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Approaching Disaster Risk Financing in a Structured Way

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Approaching Disaster Risk Financing in a Structured Way

Diana Radu

Abstract

As the number and magnitude of climate-related disasters in the EU are increasing, the impact of these disasters on public finances also depends on the extent to which budgets and budget plans reflect fiscal risks from disasters. At the same time, as many of these disasters can no longer be considered exceptional events, dealing with the fiscal cost of disasters calls for an informed national disaster financing strategy, also as a way to enhance a country's climate fiscal resilience. This discussion paper presents a structured approach to Disaster Risk Financing (DRF) in the EU Member States and describes the key elements needed to better understand, plan for and manage the fiscal cost of disasters. The paper proposes a step-by-step approach to DRF, building on previous analysis on the main concepts and ways to reduce and limit the fiscal cost of disasters.

Member States willing to develop a national approach to disaster risk financing can act under four pillars to understand: (1) the fiscal impact of disasters, (2) private sector risk ownership, (3) public sector disaster risk management and (4) institutional arrangements. The Member States would be able to locate themselves in one stage of development of DRF: "essential", "intermediate" or "advanced", and then take action to limit the burden that disasters can put on public finances.

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Keywords: natural disasters, climate change, disaster risk financing, insurance, risk transfer, fiscal risks, disaster losses, national budget.

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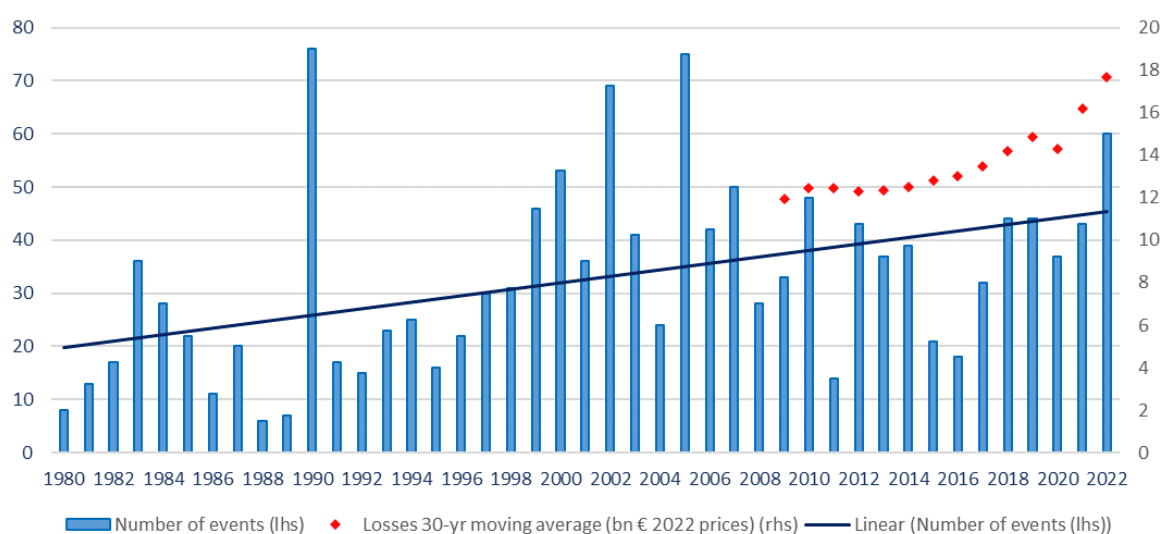
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1. INTRODUCTION

Natural disasters pose significant concerns for public finance, and the last years have shown that they are not exceptional events. The frequency of extreme weather events is on an increasing trend, as is the 30-year moving average of total losses (Graph 1). Due to global warming, weather-related hazards¹ such as floods, droughts, wildfires are projected to further increase in intensity, frequency and duration in the coming decades. Recent figures from the European Commission estimate that exposing the present economy to global warming of 3°C would result in annual climate-related losses of at least € 170 bn (1.38% of GDP) (Szewczyk et al., 2020).

Graph 1. **Number of extreme weather events in the EU, 1980-2021**



Source. Emergency Events Database (EM-DAT), European Commission.

It is of growing importance to treat disasters as belonging to a new normal. This calls for action at national level for disaster prevention, preparedness and reduction and to upgrade the budgetary planning to take into account the impact of disasters. Climate-related events will impact GDP levels and public finances, through the revenue and expenditure channels. Therefore, assessing the (past and expected future) impact of climate-related disasters on the economy and on public finances, as well as monitoring expenditure allocated to deal with the consequences of disasters, are indispensable steps to inform the authorities in their policy decisions. This implies progressively upgrading budgetary processes to reflect the macro-fiscal risks from climate-related disasters in a transparent way.

Current national processes for disaster risk management and financing are highly fragmented. Elements of disaster risk management and financing are spread over different laws, government decrees or decisions. In most cases, disaster risk management (DRM) is under the lead responsibility of the ministry of internal affairs, while disaster risk financing (DRF) rests mainly on decisions taken by the ministry of finance and economy. Disaster and climate experts, meteorologists, environmental scientists and researchers have different roles in the DRM phases and at different stages in the design, formulation and implementation of action on the ground. Most notably, while evidence from international initiatives on disaster resilience² shows the authorities' willingness to involve relevant stakeholders, the responsibilities are still not articulated around a shared vision on the national process and strategy for DRF.

¹ Annex 1 provides definitions of different risk components, including hazards.

² Such as the Sendai Framework for disaster risk reduction 2015-2030, adopted by UN Member States in 2015 (see Box 1).

The availability of information relevant for DRM and DRF varies greatly in scope and detail.

The reports on disaster risks, if they are produced at all, are generally published independently from budgetary documents. These reports can be part of the national budget process or of the national strategy for DRM, in other cases they are voluntary products associated with initiatives such as the Sendai Framework for Disaster Risk Reduction (see Box 1) or the EU guidelines for national risk assessments. Disaster loss data tend to be produced, collected and stored by different actors in a scattered way, using different methodologies and are rarely public.

National budgets' account of the fiscal impacts of climate change is limited. The 2021 EU Climate Adaptation Strategy has stressed in the first place the relevance of the macrofiscal risks from climate change and called for action in this respect. More recently, the Economic Governance Review³ has included for the first time reporting requirements on the fiscal losses and contingent liabilities from climate related disasters and on the macrofiscal risks from climate change. As the macrofiscal risks from climate change feed into public finances through different channels, this paper sets a narrower perimeter and focusses on the treatment of losses and fiscal risks from climate-related disasters in the national sphere.

Against this background, this discussion paper aims to contribute to a shared understanding of the key steps and stages of development of disaster risk financing. It proposes a coherent and structured approach to disaster risk financing in four pillars: (1) fiscal impact of disasters, (2) private sector disaster risk ownership, (3) public sector fiscal risk management and (4) institutional arrangements. This approach could be a reference for the relevant authorities in those Member States willing to further structure and develop their disaster risk financing processes and articulate the different elements and roles around a shared vision on the management and financing of disasters. The discussion paper provides some selected evidence on good practices on DRM and DRF in EU Member States and beyond and proposes to look at the development of sound DRF according to three stages: basic/essential, intermediate and advanced.

2. DISASTER RISK FINANCING IN THE EU MEMBER STATES STEP BY STEP

Public budgets need to accommodate new and existing policy priorities, while ensuring the long-term sustainability of public finances. At this juncture, it is important to reflect on how best to prepare for, plan and pre-arrange financing for disasters, while at the same time reducing such risks and increasing the resilience of societies and the economy to disasters.

All EU Member States practice some form of disaster risk financing as all of them have been confronted with such events at various moments in time, as shown by the recourse to the EU Solidarity Fund (see Graphs 2 and 3). The EU Solidarity Fund (EUSF) is the main EU financial instrument that provides financing to EU Member States, ex-post. Access to the EUSF is granted upon request in the aftermath of disasters and for incurred damage above predefined thresholds⁴. As the amounts granted and timing of disbursement of funds cannot be determined with certainty, the EUSF is not specifically considered in the national DRF approach, but mainly seen as a top-up to the amounts mobilised to cover post-disaster costs.

The most common way to deal with the financial consequences of disasters is *ad-hoc* financing. This practice rests on identifying the funds needed to cover the cost of a disaster in a budget

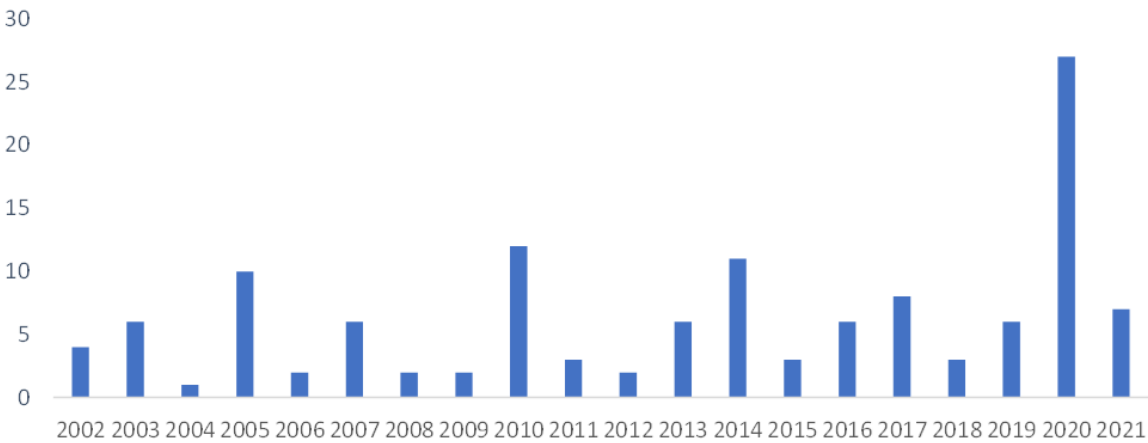
³ The amended Directive on National Fiscal Frameworks (published in [OJ L 2024/1265, 30.4.2024](#)) introduces reporting requirements relative to macro-fiscal risks from climate change (Article 9(2)(d)), disaster and climate-related contingent liabilities and fiscal costs incurred due to disasters and climate-related shocks (Article 14(3)). These requirements take account of the existing challenges to assess the impact of climate change and Member States would have to apply them "to the extent possible".

⁴ [EU Solidarity Fund](#).

that does not specifically take such events into account. In fact, there is limited evidence of natural disaster funds or other pre-arranged funding in the national budgets (Radu, 2021 and 2022).

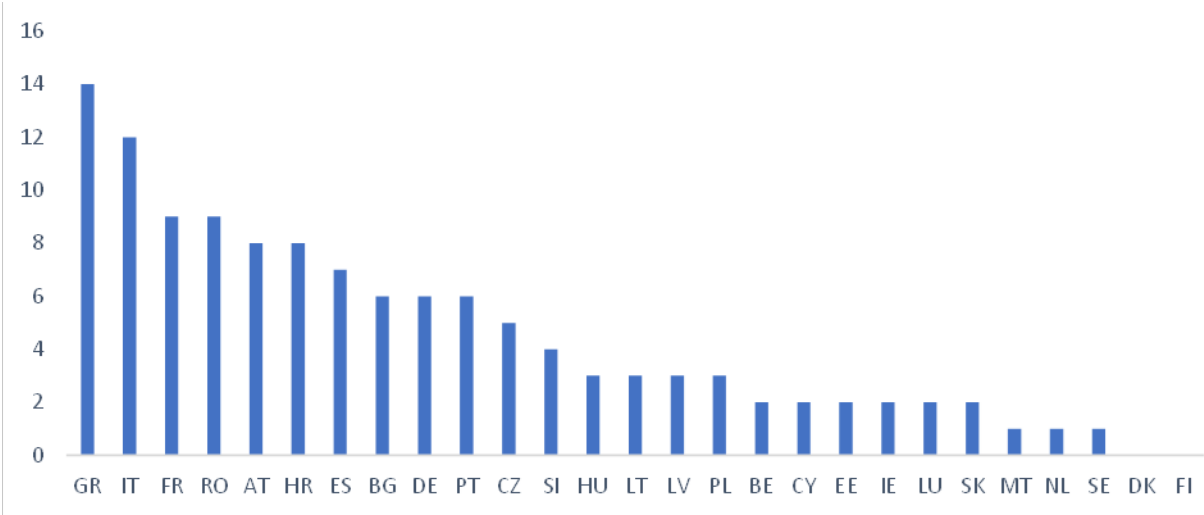
Ad-hoc financing is suboptimal in many respects. First, it rests on mobilising resources in a situation requiring urgent action, while at the same time experiencing disrupted economic activity and government operations. This can entail budgetary reallocations and a longer-term realignment of investment budgets (OECD, 2015). In addition, acting as insurer of last resort leads to moral hazard. This happens when public authorities provide implicit insurance coverage because they are expected to step in once a disaster occurs even if no attempt has been made to insure assets against disaster risks. Such a situation can even lead to overcompensating disaster costs. Second, it does not follow a clear logic of limiting such costs over time when reconstructing damaged assets. Third, it does not reflect lessons from past disasters and insights from the disaster profile of the country. Finally, it makes insufficient use of available financial products and innovation that could be explored on top of traditional tools for disaster financing.

Graph 2. **Number of approved EU Solidarity Fund applications**



Source: European Commission.

Graph 3: **Number of EU Solidarity Fund applications by country (2002-2021)**



Source: European Commission.

Acknowledging that there is not a single way to manage the disruption and losses caused by a disaster, a structured approach should leave space to national specificities. Designing a national DRF strategy that reflects a shared vision of DRM across all stakeholders would rest on the following main elements: develop national knowledge of disaster risks and collect relevant data; produce quantitative disaster risk assessments and articulate them with the budgetary processes; promote cooperation between public services with clear procedures and guidelines; insert resilience objectives in the use of public funds for reconstruction and improve the national strategy with an ex-post assessment and lessons learnt after each disaster.

BOX 1. THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION

The [Sendai framework](#) for disaster risk reduction was adopted in 2015 by the 193 UN Member States at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Japan. It aims to achieve a substantial reduction in disaster risks and losses in lives, livelihoods and health and in the economic, physical, cultural and environmental assets until 2030. The framework aims to achieve seven global targets such as reducing economic loss/global GDP, damage to critical infrastructure and disruption of basic services, to increase the number of countries with local and national disaster risk reduction strategies and the availability and access to multi-hazard early warning systems and disaster risk information and assessments. 38 qualitative and quantitative indicators track progress in implementing these targets, introducing a strong accountability element in the framework.

The Sendai framework encourages the establishment of [National Platforms](#) and brings its support with specific guidelines in this area. These platforms are mechanisms for coordination and policy guidance on disaster risk reduction involving public, private and civil society stakeholders in a country. The platforms give valuable insights on how to establish cooperation across relevant stakeholders (on the legal basis, mandate and participants) and national authorities could seek potential synergies with the DRF process.

This structured approach would complement the World Bank DRM and DRF assessment tool⁵ and the Sendai framework for disaster risk reduction. The 2022 World Bank Disaster Resilient and Responsive Public Financial Management (DRR-PFM) Assessment Tool aims to help developing countries be better prepared for, respond to and recover from disasters caused by natural hazards with rapid onset (Annex 2). The World Bank tool covers planning and budgeting for DRM, public investment and asset management, budget execution and control, public procurement, audit and oversight. Three cross-cutting themes are also considered: institutional arrangements for DRM, IT systems and records and social inclusion. The elements of the 2015 Sendai framework for DRR are broader in coverage and can help countries develop DRR strategies, make risk-informed policy decisions and allocate resources to prevent new disaster risks (see Box 1).

3. FOUR PILLARS FOR A STRUCTURED APPROACH TO DRF

The key elements of disaster risk financing at country level can be structured in 4 pillars. Pillar 1 refers to the fiscal impact of disasters, realised and estimated. Pillar 2 covers the risk owned by the private sector, while pillar 3 covers the risk owned by the public sector and how it is managed. Pillar 4 covers institutional aspects of governance, transparency and accountability.

The elements outlined above are not all fully new to EU Member States, but in general the processes are fragmented, and responsibilities are scattered across the administration. Before reflecting on the overall DRF approach, governments should take stock of existing national practices. This step requires already a certain level of resources and coordination to identify these

⁵ [The 2022 World Bank Disaster Resilient and Responsive Public Financial Management: an Assessment Tool, tailored to take into account the realities of developing countries.](#)

practices and to assess them, not least, cooperation between services with different expertise, political support and technical skills. Depending on the degree of development of DRF in the Member State, disaster risk financing can require defining, introducing and using new methodologies and procedures/guidelines as well as developing expertise in the relevant administrations. As EU Member States already have in place some of the above-mentioned elements with different degrees of sophistication, the proposed structured approach would allow them to place themselves in different development stages and identify areas that could be developed. Accordingly, the “essential” stage corresponds to the necessary minimum for Member States interested in a structured DRF approach. The “intermediate” stage is more developed, with wider coverage, methods, and guidelines, along with a clearer allocation of responsibilities and coordination across actors. The “advanced” stage is more detailed, rests on technical expertise, methodologies and transparency and broadens the scope of DRF to include conditional compensation, resilience objectives, ex-post assessment and feedback loops.

Pillar 1 - Identifying fiscal impact from disasters

	Elements	Basic / Essential	Intermediate	Advanced
1. Fiscal impact from disasters	<i>Historical losses from physical damage</i>	Some data available for some events Publicly available	Data available for all events with a significant budgetary impact Publicly available	Systematic and comparable data collected for all events with a significant budgetary impact Public database
	<i>Historical disaster-related expenditure</i>	Partial tracking disaster-related expenditure Transfers to local authorities	Tracking main disaster-related expenditure Transfers to local authorities	Tracking all disaster-related expenditure Transfers to local authorities
	<i>Future economic loss estimates</i>	Identification, qualitative and/or quantitative assessment of risks within bandwidths Publicly available methodology In budgetary documents	Qualitative and quantitative assessment within bandwidths for risks with high budgetary impact Publicly available methodology In budgetary documents	Quantitative assessment for risks with high budgetary impact for different scenarios Publicly available methodology In budgetary documents
	<i>Disaster-related public expenditure estimates</i>	Identification and qualitative disclosure in budgetary documents	Quantitative disclosure for some risks with a significant budgetary impact in budgetary documents	Quantitative disclosure for all relevant risks with a significant budgetary impact in budgetary documents

Before looking at planning and budgeting for future disasters, the authorities need to know the extent of past disaster costs at a minimum and the share covered by public money. Such knowledge rests on the availability of past disaster loss data and estimates of economic losses from past disasters, which can then be used to estimate the explicit liabilities from the reconstruction of damaged public assets (i.e., infrastructure such as roads, hospitals, schools) and emergency response to cover the basic needs of citizens and other contingent liabilities that are likely to be triggered. A robust and comprehensive national DRF should start with a good overview of past disaster related losses and of the share covered by public spending and a disaster risk assessment based on sound and public methodologies. This pillar has a backward looking and a forward-looking dimension.

Past disaster loss data collection is the cornerstone of a disaster risk financing strategy, it is the basis for the formulation of needs, material and financial, for immediate response, reconstruction and recovery. At the same time, past loss data collection and availability appears to be one of the main weaknesses of DRF in EU Member States⁶. Getting good disaster loss data rests on a detailed and structured collection of information that usually takes place after the disaster strikes and when damage can be assessed. The management of such data, when available, is also fragmented among different authorities and stakeholders in charge of different tasks. Public authorities would need to cooperate more closely with insurance companies, which are currently the main data collectors, to

⁶ According to the [Sendai data readiness review](#) (2017), of the 15 EU Member States that have provided answers to the survey, seven have declared to have a national database for collecting disaster losses and four make that data public. The methodologies to collect and store the data are very diverse and the process usually involves several different institutions.

find ways to make this information public, while addressing privacy concerns. At a minimum, past disaster loss data should be collected from national administrations and made public, even if incomplete. More developed practices would mean a broader scope in data collection covering all disasters with a significant budgetary impact (above a predetermined % of GDP). In the advanced stage, disaster loss data collection would cover all events with a significant budgetary impact, be comparable and available in a public database. Such databases need to be developed and maintained as public goods for their potential use in other applications and services.

Data on disaster-related public expenditure gives insights on the government role in the aftermath of a disaster and on the extent of its implication. In particular, it gives the size of the public sector participation compared to the overall damage and financial needs. Moreover, such data increases transparency and accountability on the use of public funds for disasters. In the *essential* stage, the authorities would provide partial information on public disaster-related expenditure (i.e., either for some events or some expenditure items). In the *intermediate* stage, the authorities would cover the main expenditure items and be comprehensive in the coverage of public spending for disasters in the *advanced* stage. As local authorities drive the post-disaster response and reconstruction effort, transfers from the State to local authorities should be tracked in any stage of development of disaster risk financing. Such public spending is also made possible by the budgetary arrangements and financing instruments that are in place to pre-arrange funds to cover disaster risks. As these aspects fall under the government strategy for risk retention and risk transfer, they are developed in the pillar on the public sector risk management.

The forward-looking dimension covers the economic loss estimates and fiscal risks from disasters.

- **Economic loss estimates** require the authorities to identify, describe and quantify disaster risks with various degrees of accuracy, although arguably such risks are surrounded by uncertainty. National risk assessments in their most common form are qualitative and provide a risk matrix on the magnitude and likelihood of the hazard. Therefore, the information gap would need to be bridged to go from a qualitative assessment to quantitative estimates of the economic losses from disasters. Information on economic loss estimates should be presented in budgetary documents, fiscal risk reports or annexes thereof. In the essential stage, qualitative information could be provided and, where possible, estimates within bandwidths (quantitative information, using historical data as a central estimate for future economic losses). In the intermediate stage, the authorities provide a qualitative and quantitative assessment of risks with high likelihood and magnitude of economic impact within bandwidths. In the advanced stage, estimates are presented according to different scenarios.
- Keeping in mind the link between climate change and disaster risks, countries can start from a broader angle and quantify the economic impact of climate change, be it from climate mitigation, adaptation, transition or discrete events such as disasters. The quantification of the economic impact of climate change and related disasters impacts is an area under development by academia and scientists. Seminal in this field is the work of Nordhaus on the Dynamic Integrated Climate-Economy (DICE) model among others (Nordhaus, 2018). Some countries follow different approaches. For instance, Denmark has developed its own GreenREFORM model⁷, currently looking at mitigation, but which could be enhanced to include other aspects of climate change and policies and replicated and applied to other countries. In a similar vein, Armenia has successfully used the IMF Fiscal Risk Portal⁸ to start quantifying fiscal risks from climate change. The country has used the Natural Disaster Shock module of the IMF Fiscal Stress Test⁹ to assess the impact of different scales and magnitudes of natural disasters on its macroeconomic and fiscal outcomes. In addition, the IMF Fiscal Risk Assessment Tool¹⁰ enables

⁷ <https://dreamgroup.dk/economic-models/greenreform>.

⁸ [IMF Fiscal Risk Portal](#).

⁹ [IMF Fiscal Stress Test](#).

¹⁰ [IMF Fiscal Risk Assessment Tool](#).

countries aiming to develop their climate fiscal risk assessment to identify the largest sources of fiscal risks. To be relevant, deterministic models can bring value where stochastic models cannot be used due to lack of data (DRMKC, 2017). In any case, the methodology underpinning the estimates should be public to allow debate and challenge. The Post Disaster Needs Assessment tool (see Box 2) can be used ex-post to gauge the extent of post-disaster financing needs but also to compare with the ex-ante disaster impact estimates and whether the methodology needs to be fine-tuned.

BOX 2. POST DISASTER NEEDS ASSESSMENT

Post Disaster Needs Assessment (PDNA) is a useful tool to assess ex-post the robustness of the national disaster risk assessments and quantification and whether the provisions made for disasters in the budgets and the disaster risk financing strategy are appropriate. The PDNA is a joint project between the European Union, The World Bank and the United Nations development group aiming to support government ownership and leadership in the post-disaster needs assessment process, including the financial resources needed for recovery. This assessment informs government officials, senior managers from multilateral agencies, technical staff and civil society in case of a request for international assistance for post-disaster recovery and reconstruction. The PDNA puts together information on the socio-economic aspects of disasters and effects (i.e., economic losses), impacts and needs. The result is a consolidated report, similar to a resilient recovery strategy. The consolidated assessment is based on seven sector reports: social, infrastructure, productive, macro-economy, finance, cross-cutting themes, human development (GFDRR, 2013).

- **Estimates of public spending** for disasters should feature in budgetary documents and be part of the annual and medium-term budgetary planning. Disasters feed into public budgets through the revenue and expenditure channels. A disruption in economic activity lowers consumption and production and hence leads to lower revenues. The spending channel can be apprehended via spending for emergency assistance, public compensation schemes, reconstructing damaged assets and infrastructure, triggering of other contingent liabilities from SOEs, just to name a few. The estimates of the budgetary impact can be more detailed (i.e., a bottom-up approach) or be an overall estimate of the expected budgetary impact and financing needs. In DRF, the focus would be on the disaster financing needs and therefore, estimates of public spending. In the essential stage, the identified spending items could reflect past data which in the absence of any other estimate is the best proxy for future needs. In the intermediate stage, public spending for some risks can be more easily estimated due to availability of models, past experience and frequency of occurrence of hazards (see Box 3). In the advanced stage, all relevant risks with a significant budgetary impact would be covered.

A common method to assess risks across EU Member States would be desirable. While recognising the need for scope to accommodate national features for the treatment of disaster risks and related financing needs, developing a common approach to assessing the likelihood of occurrence and order of magnitude across EU Member States has the merit of comparability and convergence of national practices towards good or best practice. Such approach could be useful in the management of those disasters hitting several Member States at the same time.

BOX 3. FLOODS RISK MANAGEMENT PLANS

Floods are the most common and most costly natural disaster in the EU Member States. As a consequence, more efforts have been put into understanding the exposure and vulnerability to floods risk, leading to flood risk maps and better collection on information on river basins. At the same time, an EU Floods Directive ([Directive 2007/60/EC](#)) has given an impetus to the assessment, preparedness, reduction of flood risk and production of flood risk management plans every six years. Moreover, Member States are required to produce an assessment of the potential adverse consequences of future floods on economic activity among others (Article 4(2)(d)).

Some national approaches driven by EU or international commitments could evolve to be better integrated within national disaster risk management and financing strategies. Some examples of these approaches in EU Member States are the national risk assessments (voluntary and not always public), the flood risk management plans (produced every six years), national energy and climate plans, operational programmes for Cohesion policy, national adaptation strategies and plans although with a different time horizon than the budget planning horizon. The national voluntary reports produced as part of the mid-term review of the Sendai framework in 2022 provide relevant information for DRF: a list of the main risks of the country, main stakeholders in monitoring and assessing risks, risk governance and risk financing arrangements, etc. At the same time, the RiskDataHub¹¹, run by the EU Joint Research Centre, is a web platform of European wide risk data and methodologies for disaster risk assessment, populated with damage and loss data from open sources. The advantage of the RiskDataHub is that it could be used by countries wishing to record their information in a database, following a unique event ID. DesInventar¹² is another disaster information management tool helping to generate national disaster inventories and the construction of databases on damage, losses and, in general, effects of disasters, hosted and sponsored by UNDRR.

Pillar 2 - Private sector disaster risk ownership

	Elements	Basic / Essential	Intermediate	Advanced
2. Private sector Insurance	Private assets insurance	Assessment of disaster insurance penetration	Assessment of disaster insurance penetration Regulatory measures for insurance take-up	Assessment of disaster insurance penetration Regulatory measures for insurance take-up Conditional compensation from public money

Using risk transfer instruments is part of a country's strategy to limit the fiscal cost of disasters. Disaster insurance is one of the most widely used risk transfer instruments available for most disaster risks. Recent trends however point to some risks becoming uninsurable because the likelihood of occurrence has become too high (i.e. droughts). EIOPA's dashboard on the insurance protection gap for natural catastrophes¹³ provides insights at country level for coastal floods, earthquakes, floods, windstorms and wildfires. It is a tool with high potential that could benefit in particular from better national disaster loss data for the private and public sectors and a broader coverage of catastrophes.

¹¹ [RiskDataHub](#).

¹² <https://www.desinventar.net/>.

¹³ [EIOPA dashboard on the insurance protection gap](#).

Accurate and up-to-date information about disaster insurance coverage is essential in the design of a disaster risk financing strategy. First, it is important for public authorities to assess the extent of the disaster insurance protection gap, to understand its causes and to take actions to narrow it. In this respect, public authorities can create a regulatory environment encouraging disaster insurance take-up and monitor the effective enforcement of these laws. Disaster insurance penetration rates remain low in some EU Member States despite disaster insurance being available in various forms (Radu, 2022). Second, it is important to collect information on the insurance of private assets (as well as on public assets detailed under Pillar 3) which determines the extent of the government participation in the post-disaster effort. Third, it informs the design of the national disaster risk financing strategy, including by granting access to public funds conditional on disaster insurance purchase. Insurers could also propose innovative insurance products offering discounts conditional on risk reduction, prevention and adaptation measures, called impact underwriting. The robustness of this pillar depends on the close cooperation between public authorities and private sector insurers. More cooperation on data and risk assessment between public and private sector would support the risk reduction and prioritisation of resilience investment.

Insufficient disaster insurance for households and companies can become a significant burden for the government in the aftermath of a disaster. Taking stock of disaster insurance penetration is therefore a key input to governments aiming to define a disaster risk financing strategy that is consistent with the past and potential disaster losses. In the essential stage, the authorities would perform an assessment of private assets insurance penetration. In the intermediate stage, the country would adopt laws to support disaster insurance take-up and enforcement. Countries in the advanced stage would have information on all the elements above. More details could be available on provisions such as for access to public funds conditional on disaster insurance purchase.

Pillar 3 - Public sector fiscal risk management

	Elements	Basic / Essential	Intermediate	Advanced
3. Public sector fiscal risk management	<i>Public insurance schemes (for private and/or public assets)</i>	optional	mandatory (in no private insurance)	mandatory (if no private insurance)
	<i>National budgets</i>	Managed under the overall budget of different ministries Ad-hoc financing via budgetary reallocations, deficit, debt	Managed under the overall budget of different ministries Mainly ad-hoc financing Some contingent financing Some pre-arranged financing	Managed under the overall budget of different ministries Some ad-hoc financing Contingent financing in the budget Support Schemes Reconstruction expenditure Mainly pre-arranged financing
	<i>Public assets insurance</i>	Main public assets list , insurance status in high-risk areas, hazard map	Main public assets list , insurance status everywhere, hazard map, exposure	Public assets repository , insurance status and promotion, hazard map, exposure, vulnerability
	<i>Compensation</i>	Ad-hoc decision	Legal base and thresholds for some sectors/disasters	Legal base for compensation Comprehensive compensation system with link to insurance
	<i>Disaster prevention and preparedness</i>	No link between spending for prevention and preparedness and disaster resilience objectives	Spending for prevention and preparedness is linked to broad disaster resilience objectives	Explicit link between spending for prevention and preparedness and disaster resilience objectives Ex-post review

This pillar examines the national disaster risk financing strategy put in place once disaster risks have been identified, including the private insurance coverage for these risks. A national disaster risk financing strategy uses pre-arranged funds for the disaster risk that is retained by the public sector, together with the use of disaster risk transfer instruments. The strategy would need to

reflect the authorities' choices on which risks to "retain" (and thus pass on to the public finance, including risks from private assets) and which risks to "transfer" by creating a regulatory environment supportive of disaster insurance provision and take-up. Usually, the risk of high frequency and low impact disasters is retained by governments and reconstruction of public assets represents one of the largest spending needs. The ensuing financing needs are covered by ordinary budgetary arrangements such as contingency reserves or specific budgetary tools such as natural disaster funds. Low frequency-high impact disasters would be transferred through the purchase of risk transfer instruments.

- **Public insurance schemes**

Disaster risk retention happens if a public insurance scheme is available. Differently from private insurance schemes, detailed in the Pillar 2, these schemes entail public funds covering the uninsured part of the disaster risk. Depending on the cost of the shock, such schemes could require additional topped-up public spending if the disaster exceeds the capacity of the public insurance scheme to absorb the cost (Radu, 2022). The public disaster insurance scheme can be optional if private disaster insurance is available in the essential stage but made mandatory if no private insurance is available in the intermediate and advanced stages (for uninsurable disasters risks for instance).

- **National budgets**

Once a public insurance scheme is established, national budgets and budgetary plans should reflect the financing of residual disaster risks in the most comprehensive way. The budgets of the ministries usually involved in DRM (internal affairs, health, environment, agriculture) are sometimes used to cover disaster related expenditure. In all development stages, these budget lines should be presented for each of the ministries involved in DRM and DRF with details on situations justifying their use to complement or buffer pre-arranged financing.

The core part of DRF refers to the management of the fiscal cost of disasters under the regular budget plus other disaster financing arrangements the authorities might choose. The **essential** stage entails exclusively ad-hoc financing, either via *budgetary reallocations* under the approved budget and expenditure ceilings or running deficits. In the intermediate stage, some ad-hoc financing would still be used to complement *contingent financing* and some pre-arranged financing (see Box 4). Contingent financing is a critical component of DRF that aims to ensure immediate post-disaster liquidity to meet emergency and recovery needs and avoid that the allocated budget is not diverted from ongoing projects. It can take the form of contingent loans that can be accessed in function of the disaster type, location and intensity. In the advanced stage, the budget and budgetary strategies would reflect DRF arrangements relying only to a limited extent on ad-hoc financing, but mostly on contingent financing, pre-arranged support schemes for households and firms, budgeted plans for spending for post-disaster reconstruction and other forms of pre-arranged financing.

BOX 4. DISASTER RISK MANAGEMENT DEVELOPMENT POLICY LOAN WITH A CATASTROPHE DRAW DOWN OPTION (CAT DDO) TO PREARRANGE LIQUIDITY IN ROMANIA

Disasters represent a significant challenge for public finance in Romania. Between 2005 and 2016, Romania has received over € 119 million support for disaster reconstruction through the EU Solidarity Fund, which represented a small fraction of the overall damage from disasters and arrived with unpredictable timing and amounts. Typically, the EU Solidarity Fund payouts are less than 5 percent of the reported damage. Despite the mandatory catastrophe insurance for homeowners, insurance penetration in Romania remains low at about 20% of the insurable housing stock, which represents a significant contingent liability for the Government. The climate outlook and projected increase in the frequency and intensity of natural disasters highlight the need for Romania to increase its physical and financial resilience to climate and disaster risks.

In this context, Romania has signed an agreement with the World Bank in 2018 for a disaster risk management development policy loan of €400 million including a catastrophe draw down option. The loan aimed to support the government's efforts to comply with international commitments and improving the understanding of and response to disasters. Under this agreement, the Romanian government had committed to strengthen the national framework for disaster risk management and financing and to strengthen the government's capacity to systematically identify and reduce disaster and climate risk.

Several prior actions have been considered in the assessment of the Romanian loan agreement:

- the establishment of a National Platform for Disaster Risk Reduction;
- the adoption of a national emergency management information system for emergency and disaster response;
- strengthening the capacity to systematically identify and reduce disaster and climate risks and to manage the financial impact of disasters and
- a revised building design code for seismic risks in existing buildings.

The Ministry of Internal Affairs, the Ministry of Public Finance and the Ministry of Regional Development and Public Administration were in charge of monitoring progress of the program during the drawdown period, with the Ministry of Public Finance ensuring the overall coordination.

Romania has been able to use this pre-arranged loan in 2020 to help prevent and respond to the COVID-19 pandemic. A pandemic is a hazard and climate change can impact the pandemic risk (Poljansek and al., 2021). The Romanian CatDDO is an example of prearranged financing for disaster risks, not specifically for natural disasters (hydrologic, meteorologic, climatologic). It highlights the importance of such arrangements in supporting the government to build resilience while at the same time guaranteeing access to finance within 48 hours in response to a natural disaster or health emergency.

Source: <https://documents1.worldbank.org/curated/en/120621530243038191/pdf/Romania-DPL-Cat-DDO-PD-06052018.pdf>.

- **Public assets**

The reconstruction of public assets is another major source of disaster costs for the government. To limit the impact, public assets hazard maps and insurance can be put in place. In the essential stage, the authorities would produce a list of main public assets compatible with a hazard map and collect information on the insurance status of main public assets in high-risk areas. In the intermediate stage, the country would complete the assessment of public assets insurance to the entire territory, jointly with a hazard map and list of public assets exposed to hazards. This would require a more detailed treatment of public assets to understand what can be insured and how. Countries in the advanced stage would present more details in a public assets repository also reflecting vulnerability to hazards, comprehensive information on public assets' insurance status and a national policy on insurance of public assets (Box 5).

BOX 5. STATE ASSET INSURANCE SCHEME IN INDONESIA

Indonesia has put in place a State Asset Insurance Policy programme to insure public assets against climate and disaster risks, in the context of the National Disaster Risk Financing and Insurance strategy. In 2019, the government introduced a state building insurance scheme, as the first phase of the State Asset insurance mechanism. The scheme provides insurance for natural disasters, funded by a pool of private insurers. This scheme was introduced for the Ministry of Finance's buildings in 2019 and extended to buildings belonging to other ministries in 2020. The estimated insurance value of the government buildings to be covered by this scheme amounts to IDR 371 trillion (13% of GDP). The insurance premium for disaster risks is estimated to be 0.2 % of the building values. The overall scope of assets to be covered in the future includes buildings, bridges, transportation modes, and other government properties. The assets covered have to be exposed and vulnerable to disasters and to have significant contribution to public services.

- **Compensation rules**

Upfront clarity on the compensation rules and access to public funds is part of DRF arrangements. Such rules bring clarity to potential beneficiaries but also facilitate planning DRF for the amounts that could be disbursed in case of disaster. Moreover, concerning the fiscal implications, such compensation rules would set a perimeter or cap on the size and scope of the State involvement post-disaster, thereby limiting the implicit liabilities. The default situation is where compensation rules are decided ad-hoc and after the occurrence of the event (essential stage). In the intermediate stage, a law would, for example, establish that for certain types of disasters the State would provide compensation up to pre-set thresholds for some sectors. The most advanced stage would mean that a law covers the provision and access to public compensation in detail. Compensation conditional to purchase of disaster insurance would also be part of the most advanced arrangements.

- **Disaster prevention and preparedness**

Measures for disaster prevention and preparedness are steps in DRM that limit the human and material loss and contribute to a faster post-disaster recovery, in particular when they are linked with resilience objectives. Although not specifically linked to disaster risk reduction, public spending for disaster prevention and preparedness that reflects disaster resilience objectives is a powerful way to reduce the impact of disasters. In the essential stage, clarity on public spending for prevention and preparedness contributes to the overall assessment of the DRM/DRF strategy, even if such spending is not directly linked with disaster resilience objectives¹⁴. In the intermediate stage, public spending for prevention and preparedness set out in a comprehensive DRM strategy would be linked to broad resilience objectives. In the advanced stage, the link with disaster resilience objectives would be

¹⁴ Disaster resilience goals can target increasing awareness, the capability to assess disaster risks, establishing or improving early warning systems, etc. In 2023, the EU has adopted a [Recommendation and Communication on disaster resilience goals](#).

straightforward and the country would assess ex-post the prevention and preparedness measures that had been implemented until then.

Annex 3 proposes a set of questions that Member States could reflect upon to gather initial knowledge on the state of play with respect to budgeting for fiscal risks from natural disasters.

Pillar 4 - Institutional arrangements

	Elements	Basic / Essential	Intermediate	Advanced
4. Instit(ional) arrangements	Transparency and monitoring	All information is public , information on DRM funds and expert assessment of methodology	All information is public in budget documents, expert opinion on methodology and post-disaster risk management	All information is public in budget documents, expert opinion on methodology and post-disaster risk management, monitoring funds use
	Governance and coordination	Some coordination across public services Ad-hoc task force	Clear role and resources across relevant ministries and services Permanent DRM/ DRF service	Established correspondents in relevant ministries Permanent DRM/DRF in MoF for coordination

Institutional arrangements for governance, coordination, transparency and monitoring are key elements of DRF as the nature of the operations requires swift and efficient action and allocation of resources. Institutional arrangements are important in anticipating and managing disaster response, from a material and financial perspective. Underpinned by appropriate institutional arrangements, DRF speeds up the normalisation and reconstruction after a disaster. These arrangements are part of disaster preparedness, and they show who has the authority to coordinate actions of the main actors, which other stakeholders are involved and how the post disaster financial needs are met.

- **Transparency and monitoring**

All aspects of DRF should be addressed transparently. This means transparent methodologies for risk assessments, disaster loss data collection and reporting, governance arrangements and deliverables, and use of funds. The databases, methodologies, reports and support documents outlining DRF should be public and subject to expert assessments. A regular review and update are also warranted to keep the pace with new methodologies and models as they are developed. This would ensure that the national DRF is based on the most plausible inputs. When a country is in the intermediate stage, it is expected to have expert assessments of the methodologies and post-disaster assessments of risk management and of the link between reconstruction efforts with resilience objectives. In its most advanced form, DRF would also include procedures for control systems to track and report disaster-related expenditure in the most accurate manner. This could also involve the national parliament.

- **Governance and coordination**

The diversity of DRM and DRF actors calls for coordination across stakeholders and clear attribution of responsibilities. The tasks that need to be fulfilled also call for commensurate human and administrative resources. Procedures and guidelines, memoranda of understanding between different ministries or a law bring clarity on the allocation of responsibilities, roles and timing of actions in case of disaster. The design of the DRF should be the result of joint work between the authorities and stakeholders that traditionally take part in the post disaster phase (i.e. ministry of interior or home affairs, health or environment, civil protection agencies, non-governmental stakeholders, experts, think tanks). The lead ministry for implementing DRF should be in principle the ministry in charge of the budget (i.e. Ministry of Finance). In practical terms, the coordination could be ad-hoc and ensured by a task force in the basic/essential stage of DRF and go as far as to establish correspondents in relevant

ministries and a permanent coordinating service in the Ministry of Finance in the most developed form of DRF. As DRF requires specific expertise across different fields, the correspondents or relevant services should maintain and update the skills needed to develop and keep DRF processes up to date by means of expert group meetings, peer-learning and trainings.

- **Support documents/deliverables**

DRF should have a solid base, either a law or a reference document/strategy/platform detailing the roles of the main actors and the timing of their actions with respect to a disaster. Instead of developing them from scratch, the Sendai National Platforms for Risk Reduction could serve as a starting point for developing a DRF base. These platforms are mechanisms for coordination and policy guidance on disaster risk reduction, are multi-sectoral and interdisciplinary, with national public, private and civil society participation¹⁵. Some elements are necessary ex ante, (i.e., risk assessments, information on insurance coverage, compensation rules, conditional compensation). Other elements only come into play after a disaster strikes: triggers and channels for resources mobilisation, funds disbursement.

From a public finance perspective, a key step is to provide relevant DRF information in budget documents or annexes thereof. Such information can cover past disaster damages by type of hazard, estimates of losses and disaster contingent liabilities under different scenarios, earmarked funds or contingent reserves in the budget, the budget lines of main ministries that can be tapped in case of disaster. The presentation can be done directly in the annual budget, in the medium-term strategy, in a fiscal risks' section/statement or in an annex to the budget. All such budgetary information should be public and easily accessible.

An important element of DRF transparency is availability of disaster loss data. Such data should be collected and made accessible in well-managed databases. A common challenge to DRM and DRF practitioners is that such data is rarely collected and made public. Private sector loss data is mainly reported to and collected by private sector insurers, while public sector data is not collected systematically and disaster-related expenditure is not easy to track or monitor. Member States should regard such databases as a public good and invest in building them to contribute to a more resilient economy and to the sustainability of public finance over the longer term¹⁶.

4. CONCLUSION AND WAY FORWARD

The aim of this discussion paper is to contribute to a shared understanding of the necessary DRF steps and stages of development. This exercise comes after several years of severe disasters affecting EU Member States and record-breaking weather conditions. Going beyond these occurrences, climate change will lead to a baseline where heatwaves, forest fires, floods or droughts are no longer exceptional and unpredictable events. To take account of this change in paradigm, Member States would at least need to take stock of their practices and assess whether they are appropriate to meet the future material and financing needs from disasters while, at the same time, striving to prevent, reduce and limit the burden on public finances.

The paper proposes to consider new elements (conditional disaster compensation, leveraging existing tools to reduce the administrative burden, institutional arrangements, etc.) for the design and implementation of DRF, and highlights areas relevant for national authorities

¹⁵ [Sendai National Disaster Risk Reduction Platforms](#).

¹⁶ The Risk Data Hub database collects disaster data (exposure, losses) for EU Member States from publicly available sources. It has been developed by the European Commission's Joint Research Centre, is upgraded regularly to reflect progress and developments.

when assessing, developing or reforming their DRF approach¹⁷. Of particular importance are: data collection, risk assessments based on methods cleared by experts, cooperation with the private sector, budget clarity on the lines that can be mobilised to meet post-disaster financing needs and strategic reflection on other disaster financing solutions. The discussion paper also looks at the institutional arrangements that should form the environment in which DRF strategies are built and implemented.

Current DRF practices could be improved to follow a more structured and articulated logic across steps and actors. The paper considers different stages of development (i.e., essential, intermediate, advanced) across four pillars previously mentioned, as a toolkit for Member States wishing to assess their practices and work on less developed aspects. At the same time, this toolkit is not a closed option product as national evidence is very diverse, although with some common features (i.e., shared challenges related to loss data collection and loss estimates, ad hoc approach to DRF, fragmentation). Moreover, in terms of budgetary arrangements and reporting, the options available leave space to national specificities. Finally, beyond addressing country-specific needs, this toolkit is meant to evolve and reflect new methods and financial instruments designed to meet the increasing challenges posed by climate related and natural disasters.

¹⁷ Radu, D., 2021. "Disaster Risk Financing: Main concepts and evidence from EU Member States", European Commission Discussion Paper 150. And: Radu, D., 2022. "Disaster Risk Financing: Limiting the fiscal cost of climate-related disasters", European Commission Discussion Paper 174.

ANNEX 1

Risk components

Disaster risk is expressed as the likelihood of loss of life, injury or destruction and damage from a disaster in a given period of time.

A *hazard* is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socio natural in origin.

Vulnerability is given by the characteristics determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

Exposure is given by the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.

ANNEX 2

Types of Rapid onset disasters from natural hazards (World Bank DRR-PFM assessment tool)

Rapid Onset			Slow Onset
Biological	Meteorological and Hydrological	Geophysical	Climate and environmental change
Epidemics Insect and animal pest infestation	Hurricane/Tropical Cyclones Storms Storm surges Tornados Intense rainfall events Heatwaves Flooding	Earthquakes Tsunamis Volcanic eruptions	Changes in temperature and rainfall patterns Ecosystem degradation Drought Rising sea levels Desertification Salinisation Thawning of glaciers and permafrost

ANNEX 3

Guiding questions for a self-assessment of disaster risk-based budgeting practices: identifying the gaps

Disaster risk-based budgeting is the consideration of disaster risks¹⁸ throughout the government's budget cycle with the objective of reducing the impact of disasters.

1. Do you practice disaster risk-based budgeting? Is disaster risk-based budgeting set out in relevant documents (e.g., legislation, political commitment, other)?
2. Are disaster risks considered in your national annual budget / medium-term fiscal strategy/framework / line ministries' annual plans and budgets / sub-national governments' annual plans and budgets / annexes or reports that are produced during the budget cycle?
3. Do you have methodologies to calculate these risks? Are the disaster risks assessments integrated to the budget process?
4. Do you have legislation, policy or guidance discussion papers to define the responsibilities of budget users with respect to producing input on disaster assessments relevant for the budget?
5. Is there a group/task force involving all relevant stakeholders (i.e., academia, insurance sector, relevant ministries, civil protection agencies) for disaster risk assessments and inputs for budgets?
6. Is there a unit/department within the Ministry of Finance that identifies and quantifies disaster-related contingent liabilities?
7. Do you track disaster-related expenditure (ex-post) at aggregate level/by main expenditure item?
8. Do you track the impact of disasters on government revenue (ex-post) at aggregate level/by main revenue items?
9. What reporting (in-year, annual or a different frequency) is available on disaster risks and their impact on government expenditure/revenue? Is this information public?
10. Are disaster risks or disaster resilience goals considered in investment decisions by the Ministry of Finance, line ministries and sub-national governments? How?
11. What financing instruments have you used after a disaster?
12. Does the government insure any of its key public assets?
13. Which are the drivers of the rate of insurance penetration in your country: availability, affordability, enforcement? Is there a public disaster-linked insurance scheme in place?
14. What are/would be the main challenges to disaster risk-based budgeting?

¹⁸ Disaster risk is the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (UNRR).

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