QUICK GUIDE

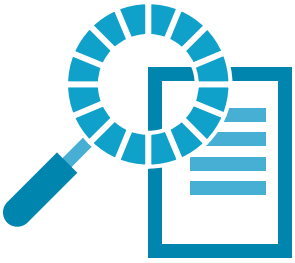
# DISASTER RISK ASSESSMENT FOR PROJECT PREPARATION

## Disaster Risk and Resilient Development

Disaster risk presents a serious threat to inclusive development in many developing member countries (DMCs) of the Asian Development Bank (ADB). Direct physical losses have increased over recent decades as economies have grown with little regard to disaster risk, leading to an expansion in the levels of infrastructure and assets exposed and vulnerable to natural hazards. Disasters have a particularly detrimental impact on the poorest members of society, widening income and gender disparities and affecting the nutritional, health and educational status of this group disproportionately.

However, there is nothing inevitable about the impact of natural hazards. While many development actions carry potential disaster risk, they also provide opportunities to strengthen resilience. There is a wide range of potential structural and nonstructural risk reduction measures that can be taken to strengthen resilience. To ensure that these opportunities are reaped, disaster risk considerations should be integrated into development policy, plans, and individual investments.

Such integration requires an adequate project disaster risk screening and assessment process that provides the information needed to protect ADB investments against natural hazards. More ambitiously, a disaster risk assessments (DRA) can help steer development investments toward increasing the resilience of exposed and vulnerable communities more broadly, for instance by helping diversify income sources or improving access to public services.



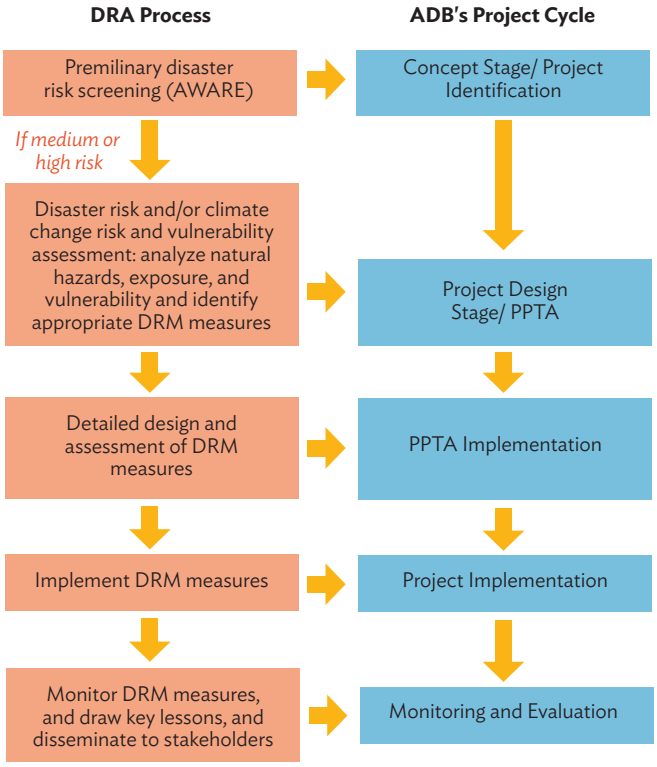
## Preliminary Climate Change and Disaster Risk Screening

The integration of disaster risk considerations into project design at ADB starts with preliminary screening, as indicated in Figure 1. ADB examines a range of different aspects of a project during the project identification and concept phase. Climate change and disaster risks are initially covered through the rapid environmental assessment (REA). Results feed into the environmental safeguard classification and overall quality assurance process. If the project is found to score an "A" or "B" in the safeguard categorization, closer environmental scrutiny is required.

ADB's REA form also contains a checklist for preliminary climate change and disaster risk screening. Among other issues, this one-page checklist looks at the possible impact of extreme hazard events on a project (Figure 2). If a project is found to have a medium to high climate change risk or disaster risk according to this preliminary checklist, it should undergo more detailed risk screening, for instance using the AWARE for Projects tool[1] or other web-based open-access tools.

A low score in the AWARE tool or equivalent will normally not require any further investigation. However, in case of uncertainties (e.g., due to data deficiencies), further expert consultation may need to be conducted. If a project or one of its subcomponents receives a medium or high risk score, a more in-depth DRA is required.

Figure 1: Disaster Risk Assessments and ADB Project Cycle



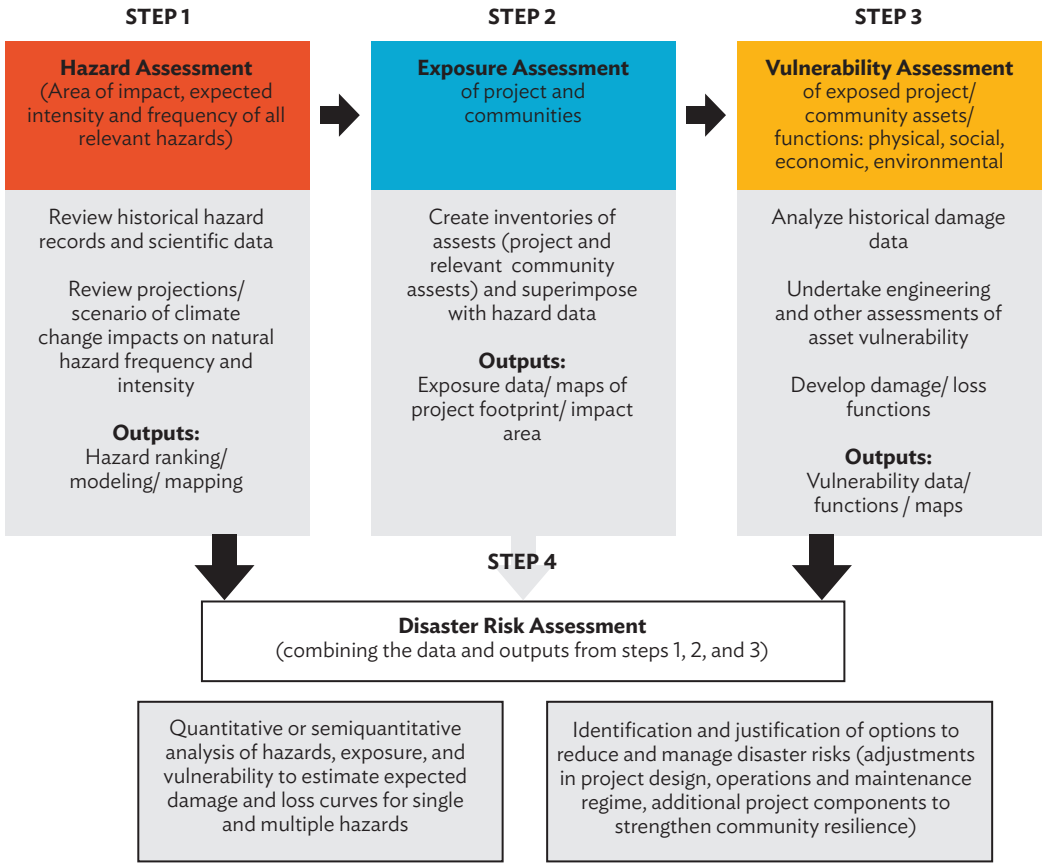

ADB = Asian Development Bank, DRA = disaster risk assessment, DRM = disaster risk management, PPTA = project preparatory technical assistance.
Source: Adapted from ADB (2013).

[1] The enhanced version of the AWARE tool introduced in 2017 covers geophysical hazards as well as extreme weather events.

## Disaster Risk Assessment

A DRA seeks to further facilitate risk-sensitive decision making, informing the design and location of projects in cases where preliminary analysis indicates that disaster risks are medium or high. It is based on an analysis of the three components of disaster risk: hazard characteristics, elements at risk, and the vulnerability of those elements. It identifies and analyzes the types, intensities, and probabilities of natural hazard events and the resulting impact on people, communities, and assets within a defined spatial location. The resulting knowledge provides communities, organizations, and governments with a basis to identify how particular projects or activities contribute to increased or reduced disaster resilience, to prioritize disaster risk management (DRM) needs, and to inform the design of DRM strategies and actions. This process is summarized in Figure 2.

Figure 2: Steps in Undertaking a Disaster Risk Assessment




Source: ADB.

Depending on the results of the initial screening, project context, and the required scope and depth of assessment, a DRA can be conducted as a standalone exercise or integrated into the environmental impact assessment (EIA), initial environmental examination, or climate risk and vulnerability assessment (CRVA). If, for instance, disaster risk is high but climate risk is low, a DRA is sufficient. If climate change and extreme weather risk are medium or high but exposure to geophysical hazards is low, an expanded CRVA, covering extreme events in the near term as well as consequences of climate change, is appropriate. If the only medium or high risk stems from geophysical hazards, it may be sufficient to ensure that geophysical risk is incorporated into detailed technical design rather than undertaking a DRA. If both climate change risk and exposure to natural hazards are medium or high, joint or separate CRVAs and DRAs may be required. Either way, the two teams should work together closely.

Three key questions inform the required scope and complexity of a DRA (or DRA components of CRVAs):

- What natural hazards should the assessment focus on?
- Does the DRA require a single sector or a multisector lens?
- Is it sufficient to focus the DRA on the project site alone or should it cover the larger area of impact of either the project or the natural hazard(s) under investigation?

A project area may be threatened by one or more natural hazards. The initial hazard analysis needs to identify all relevant types of natural hazard occurring in the project area and their interactions and take them into account in the DRA. It is also considered good practice to look at a wide range of elements at risk, such as external infrastructure and services (e.g., power supply, communications, and road access) that a project relies on, and apply a multisector lens to DRAs.

A full-fledged DRA is not always necessary. However, as a rule of thumb, large-scale investment projects in medium- and high-risk areas that cover or impact large, more densely populated areas require greater scrutiny, both because of the potential scale of direct losses and the life safety and socioeconomic consequences. More comprehensive DRAs are also warranted in medium- and high-risk areas for relatively smaller projects if the projects are critical to the functioning of communities (e.g., urban water or electricity) or if the structural failure of project infrastructure as a consequence of a disaster could potentially lead to loss of life.

In terms of approach, there are a variety of DRA tools and methodologies that can be applied. Choosing the appropriate one depends on the scale and objectives of the assessment, the level of access to data and technology, available resources (time, expertise, and funding), and stakeholder and end-user priorities and concerns. However, DRAs do not have to be complicated or time-consuming exercises. Sometimes, the analysis of existing risk information such as hazard maps and disaster loss data may be sufficient to determine if higher design standards are needed.

Methods vary from local participatory assessments using mostly qualitative research tools to highly quantitative national or regional assessments based on statistical and modeling methods. In practice, many DRAs mix quantitative or semiquantitative methods with a qualitative analysis of causal chains that contribute to the exposure and vulnerability of elements at risk. In the context of ADB project preparation, combined qualitative and semiquantitative analysis will often be the default option, especially if available data are limited.

Quantitative risk assessment uses numerical values to estimate both the likelihood and consequences of natural hazard events. Such assessments are important, for instance, in structuring disaster insurance instruments and in developing strategies for the fiscal management of disaster risk more broadly. The accuracy of quantitative risk assessments depends on the quality of input data and the validity of applied algorithms and modeling tools. Access to tested and approved vulnerability functions of elements at risk, such as local building stock, helps ensure a more accurate estimation of damage and loss. Developing such functions during the project preparation phase is typically unrealistic though, except sometimes in the context of specific standalone DRR projects.

Qualitative assessments still require numerical data (e.g., data on the intensity of a natural hazard or historical damages and losses). They do not use quantitative methods to compute risk levels but often use semiquantitative methods, such as the attachment of numerical values to descriptive indicators, in order to determine the relative likelihood and extent of possible damage and loss. Such approaches increase the internal consistency of an analysis and reduce subjectivity. Qualitative assessments are the preferred approach if it is necessary to engage with stakeholders from different educational and professional backgrounds, such as community groups or politicians.

### Box 1: Options for Strengthening Resilience

**Reducing Hazard**

- Structural measures (drainage, retaining walls, dams, etc.)

**Reducing Exposure**

- Risk-sensitive land-use planning
- Relocation of project sites

**Reducing Vulnerability/Strengthening Capacity**

- Structural measures (increasing design standards, retrofitting, etc.)
- Nonstructural measures (e.g., diversifying income sources of vulnerable communities, early warning and preparedness, ecobased measures, capacity building, risk awareness education)

Source: ADB.

## Detailed design, assessment, and implementation of disaster risk management measures

If the DRA or other related assessment indicates unacceptable levels of risk in the absence of any DRM actions, the DRA should provide clear recommendations on appropriate DRM measures. These measures can take the form of stand-alone initiatives, such as seismic retrofitting of school buildings; the incorporation of DRM components into wider projects, such as flood control elements of urban development projects; and the integration of DRM measures into other development actions, such as adjustments in road engineering design and location to strengthen resilience against extreme rainfall or landslides. They can also involve both structural and nonstructural measures (Box). These DRM recommendations then need to be evaluated in terms of their technical feasibility, cost, and net economic benefit during the project preparatory technical assistance and, if approved, subsequently implemented.

## Monitoring Disaster Risk and Disaster Risk Management

The degree of prominence given to disaster risk and DRM measures in a design and monitoring framework (DMF) and other project documents will depend on their importance to a project's outcomes. DRM-related performance indicators are required if a project has an explicit DRM subcomponent or the project outcome directly relates to enhanced DRM. Baselines established through the DRA can be used to monitor these indicators and help identify data sources for monitoring purposes.

If a project faces high levels of risk but does not include specific DRM components, disaster risk should be included in the section on risks and assumptions in the DMF and the associated risk assessment management plan. Relevant key activities could also be included in the project's environmental management plan.

This quick guide was prepared as part of a wider regional technical assistance project on Development of Guidance Materials and Screening Tools for Incorporating Disaster Risk Concerns in Country Partnership Strategy and Project Preparation (TA 8752-REG), financed by the Asian Development Bank's Technical Assistance Special Fund. The fuller Disaster Risk Assessment for Project Preparation is available at https://www.adb.org/documents/disaster-risk-assessment-project-preparation-guide. The contents presented in this and all related documents do not constitute part of ADB's formal operational policies, procedures and business processes. They should be treated as nonbinding technical reference materials.

Asian Development Bank. 2017.

**About the Asian Development Bank**

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to a large share of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

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