biosphere reserve is one strategy to protect environmental services. The challenge is how to develop this activity so that it is economically and socially beneficial.

### Advancing Collaboration Between Indonesia and Japan

Indonesia and Japan can develop cooperation in several key areas. First, they need to prepare a broad-based framework and approach to build a resilience culture and to promote low-carbon development, ecosystem-based development, a bio-economy, and climate change adaptation and mitigation. Second, both countries should manage the knowledge in the many studies they have produced and in the data collected on disasters, the climate, and resources, and optimise this knowledge by supporting the technocratic development process. Third, the capacity of local people must be built and knowledge transferred to them with the participation of more actors. Fourth, the tsunami early warning system must be strengthened with appropriate technology. Fifth, Indonesia and Japan can work together to develop smart and precise farming practices that meet local needs. Sixth, both countries have collaborated on the bio-economy for energy, waste, and other sectors, and must now expand and replicate the research or pilot projects that will result in action at the commercial level. Finally, Indonesia and Japan can develop more understanding on how to develop sustainable cities. Japan was a pioneer in this area and Indonesia can learn much from Japan's many experiences and minimise its own failures.