

Application of impact, vulnerability and risk assessments

Input by UNDRR, 4 September 2026

1. What practical example or case of applying an impact, vulnerability and risk assessment would you highlight, and in what country, region or adaptation context?
2. What was the assessment intended to inform, and how were its findings used in adaptation planning, prioritization, implementation, investment or other relevant decision-making processes?
3. What were the principal enabling factors and challenges in moving from assessment to practical application?
4. What key lesson from this experience could be relevant in other contexts, and are there existing methodologies, tools or guidance that the AC should take into account in order to build on existing work and avoid duplication?

Inputs may be concise and need not exceed 1–2 pages. References or links to relevant case studies, assessments, tools or supporting materials are particularly welcome.

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Applications and use cases of impact assessments¹

- (i) **Impact-based forecasting for anticipatory action to typhoons in the Philippines:** The Philippines faces around 20 tropical cyclones annually, prompting humanitarian agencies to use a machine learning impact forecasting model that predicts building damage and enables anticipatory action 72 to 120 hours before landfall. Developed by the Netherlands Red Cross 510 initiative and adopted by the Philippine Red Cross and UN OCHA Philippines, the model is trained on more than 60 historical events and uses around 40 hazard, vulnerability, exposure, and coping-capacity indicators alongside real-time weather forecasts. Enhanced with Google Open Buildings data, it supports targeted early interventions. However, scalability requires extensive historical loss data and adequate spatial resolution. [Impact-based forecasting for anticipatory action to typhoons in the Philippines | UNDRR](#)
- (ii) **An impact-based early warning module in Nepal's BIPAD portal:** In Nepal, a country highly vulnerable to recurring monsoon floods, the National Disaster Risk Reduction and Management Authority has integrated a real-time impact-based forecasting module into its national disaster information management system, the BIPAD portal. Operating within a national disaster risk reduction and adaptation context, the module quantifies and visualizes potential flood impacts by overlaying flood hazard maps with OpenStreetMap infrastructure data, household vulnerability scores from the Nepal

¹ <https://www.undrr.org/building-risk-knowledge/disaster-data> and <https://www.undrr.org/media/105262>

Red Cross Society, and historical loss and damage baselines. By combining real-time meteorological forecasts with local socioeconomic exposure metrics, the system moves beyond hazard monitoring to project tangible physical and social consequences ahead of disasters, guiding targeted early action and risk-informed decision-making across national, provincial, and municipal levels. [An impact-based early warning module in Nepal's BIPAD portal | UNDRR](#)

Applications and use cases of risk assessments²

- (iii) **Understanding vulnerability in Sri Lanka – combining disaster losses and damages data with national survey data.** In Sri Lanka, national citizen survey data analysed through the Multidimensional Vulnerability Index provide a clear picture of pre-existing socioeconomic vulnerabilities that can inform risk and vulnerability analysis. By combining these survey insights, such as widespread deprivations in adaptive capacity, water access, and household debt—with granular subnational disaster loss and damage databases, decision-makers can identify regional hotspots and priority areas for risk reduction. This integrated approach highlights how experienced disasters compound existing vulnerabilities in both rural and urban areas, demonstrating the value of merging multidimensional poverty metrics with loss data to guide risk-informed development. [Understanding vulnerability in Sri Lanka: Combining disaster losses and damages data with national survey data | UNDRR](#)

From assessment to practical application – Challenges

(i) The science-policy-practice gap

One of the most persistent challenges is that risk assessments are often designed by technical experts but not tailored to decision-makers' needs. As a result, findings may be scientifically robust but insufficiently connected to policy and operational choices.

(ii) Data limitations and uncertainty

Risk assessments frequently face challenges related to incomplete hazard data, limited exposure datasets, rapidly changing conditions and climate change uncertainty. Decision-makers may hesitate to act when uncertainty is perceived as too high, even though uncertainty itself can be a reason for precautionary action.

(iii) Institutional fragmentation

Disaster risk often cuts across multiple sectors and administrative boundaries. Responsibilities may be divided among agencies responsible for planning, infrastructure, environment, finance, and emergency management. Poor coordination can prevent risk information from being translated into coherent action.

(iv) Difficulty addressing systemic and cascading risks

Traditional assessments often focus on individual hazards. However, modern disasters increasingly involve interconnected risks across critical infrastructure, supply chains, health

² <https://www.undrr.org/gar/gar2025/solution-exploration>

systems, and ecosystems. Translating assessments into practical action becomes more complex when risks are systemic and cross-sectoral.

(v) Competing priorities

Investments that reduce future risk may compete with more immediate development priorities. Consequently, preventive measures are frequently underfunded despite demonstrating strong long-term benefits.

From assessment to practical application – Enablers

(i) Strong disaster risk governance

Risk information is most likely to influence decisions when clear institutional arrangements exist that assign responsibilities, coordinate stakeholders, and integrate DRR across sectors and levels of government. Political commitment is often required to translate scientific findings into regulations, budgets, and long-term investments.

(ii) Risk-informed planning and decision-making

Risk assessments become operational when they are embedded in development planning processes, including land-use and spatial planning, building codes and infrastructure standards, public investments, etc.

(iii) Stakeholder participation and co-production

Effective implementation frequently depends on involving local communities, civil society, businesses, and technical experts throughout the assessment process. Participatory approaches improve legitimacy, incorporate local knowledge, and increase ownership of resulting actions.

(iv) Financial resources and investment mechanisms

Risk reduction measures often require sustained investment. Enabling conditions include dedicated DRR budgets, contingency financing, public-private partnerships, among others.

(v) Institutional and adaptive capacity

Organizations need the skills, expertise, and systems necessary to interpret and use risk information. This includes technical capacity, data management systems, cross-sector coordination, monitoring and evaluation mechanisms, and learning and adaptation processes. Adaptive capacity allows institutions to continuously update decisions as risks evolve.

Replicable lessons

A key lesson emerging from UNDRR's work on global disaster risk assessment, including the Global Assessment Report (GAR), global risk models, the Sendai Framework Monitor (SFM), and more recently DELTA (Disaster and Emergency Loss Tracking and Accounting) initiatives, is that risk assessment only becomes useful when it is embedded in decision-making systems and linked to actions that reduce vulnerability, exposure, and risk creation. The shift is from producing risk information to enabling risk-informed governance.

(i) Move beyond hazard assessment to a systems view of risk

One of the most important contributions of the Sendai Framework is its framing of disaster risk as the interaction of hazard, exposure, vulnerability and capacity, rather than as a hazard

problem alone. Many adaptation assessments place greater weight on climate hazards and scenarios; it is necessary to ensure more emphasis is given to underlying vulnerability, governance failures, inequality, and development patterns.

(ii) Impact and risk data must complement each other

The Sendai Framework Monitor and disaster tracking systems are designed for systematically collecting data on mortality, economic losses, infrastructure damage, service disruptions, and impacts on livelihoods. These data demonstrate adverse impact from climate-related hazards, and can inform adaptation assessments and effectiveness. Linking historical impacts to future scenarios allows for more informed adaptation and risk reduction measures.

(iii) Capacity and governance are part of risk

UNDRR terminology explicitly treats capacity as part of the risk equation rather than merely a response consideration. Risk is shaped not only by hazards and vulnerabilities but also by the ability of institutions and societies to manage change. Adaptation assessments should evaluate institutional effectiveness, access to finance, social protection systems, and governance arrangements.

(iv) Measurement should support accountability

The Sendai Framework Monitor represents an important lesson in linking assessment to measurable outcomes and targets. Risk assessment gains influence when it is tied to indicators that can be tracked over time. Without these elements, adaptation risks become a planning exercise rather than a management process.

(v) Focus on decision relevance

A practical lesson from global risk modelling is that increasingly sophisticated models do not automatically lead to better decisions. The most useful assessments are often those that provide actionable information for planners, investors, and communities.

Risk assessment should be viewed as a governance and decision-support process, not merely a technical exercise. The value of an assessment lies not in how accurately it describes risk, but in how effectively it influences decisions, investments, institutions, and behaviour that reduce future risk. This is directly applicable to adaptation-related risk assessments, where the challenge is similar to moving from understanding climate risk to enabling practical adaptation action.

Existing methodologies, tools or guidance

1. [National disaster risk assessment: A guide for national practitioners](#)
2. [Technical guidance on comprehensive risk assessment and planning in the context of climate change](#)
3. [Technical guidance on application of climate information for comprehensive risk management](#)
4. [Using Traditional and Indigenous Knowledges for Disaster Risk Reduction](#)
5. [DELTA Resilience](#)
6. [Technical guidance for monitoring and reporting on progress in achieving the global targets of the Sendai Framework for Disaster Risk Reduction](#)
7. [A framework towards assessing climate change and disaster-related losses of biodiversity and ecosystem services \(FRAME-ECO\)](#)