BEING TIMELY: CREATING GOOD TRIGGERS AND PLANS IN DISASTER RISK FINANCING

CENTRE FOR DISASTER PROTECTION

GUIDANCE NOTE

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About the Centre for Disaster Protection

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Hurricane Irma, British Virgin Islands.
Image: Russell Watkins/DFID

WHY ARE TRIGGERS AND PLANS SO IMPORTANT?

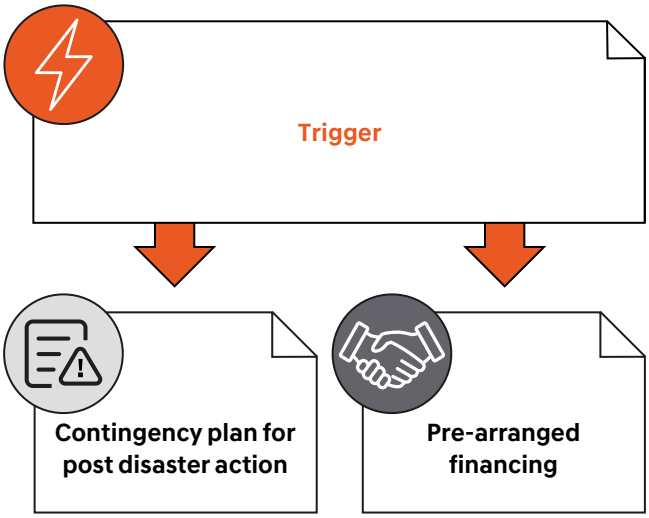
In many countries, including high-income ones, decision makers often face chaotic situations in the wake of a disaster. Response systems may struggle to react quickly and help those in need, and they may not have the capacity required. Political and other interests may not be aligned with preventing the worst outcomes of disasters. This can result in sub-optimal decisions being taken and response activities being delayed.

But it does not have to be this way. The more planning that occurs before a disaster strikes, the faster, more coordinated, and ultimately more effective the response. In their 2016 book, Dull Disasters?, Clarke and Dercon outlined a potential approach that describes aspects of disaster risk financing (DRF):

- a sound, coordinated plan for post-disaster action agreed in advance (i.e. a description of certain activities to be undertaken in case of a disaster);
- a fast, evidence-based decision-making process (i.e. a pre-agreed threshold or trigger ensuring timely action); and
- financing on standby to ensure that the plan can be implemented (i.e. arrangements ensuring that funding is available when it is needed most).

Another way to think about this is to consider a trigger activating both plans and associated finance. When the trigger is met, the financing becomes available and the response plan is launched (see Figure 1).

Figure 1: Framework for effective disaster response planning



This guidance note does not discuss the financing instruments that can provide funding (e.g. budget lines, loans, insurance, and catastrophe bonds). Instead, it focuses on evaluating the quality of contingency plans and triggers.

Box 1: Defining triggers and plans

Trigger – a trigger is the pre-arranged mechanism that identifies the moment when a contingency plan and financing are activated, and determines the level of response. This could be anything from a simple launch declaration by the person in charge, to a sophisticated political process involving multiple stakeholders, data sources, and analytics. However, we recommend something quite specific. The trigger should, as much as possible, be automated and agreed in advance. This means that, wherever possible, triggers for action should be based on objective data. Decisions should be based on hazard indicators such as recorded wind speed, water levels, or lack of rainfall. Or impact indicators such as the number of refugees arriving in a border town, a certain percentage loss of average area crop yield, or a certain percentage rise in food prices in a given area.

Of course, data cannot and should not replace all human involvement. There are also cases in which human decision-making must come into play—for example, in order to account for particularly complex disaster situations, or in order to adjust for inaccuracies of the data. However, the point of basing triggers on rapidly available, objective data is that it tends to enable a much faster, more reliable, and cheaper response. Knowing when a contingency plan will be activated can also enable better alignment of other preparedness investments.

Contingency plan – a contingency plan outlines the response activities to be undertaken after a disaster strikes. This definition is general and a contingency plan can take various forms—it could be a national-level plan for how to reconstruct public infrastructure after earthquakes; a plan of a local ministry for how to give money to poor households that are affected by drought; or a plan for how to relocate households in a certain area that have lost their homes after a flood. The overarching idea is that instead of deciding what to do next after disaster strikes, it tends to be more effective to plan the response, or parts of it, beforehand.

HOW ARE THEY USUALLY TACKLED?

The rationale of planning ahead for disasters is typically clear to policy and decision makers. Unfortunately, the reality often looks different. Many countries lack both triggers and contingency plans altogether. For example, both were largely absent during the West African Ebola crisis in 2014, and the catastrophic droughts in the Horn of Africa in 2011. In both cases, lengthy political decision-making processes, and the absence of comprehensive contingency plans, were decisive factors for delaying the respective response for weeks or even months (WHO 2015; Gray and Asmare 2012). Box 2 shows how triggers can be used to activate early action planning for floods and cyclones in Bangladesh.

Box 2: Example from Bangladesh - Forecast-based Early Action for floods and cyclones

Bangladesh is exposed to frequent tropical storms and flooding. Vulnerability among the population is high. In combination, these two factors have led to repeated large disaster impacts in the past.

The Bangladesh Red Crescent Society (BDRCS) has been implementing Forecast-based Early Action since 2015, in order to improve disaster response. Triggers activate an early action protocol (the contingency plan). Activities under the protocol are funded by the Disaster Relief Emergency Fund hosted at the International Federation of Red Cross and Red Crescent Societies (IFRC).

The programme focuses on river floods and tropical cyclones. For the flood trigger, the Bangladesh Water Development Board provides a forecast 7–10 days ahead, combining a variety of data sources including gauge data, rainfall stations, precipitation forecasts, and others. For the cyclone trigger, the Bangladesh Meteorological Department provides a forecast with a lead time of 36 hours, monitoring data such as speed, position, maximum sustained wind, strong wind areas, and track of the storm. In each case, the forecast is combined with exposure and vulnerability data to form an estimate of the expected impact—'the index'. Once a pre-defined index threshold is reached, the early action protocol is launched. Under this protocol, affected households can receive cash grants or be evacuated, BDRCS volunteers can be trained, or other emergency measures can be implemented. Cash grants have been provided in response to floods in 2017 and 2019 (Tanner et al. 2019; BDRCS 2019).

In some cases, plans are in place but ineffective as they either lack clarity, comprehensiveness, credibility, or do not focus on those who would need post-disaster support most. Likewise, clear, pre-established and automated triggers are still rarely used—post-disaster decision-making processes are still the norm.

The two elements advocated for here—pre-established triggers and contingency plans—are fundamental for effective disaster response. After a disaster, their absence can lead to slow, tactical decision making by those in charge, and the ensuing response may be both underfunded and poorly coordinated. But even before disaster strikes, the lack of triggers and contingency plans can have negative effects—funding set aside for the response will likely be insufficient if it is unclear what the response will look like, investments in response capacity lack a framework for reference, and alignment with disaster risk reduction and other response activities is impossible.

The approach of linking the execution of contingency plans to pre-agreed triggers offers many benefits. At the same time, it brings challenges that require active management. These are summarised in Table 1.

Table 1: Benefits and challenges of linking response plans and triggers in advance

Benefits	Challenges
Risk ownership - contingency plans define who is responsible for what following a disaster, avoiding post-event politicisation. **Faster response** - early response can ensure that people in need receive aid quickly, and can help avoid further humanitarian and economic loss. **Cost effectiveness** - by countering escalating humanitarian and economic cost, there is some evidence to indicate that early response is more cost-effective than later response activities. **Coordination** - coordination among different actors can be challenging. Agreeing on collaborative processes in advance can make this smoother when required. **Response capacity** - the planning process enables an assessment of required capacity of the actors involved in the response, and helps ensure that potential gaps are filled. **Predictability** - when people know what to expect in cases of disaster, they can prepare more effectively. Predictability also enables certain financing options (e.g. insurance) which are otherwise unavailable. **Transparency and accountability** - pre-agreed plans and triggers bind politicians and can thus be a useful tool against leakage and undue political influence.	**Imprecision** - pre-agreed plans and triggers that are not linked to actual losses and damages are bound to be imprecise. Sometimes disaster response activities may be launched as prescribed by the plan that do not perfectly match the needs of the beneficiary population, and sometimes the trigger may not accurately capture the situation it tries to approximate. **Over-reliance on imperfect data** - there are specific risks linked to beneficiaries expecting support based on plans and data-based triggers. People may expect protection and thus accept higher risks in their daily lives or dismantle coping strategies. When the trigger fails and protection does not come through, their loss can be even greater than without the pre-arranged system. **Need for significant upfront investments** - developing comprehensive contingency plans, delivery systems, information systems, and reliable triggers is complex, expensive, and requires the support and time of experts. **Inflexibility** - with plans agreed in advance, the ability to react to specific characteristics of the post-disaster situation may be limited. Elements of flexibility such as a last-minute appropriateness check can help to manage this. Plans also need to be updated in order to reflect any potential changes, e.g. in response infrastructure or the disaster risk profile.

● PRACTICAL GUIDANCE

This section is structured as follows:

- Practical guidance on contingency planning
  - What constitutes a good contingency plan?
  - Common traps to avoid
- Practical guidance on triggers
  - What constitutes a good trigger?
  - Triggers - what's on the menu?
  - Investing in the design process
  - Assessing trigger quality

PRACTICAL GUIDANCE ON CONTINGENCY PLANNING

What constitutes a good contingency plan?

What are the key ingredients of an effective disaster contingency plan? And what differentiates a good plan from a bad one? Table 2 summarises the key criteria.[1]

Table 2: Key criteria for good contingency planning

Criterion	Description
Target contingencies	A good disaster contingency plan is clear about the risks that it covers. It is based on a thorough analysis of different disaster scenarios. It defines the scenarios it covers. For example, a response plan may only be applicable for a certain geographic zone, a certain hazard, a certain hazard severity, or a certain post-disaster phase (response, recovery, or reconstruction). A good plan sets this out in advance. It also clarifies its relationship to other existing contingency plans, ensuring alignment.
Responsibility to act	A good plan defines the response process by thinking backwards from the desired result. It must both define response activities and allocate risk ownership to different actors, in terms of both responsibility to act and to pay. Responders must both know what they are to do when disaster strikes (e.g. relocate flood-affected households) and which outcomes they are responsible for (e.g. make sure households are sheltered). Thus, on the one hand, the plan should describe response operations, i.e. identify beneficiaries, tasks to be undertaken, duration of the response, etc. On the other hand, it should be clear about who bears responsibility for what end result.
Credibility	Importantly, an effective disaster contingency plan is credible. There is little use in having a plan that is not adhered to in the end. When Nepal was hit by a large earthquake in 2015, the response was slow regardless of previously established preparedness planning—one reason was the lack of adequate logistics infrastructure, which meant that the plan could not be implemented as intended. The implementation of the contingency plan was also hindered due to bureaucratic inflexibility and diplomatic disagreements (Wendelbo et al. 2016; US News 2015). A good plan has political commitment behind it. It is also backed up by delivery capacity, and the actions it outlines are reasonable—otherwise it will not be implemented. And finally, it needs to be underwritten—it needs to be clear in advance how the different aspects of the plan will be funded.
Targeting the vulnerable	A good contingency plan focuses on the vulnerable (also see guidance note 'Creating power for people facing risk: the role of participation in disaster risk financing' (Centre for Disaster Protection, 2020). It identifies beneficiaries and those expected to recover by themselves. The poor tend to be disproportionally exposed and vulnerable to disasters and are thus often those most affected. For example, from 2008 to 2011, Kenya suffered four subsequent years of drought causing US$ 12.1 billion in losses and damages. Almost three quarters of that was suffered by the predominantly poor livestock sector. Given the poor are often located in rural areas and lack political standing, their needs tend not be considered adequately at the central level. A good plan does exactly this, however. It places the wellbeing of people at its centre.
Scrutiny	Finally, a good contingency plan has been tested and scrutinised (see also guidance note 'Improving constantly: embedding scrutiny and learning in disaster risk financing' (Centre for Disaster Protection, 2020)). Where possible, parts of the plan should be tested in practice. For example, since 2011, the World Bank has set up cash transfer programmes for the poorest in six Western Sahel countries using the Sahel Adaptive Social Protection Program. The programmes are also designed to use objective triggers in order to scale up in response to shocks such as drought. To ensure their operational capacity to do so, the programmes have so far scaled up in response to shocks without such triggers—by the end of 2018, pilot scale-ups had been carried out in Mauritania, Niger, and Senegal (WBG 2019a). In addition, where possible, plans should be made subject to stress testing in order to verify their delivery capacity. Finally, they should be made available to external scrutiny to ensure all aspects are duly considered.

1 This note does not provide guidelines on the specifics of disaster response such as tasks to be carried out by responders, the division of responsibilities between actors, or how to organise emergency logistics. Others are better placed to do so and further references are provided in the "Tools and Resources" section at the end.

Flooding in Mozambique.
Image: Christopher Black/ International Federation of Red Cross and Red Crescent Societies

Common traps to avoid

Policymakers should design disaster contingency plans with the above criteria in mind. At the same time, there are a few traps that they should avoid falling into.

- **Do not go it alone.** Good contingency plans are the product of a comprehensive, iterative process between scientists, public officials, implementers, and financial specialists. Scientists provide risk analysis and models that serve as the basis for response plans. They thus help to identify what shocks the plan should address. Public officials are in charge of political decisions, including the definition of main objectives, the identification of target beneficiary populations, and ensuring public commitment. Implementers will take care of operational aspects, including logistics, targeting of beneficiaries and communications. They can thus provide perspective on what is realistic, and where capacity is lacking. Financial experts help to assess the financial cost of contingency plan and ensure that funding arrangements are in place that provide response financing when it is needed most.
- **Strike a balance between a technical and a policy document.** Policymakers can sometimes be tempted to treat contingency plans as either purely political (and not ensure they are realistic) or purely technical (and avoid political commitment). A good plan must be both—it is political as it requires decisions on response priorities, public support, and political leadership. But it is also technical as it integrates risk analysis and lays out the details of implementation. One way of ensuring that technical, operational, and political aspects are included appropriately is to implement an external scrutiny/review process.
- **Combine discipline with flexibility.** In some cases, elements of flexibility can help ensure that the response takes previously unforeseen disaster situations into account. For example, the African Risk Capacity (ARC), a pan-African drought insurance facility, requires contingency plans that are approved ahead of time, and which are updated just before payouts are made (Box 3).
- **Ensure comprehensive cover and alignment.** Naturally, no plan can cover all disasters and their respective responses. Some plans specifically target a single hazard and a specific population group. However, it can sometimes be easy to overlook disasters or scenarios that are more difficult to respond to or to prepare for. Policymakers should try to ensure that existing plans cover all (or most) disaster scenarios, and that they align and complement each other—there are often gaps and overlaps.
- **Avoid recency bias.** It is human nature to focus on the things that have happened most recently. However, disasters do not behave this way. By its very nature, a one-in-fifty year event occurs on average only once every 50 years. For example, between 1996 and 2012, there were almost no disaster-related losses in the Philippines—then in 2013, the country was hit by Typhoon Haiyan, one of the most destructive storms ever recorded. To ensure that contingency plans also account for such events, risk models can be used that estimate the likelihood of events of certain severities to occur.

Box 3: Africa - the Contingency Planning Requirement of the African Risk Capacity (ARC)

ARC is a specialised agency of the African Union (AU) that has been providing insurance cover for AU member states to fund response activities to drought-related food insecurity since 2014. As a trigger, it uses a parametric index. Using rainfall data, the index estimates crop yields of vulnerable farmers at the end of the season, combines it with vulnerability data, and estimates the number of people in need of drought-related food aid. When the index predicts a minimum threshold of people to require assistance in an insured country, it receives a payout to use for related response activities.

This structure is in many ways similar to that of other regional risk pools such as the Caribbean Catastrophe Risk Insurance Facility (CCRIF) or the Pacific Catastrophe Risk Insurance Company (PCRIC). ARC also uses similar tools, including an index-based trigger. However, one important way in which ARC differs is that in order to be eligible for insurance coverage, countries need to submit and get approval of an operational plan outlining how potential payouts would be spent. Only expenditure to address drought-related food insecurity is eligible. When the index indicates that a payout is imminent, the country is required to submit an additional final implementation plan that describes in detail how the money will be spent, taking into account the specifics of the drought at hand. As per agreement with ARC, the country must spend the resources it receives as indicated in the plan.

The ARC approach ensures that contingency plans are put in place well in advance and are triggered by quantitative data. However, the approach is not without challenges—in some cases disaster response has been late regardless (OPM 2017).

Devastated area in Aceh province, Indonesia.
Image: Yoshi Shimizu / International Federation of Red Cross and Red Crescent Societies

PRACTICAL GUIDANCE ON TRIGGERS

What constitutes a good trigger?

An established contingency plan begs the question of timing. When should it be launched into action? A trigger is needed. The nature of this trigger will depend heavily on what the plan is meant for—for example, a trigger launching disaster response activities will have to activate much more quickly after the occurrence of a disaster than a trigger that leads to reconstruction of disaster-affected infrastructure. In any case, no matter whether hard or soft, good trigger mechanisms determine reliably when plans are meant to be activated, they are timely, they are manipulation-resistant, and they are cost-effective (see Table 3).

Table 3: Key features of a good trigger mechanism

Criterion	Description
Reliability	A good trigger is activated when it is meant to be activated. Depending on what the plan is meant for, this may for example be when a certain number of people are affected by a certain disaster, when a certain minimum loss has been suffered, or when a certain weather pattern has been determined.
Timeliness	A good trigger is structured so it is activated at the right time. In many cases, for response activities, this will be as quickly as possible after a disaster, or even before it occurs. However, in some cases—for example, for reconstruction activities—it could also be later.
Resistance to manipulation	The trigger should be designed such that the risk of manipulation of the underlying parameters is reduced to a minimum. For example, placing a third party in charge of determining whether a hard trigger has been met ('calculation agent') can help bring greater objectivity to the triggering process.
Cost-effectiveness	A great deal of scientific and technological effort can go into establishing a trigger system that satisfies the requirements above. However, it also needs to be affordable for the end user. A balance needs to be struck between these features.

Triggers - what's on the menu?

There are two broad categories of trigger—hard triggers, which use objective data to define a specific criterion that triggers the launch of a response plan, and soft triggers, which leave the decision completely or partially to the discretion of a designated party.

Hard triggers: Disaster response triggers have varying requirements, depending for example on the covered natural hazard, the type of response that is launched, and the country context. These are context-specific questions. Nevertheless, a lot can be learned from the insurance industry, which also tries to respond to disasters swiftly and cost-effectively through insurance payments, based on hard triggers. Hard triggers are typically based on one of four methods:

- *Individual loss-adjustment ('indemnity')* – payments are triggered when certain damages or losses are assessed to have been suffered by the insured. These need to be assessed after the event has occurred. In agriculture, "multi-peril crop insurance" is an example of this, where a percentage of historical crop production is insured against all unavoidable natural, climatic, and biological perils. When a peril such as a locust invasion occurs, the insured farmer's crop production after the harvest is measured by an independent assessor. If production has dropped below the insured percentage threshold, the insured farmer receives a payout. This traditional approach yields accurate results but tends to be slow and expensive, especially in contexts where disasters hit many people at the same time.

- *Parametric index (area average)* – the average damage and loss within a certain area is determined using statistical sampling. Payments to all insured parties within the area are triggered when damages have reached a minimum level. In this way, the cost of loss assessments can be reduced. Key challenges include the accuracy of the index and the collection of accurate data in a politically charged post-disaster context.
- *Parametric index (hazard measurement)* – hazard data is observed and activates the trigger when a threshold is reached. For example, for an earthquake, a trigger could be activated when a seismograph records a certain earthquake strength. Designing such an index, and obtaining the required data, can often be relatively easy. It also yields quick results. However, such an index also has its limitations, as hazard data does not always correlate strongly with the impact felt on the ground—other data such as population exposure and vulnerability are equally important.
- *Parametric index (modelled loss or impact)* – observed hazard data is combined with exposure and/or vulnerability datasets to derive a modelled loss or impact estimate. In the case of the earthquake example, seismological measurements could, for instance, be combined with infrastructure exposure (e.g. number of houses) and vulnerability (e.g. state of construction) in the earthquake area to estimate the total damage caused. Similarly, the number of people affected or thrown into humanitarian need could be estimated. Key benefits of this approach include that it also yields results quickly, obtaining the needed hazard data can be relatively easy, and actual loss does not have to be assessed. However, given the modelling complexities, accuracy tends to be an even greater challenge than for area average indexes.

Today, there are plenty of examples of where one of the triggers above is being used to launch post-disaster activities, or to function as early warning indicators. In some cases, they are also combined in composite indexes or as multiple or back-up triggers. In this note, we cannot cover them in detail. However, Box 4 and Table 4 list a few index examples used for different hazards and sectors.

Box 4: Examples of different parametric trigger models

Area average index: **India** has the largest crop insurance market in the world. In 2012/13, over 65% of the 32 million insured farmers were insured under area yield index insurance programmes. The insured area is divided up into unit areas of insurance (UAI) in which similar growing conditions are assumed. In each UAI, after the harvest of a given insured crop, several locations are selected via statistical sampling for crop cuts. For each crop cut, a team is sent out to assess the average area yield. Using the results from the different crop cutting locations, an average area yield is extrapolated for the whole UAI. If the average drops below a certain threshold, a payout is issued to all insured farmers in the UAI (summarised in WBG 2018a).

Hazard index: The index could be based on climate or other shock data. For example, in **Somalia**, the Food and Agriculture Organization (FAO)'s Food Security and Nutrition Analysis Unit (FSNAU) has been operating the Early Warning Early Action (EWEA) programme since 2014. The mechanism assembles a monthly mix of 19 ground-collected and remote-sensed indicators from different actors, including on climate, prices, nutrition, health, and population movements. For most of these indicators, the humanitarian community has agreed on hard 'alarm' and 'alert' thresholds. While not leading to action automatically, the indicators are published online at the district level and feed into the UN Humanitarian Country Team (HCT) meetings (Hillier 2017).

Modelled loss index: In November 2019, the World Bank issued a catastrophe bond for the **Philippines**, the first of its kind in Asia. The instrument can provide the country with a maximum payout of US$ 225 million. For earthquakes and tropical cyclones, hazard data is combined with exposure and vulnerability data to estimate a modelled loss. For different modelled losses, different payout amounts are made available to the country (WBG 2019b).

Impact index: For **African Union member states**, the ARC provides drought insurance using a drought impact trigger. For this, it first evaluates the post-harvest 'water requirement satisfaction index (WRSI) for a given country, which estimates the impact of (the lack of) rainfall on a crop harvest by combining rainfall, soil moisture, evapotranspiration, and plant-specific data. This index is then combined with country-specific vulnerability data to create an early estimate of the number of people requiring drought-related humanitarian assistance. Based on this estimate, ARC provides an accordingly sized payout to the affected country government to implement humanitarian assistance activities.

Table 4: Illustrative list of hard trigger examples for selected sectors and hazards

	Drought	Floods	Storm
Agriculture	*Amount of rainfall as measured by weather stations* - Weather Based Crop Insurance Scheme (WBCIS), India *Rangeland conditions as identified by satellites (normalised difference vegetation index, NDVI)* -Index-Based Livestock Insurance (IBLI), Ethiopia	*Composite of water surface extent, water depth, extent duration* as recorded by satellites - index- based flood insurance, India (pilot)	*Composite of wind speed and distance from eye of the storm* - rice insurance, Philippines (pilot)
	Area average crop yield as measured by sample crop cuts - e.g. insurance for various crops, India		
Property and infrastructure (including business interruption)	*Rainfall data as measured by weather stations* - e.g. Administración Nacional de Usinas y Trasmisiones Eléctricas (UTE) insurance of hydropower production, Uruguay	*Water flow* as recorded by tidal gauges around New York City - flood catastrophe bond for Metropolitan Transportation Authority (MetroCat Re)	*Typhoon warning, signal 8 and above* from Hong Kong Observatory - Insur8, business interruption insurance from storm warning-related shutdown
Emergency response	*Number of food-insecure people in need of assistance* as modelled by a composite of the Water Requirement Satisfaction Index (WRSI) and vulnerability data - African Risk Capacity (ARC), African Union member states *Rangeland conditions* as identified by satellites (vegetation cover index, VCI) -Hunger Safety Net Program, Kenya *Area average crop yield and rainfall as measured by weather stations* - CADENA program, Mexico *Various shock indicators (climate, prices, nutrition, health, population movements)* as identified by ground-collected and satellite data - EWEA programme, Somalia	*Region-specific impact levels* as predicted by composite of forecasted river water flow per second, exposure, and vulnerability data - Forecast-based Action (FbA), Red Crescent National Society, Bangladesh *Water surface extent* as recorded by satellites - South East Asia Disaster Risk Insurance Facility (SEADRIF), Cambodia and Laos	*Region-specific impact levels* as predicted by composite of wind speed, exposure, and vulnerability data - Forecast-based Action (FbA), Red Cross National Society, Philippines *Modelled loss* as estimated by composite of wind speed, exposure data - Pacific Catastrophe Risk Insurance Company (PCRIC), Pacific *Modelled loss* as estimated by composite of wind speed, storm surge, exposure data - Caribbean Catastrophe Risk Insurance Facility (CCRIF), Caribbean

Soft triggers: These leave an element of discretion to a deciding party about whether or not to launch a response activity. Soft triggers are thus possibly prone to drawbacks such as delay and political bias. They can however be appropriate as back-up triggers should the primary trigger fail to perform. Soft triggers can also come into play as a corrective mechanism to add flexibility in complex response scenarios. Some of the associated risks can also be mitigated—for example, an expert technical panel could be in charge of making the triggering decision rather than forums that might be subject to politicisation.

Box 5: Uganda - using a secondary soft trigger as back-up

The Northern Ugandan Social Action Fund (NUSAF) is a World Bank-funded social safety net for the poorest in Uganda, aiming to provide effective income support and build resilience. It includes a labour-intensive public works component that provides cash transfers to poor and vulnerable households in return for their participation in public works.

In 2015, NUSAF became shock-responsive to droughts. In Karamoja, home to nomadic pastoralists and exposed to frequent severe droughts, affected households are added to the labour-intensive public works component when a drought occurs. There are two triggers. The primary trigger is based on a rangeland condition index, monitored by satellites (NDVI). When rangeland conditions become too dry during the season, additional households are added to the programme from a pre-selected roster of vulnerable and poor households. In addition, the government also decided to implement a secondary soft trigger, meant to account for potential failure of the primary hard trigger. In case the primary trigger is not activated, the government waits for the Integrated Food Security Phase Classification (IPC) report which is prepared on an annual basis by a consortium of international humanitarian actors. If the IPC report describes the occurrence of a humanitarian crisis in the Karamoja region, the government can decide to scale up the safety net regardless. This becomes relevant when, for example, the primary NDVI trigger is subject to a basis risk event where no drought is detected at a regional level but might be extreme at a local level—the government can still react based on the secondary trigger.

Activation via the secondary trigger is slower and theoretically subject to political bias. However, it adds flexibility to an otherwise rigid process and can help overcome shortcomings of the primary trigger. Since being established, the safety net has scaled up twice using the secondary trigger (WBG 2018b).

Investing in the design process

Trigger design is often deeply technical. Best practice is to partner with experts—scientists who specialize in designing appropriate mechanisms. Local scientists will often have the best data available and an overview of existing research and application. They can be supported by the private sector and international research expertise. With the continuous emergence of new technologies, working with such specialists can help ensure that triggers include the latest developments.

Getting the trigger design right is important. and one should also be prepared to invest considerable time and resources. Not only does it determine whether or not a given plan is launched, it is also relied upon by the beneficiaries of that plan. In expecting protection against certain risks through a plan, they might give up resources they would otherwise usually retain for security safety. Potentially affected populations might also engage in riskier behaviour. As expectations around protection and payouts increase, should a trigger fail to perform as expected, and the protection not be available when it is needed, beneficiaries may face even worse consequences than without it.

It is also crucial to integrate strong elements of scrutiny in the trigger design process. Given the significant investments of time and resources, as well as political interests at stake, incentives may favour the use of more complex triggers with too little importance given to their suitability. However, as the consequences for beneficiaries may be severe, strong independent quality controls should be included in the design process.

It is thus important to be thorough in conceptualising any new mechanism, developing it technically, ground-truthing it, and having it approved by qualified independent peer-review, which takes time and money and should be factored in from the inception of a DRF project. The process also needs to take account of how the trigger will be updated and maintained over time, and who will bear the respective cost.

Assessing trigger quality

The rise in use of automated triggers in DRF has brought them under increasing scrutiny. This is particularly the case for index insurance. This section explores the issue of quality in terms of:

- basing the trigger on data;
- customising to the needs of the beneficiary population; and
- transparency and simplicity.

Basing the trigger on data

Good triggers are reliable, timely, manipulation-resistant, and cost-effective (Table 3), and these qualities should also be reflected in the underlying datasets themselves For hard triggers, the data should be **objective** – in order to avoid potential political bias. It should be **timely** – being available when it is needed, i.e. for response activities as quickly as possible after a disaster but for other activities, such as reconstruction, later. It should be **resistant to manipulation** – e.g. by using data from a third party such as NASA. Finally, the data should be **cost-effective**, lowering cost for trigger operation and enabling external scrutiny.

In addition, the trigger should be based on the data best suited to the specific context and program objectives. Which data indicator should launch the contingency plan? Is it a metric indicating that a disaster has occurred (e.g. water level indicating a flood)? Is it one indicating that a disaster will occur (e.g. a storm forecast)? Is it a minimum sum of disaster-related damages (e.g. drop in harvest)? Or is it an estimate of humanitarian impact? While these questions are obviously closely linked, it is important to be precise as the outcomes for each triggering approach can be quite different (see also Box 4).

Customising to the needs of the beneficiary population

Fundamentally, a trigger must be suited to the needs of the people it is designed to help. Unfortunately, this is not always the case. Practitioners should ask the following questions before approving any trigger for disaster response.

Does the trigger target the right moment for launching the contingency plan? For triggers activating disaster response activities, the element of timeliness is particularly important. Triggers should be structured so that they are activated as early as possible. This has led some disaster responders such as Red Cross Red Crescent National Societies and the World Food Programme (WFP) to move to triggers that rely on disaster forecasts rather than indicators that capture the occurrence of a disaster once it has happened (see also Box 2). For slow-onset disasters such as drought, monitoring conditions during the season can also speed up the response (Box 6).

Box 6: Argentina and Uruguay - enabling earlier drought response in the Horn of Africa

In 2012 and 2013, the governments of Argentina and Uruguay introduced new index-based livestock insurance programmes for cattle farmers. Using NDVI data, rangeland conditions were monitored throughout the season. When the index value fell below a threshold indicating forage scarcity, cattle farmers received a payout that enabled them to buy fodder, keeping their animals alive through the season.

Around the same time, in 2010 and 2012, the International Livestock Research Institute (ILRI) had pioneered index-based livestock insurance for nomadic pastoralists in Kenya and Ethiopia. The highly innovative programme used a different trigger, however. While also using NDVI data, it tried to predict livestock mortality rather than forage scarcity. Pastoralists only received a payout at a later stage when their animals had been predicted to be dead.

ILRI engaged in a constructive dialogue with designers of the South American programmes. Realising the potential gains both for beneficiaries who could keep their animals alive and in terms of cost-effectiveness, ILRI changed its trigger in 2016 to the one used in Argentina and Uruguay. Effectively, the approach thus evolved from an asset replacement to an asset protection model as the latter can provide payouts much earlier (Feed the Future 2017).

Does the trigger address beneficiary needs sufficiently? Some triggers, constructed with significant effort and technical input, succeed in predicting accurately what they are meant to predict. However, sometimes they only address part of beneficiary needs.

Box 7: Kenya - adjusting crop insurance triggers to reflect farmer reality

Over the last two decades, Kenya has seen a series of different weather index insurance (WII) pilot programmes to support crop farmers in the face of drought. These typically measured (the lack of) rainfall in order to provide relief payments to farmers. However, Kenyan farmers also face other factors than drought that are important for crop losses – according to figures from the Ministry of Agriculture, Livestock, and Fisheries up to 40 percent of losses in maize, the main staple crop, stem from pests and diseases.

In 2014, the government prepared the implementation of a national level crop insurance programme. The objective was to protect farmers holistically against the risk of crop failure, and not just against drought. Thus, despite significant previous experience in-country with WII programmes, the government, together with the commercial financial services industry, decided to adopt a different triggering approach. Today, the national crop insurance programme is based on an area yield trigger that bases payout decisions on average area yield. Looking at output (crop yield) rather than input (rainfall) ensures that all potential reasons for poor harvests are covered, including crop diseases (WBG 2016).

Does the index perform well? When an index is chosen as a trigger, one key question is whether it approximates well what it aims to approximate. Some hazards are much harder to model than others and the index might thus be less accurate. For example, the occurrence of drought (not to be confused with its impact on people) can often be modelled reasonably well using satellite-based rainfall estimates and weather station data. However, floods are notoriously difficult to predict, given that they depend on many more factors than just rainfall (the type of water body, the topography, water depth, etc). Data scarcity and low data quality are other reasons for which the index may not perform well.

Before any trigger is used, its accuracy over time should be rigorously tested. This can be done using historical data. The trigger should only be used if a certain minimum accuracy has been determined and it is thus judged as "fit for purpose".

Beyond the technical modelling, another key challenge is 'basis risk'— the potential for mismatch between the measures and models that determine payouts on the one hand, and the losses experienced on the ground on the other. For example, a weather index may indicate that an observed region overall is not suffering from drought although pockets can be severely affected. Conversely, an index may detect correctly the occurrence of a drought for the observed area overall but individual people within that area may in fact not be affected due to beneficial micro-climates. For contingency plan triggers, basis risk can be a challenge if they fail to activate although people are affected, or vice versa.

How can basis risk be mitigated? Like overall performance, index accuracy should be tested for localised conditions if data is available. Should accuracy be low or suspected to be low, it may be improved by using a secondary trigger. For example, Carter et al. (2017) suggest using on-demand area yield indexes to back-up weather indexes. Soft triggers can equally be used as secondary ones (see e.g. Box 5).

Is the trigger appropriately automated? Before disaster strikes, it should be clear precisely under which circumstances the trigger is activated. This can avoid delays due to lengthy political decision-making or the chaos that frequently characterises the aftermath of a disaster. The more automated the activation of the trigger, the more such delays can be avoided. Another way to look at this is to say that a good trigger changes the default option. Typically, after a disaster, a new decision must be taken in order to start reacting. Conversely, with an automated trigger, response activities start immediately and a decision would have to be taken to stop them.

Are there appropriate fail-safes? Any trigger mechanism can fail. Hazard data collection equipment such as seismometers may not function as planned, a satellite may go offline, or the data provider may face a system failure. For such cases, it is best practice to build redundancy into the system. This may be in the form of pre-designating an alternative way to obtain the needed index data, maintaining a backup dataset, or designing a secondary trigger altogether in case the primary one fails.

Transparency and simplicity

Responders and beneficiaries alike should be able to access and understand the trigger. Transparency enables external scrutiny of the design, and facilitates learning and adaptation in the face of new ideas or newly emerging information. It also allows for external verification of trigger activation. Finally, it allows responders and beneficiaries to integrate anticipated response activities into their own response and risk management strategies. For example, certain responders may be able to prepare more effectively when they know exactly when their services are required, and beneficiaries may engage in higher-risk higher-yield strategies if they know under which circumstances they can expect emergency support. Simplicity is equally important. Triggers will often be developed by experts. While trigger design tends to be technical in nature, its use is limited if not well understood by the operational stakeholders. With full understanding of the details, stakeholders can engage in a constant process of learning and improvement. When instead the model is a 'black box', such opportunities are missed. It will also discourage local ownership, which is critical for longer term sustainability. Instead, it can create situations of dependency and suspicion. Experts should thus pursue two avenues when developing triggers for operational partners.

- **Collaboration.** Involving local stakeholders from the beginning in both the design and data deliberations behind the trigger are paramount to creating ownership. Additional capacity building may be needed. For example, in designing country-specific triggers, the ARC engages in an extensive process of customising its model alongside local government stakeholders. It also supports the posts of in-government ARC coordinators in every member country whose task is to manage the ARC model. (See also 'Creating power for people facing risk: the role of participation in disaster risk financing' (Centre for Disaster Protection, 2020)).
- **Using a simpler model.** While this may imply compromises in terms of model accuracy, simplifying the model can be a suitable way to build trust and ownership of local stakeholders. Design can be enhanced and made more complex to capture more of the modelled intricacies at a later stage.

TOOLS AND RESOURCES

Contingency planning

Checklist for good contingency planning

In summary, the following list of questions may help practitioners evaluate the quality of contingency plans.

- ✔ Have scientists, public officials, implementers, and financial specialists all been consulted during the drafting of the response plan?
- ✔ Is the plan based on a comprehensive disaster risk assessment?
- ✔ Does the plan specify which hazards it covers and which it does not?
- ✔ Does the plan cover disaster-related risks comprehensively, or is integrated into a comprehensive response framework?
- ✔ Does the plan clearly describe response operations, including intended beneficiaries, activities, etc?
- ✔ Does the plan clarify roles and responsibilities, i.e. what all entities involved in the described response should do?
- ✔ Is the plan credible, i.e. does it have political backing, is it reasonable, and is adequate pre-committed financing available?
- ✔ Does the plan take into account the needs of the poor and vulnerable?
- ✔ Has the plan been tested and externally scrutinised?
- ✔ Does it avoid recency bias?

Examples of contingency planning

- Helpful guidance on disaster contingency planning for governments comes for from the UN Office for Disaster Risk Reduction (UNDRR), e.g.
  - 'Words into action guidelines' series, UNDRR 2019.
  - https://www.undrr.org/publications
- Various multilateral institutions have also published their internal contingency planning guidelines, e.g.
  - UN Inter-Agency Standing Committee (IASC, 2015)
    - https://interagencystandingcommittee.org/product-categories/preparedness-and-contingency-planning
  - World Health Organization (WHO, 2018)
    - https://apps.who.int/iris/bitstream/handle/10665/260554/WHO-WHE-CPI-2018.13-eng.pdf?ua=1
  - International Federation of Red Cross (IFRC, 2012)
    - https://www.ifrc.org/PageFiles/40825/1220900-CPG%202012-EN-LR.pdf

Trigger design

Checklist for good trigger design

The following list of questions can serve as a framework for practitioners to ensure that they have considered the key aspects of trigger design.

- ✔ Has sufficient care gone into developing the trigger, including scientific expert advice? Has it been peer-reviewed by an independent party?
- ✔ Is the trigger based on objective, timely, reliable, and accessible data that is available over a sufficient time horizon?
- ✔ Does the trigger model what is in the best interest of the beneficiaries it is intended to help? Are there other important risks that it overlooks?
- ✔ In case an index is used, does it predict sufficiently well what it means to predict? Is basis risk appropriately managed?
- ✔ Does the trigger have a fail-safe?
- ✔ Is the trigger as automated as possible?
- ✔ Is the trigger model accessible to all?
- ✔ Is it sufficiently simple and accompanied by effective capacity-building measures?
- ✔ Is there a process for monitoring and updating triggers with clearly assigned roles and responsibilities?

Research material

- Some scientific writers, e.g. Mapfumo, Groenendaal, and Dugger (2017) and Morsink, Clarke and Mapfumo (2016) provide guidance on how to maximise the value of index-based insurance triggers.
- Several institutes have established designated research focuses on trigger design, e.g.
  - Feed the Future Innovation Lab for Markets, Risk and Resilience at University of California, Davis https://basis.ucdavis.edu/
  - International Research Institute for Climate and Society at Columbia University https://iri.columbia.edu/

GLOSSARY

Basis risk
Basis risk is the difference between an index and the shock that the index is supposed to be a proxy for. A payout triggered by an index may be higher or lower than the beneficiary's losses, leading to overpayment or shortfall respectively. Where there are differences of opinion amongst stakeholders over what the index is supposed to be a proxy for, the precise definition of basis risk can be contested. For example, disagreement may arise over whether an agricultural insurance product that uses a rainfall-based index covers drought-induced crop disease and pest damage (the Centre).

Disaster risk financing (DRF)

Disaster risk financing covers the system of budgetary and financial mechanisms to credibly pay for a specific risk, arranged before a potential shock. This can include paying to prevent and reduce disaster risk, as well as preparing for and responding to disasters (the Centre, 2019).

Indemnity insurance
A (re)insurance contract which pays out compensation worth the ultimate net loss of a specific asset. This type of insurance can be useful in protecting high-value assets such as homes, where there is a relatively narrow scope of potential loss. Insurance payouts are determined based on an assessment of losses after an event has occurred (InsuResilience Global Partnership, 2020).

Index
In risk finance, an index is an indicator or measure that is chosen to be a good proxy for a type of shock, and used to determine payouts. For example, tropical cyclone categories used as an index for property damage, or rainfall as an index for drought-affected population. Modelled estimates of damage costs are also used as indices (the Centre).

Parametric insurance
A type of insurance that does not indemnify the pure loss but agrees before the event to make a payment upon occurrence of a triggering event (Clarke and Dercon, 2016).

Trigger
A trigger is a predefined threshold of an index underlying a risk finance mechanism which, if exceeded, prompts a payout. A trigger may also leave an element of discretion to a designated party about whether or not to launch a response activity (the Centre).

REFERENCES

Bangladesh Red Crescent Society (BDRCS) (n.d.) 'Forecast-based Financing - FbF, www.bdrcs.org/programs-and-projects/forecast-based-financing-fbf [accessed 5 January 2020.

Clarke, D. and Dercon, S. (2016) *Dull Disasters?* Oxford University Press, Oxford.

Centre for Disaster Protection (the Centre) (2019) 'Stopping disasters devastating lives', Centre for Disaster Protection's Strategy 2019-2024, London.

Feed the Future (2017) 'Index-based livestock insurance: from asset replacement to asset protection in East Africa', https://basis.ucdavis.edu/sites/g/files/dgvnsk466/files/2017-01/Mude-Asset-Protection-Change.pdf [accessed 5 January 2020].

Gray, B., and Asmare, E. (2012) 'Report of a learning review of the implementation of the risk financing mechanism of the productive safety net programme 2011', [s.n.], [s.l.].

Hillier, D. (2017) 'From early warning to early action in Somalia', Oxfam, Oxford.

InsuResilience Global Partnership (2020) 'Indemnity insurance', https://www.insuresilience.org/glossary/ [accessed 09 April 2020].

Inter-Agency Standing Committee (IASC) (2015) 'Emergency response preparedness', draft guidelines for field testing, IASC, Geneva.

International Federation of the Red Cross and Red Crescent Societies (IFRC) (2012) 'Contingency planning guide', IFRC, Geneva.

Mapfumo, S., Groenendaal, H., and Dugger, C. (2017) 'Risk modeling for appraising named peril index insurance products: a guide for practitioners', International Bank of Reconstruction and Development (IBRD)/World Bank, Washington D.C.

Morsink, K., Clarke, D.J., and Mapfumo, S. (2016) 'How to measure whether index insurance provides reliable protection', World Bank, Washington D.C.

Oxford Policy Management (OPM) (2017) 'Independent evaluation of the African Risk Capacity (ARC)', OPM, Oxford.

Tanner, T., *et al.* (2019) 'Scaling up early action. Lessons, challenges and future potential in Bangladesh', ODI, London.

UN Office for Disaster Risk Reduction (UNDRR) (2019) Enhancing disaster preparedness for effective response. Words into action.', UNDRR, Geneva.

US News (2015) 'Don't wait for disaster to strike', US News, www.usnews.com/opinion/blogs/world-report/2015/05/07/nepal-earthquake-response-shows-need-for-better-international-planning [accessed 5 January 2020].

Wendelbo, M., *et al.* (2016) 'The crisis response to the Nepal earthquake: lessons learned', *European Institute for Asian Studies* (EIAS), Brussels.

World Bank Group (WBG) (2016) 'Toward a national crop and livestock insurance program. Background report',IBRD/World Bank, Washington D.C.

WBG (2017) 'Financial risk management of public assets against natural disasters in APEC economies', draft for final consultation, Asia-Pacific Economic Cooperation, [s.l.].

WBG (2018a) 'A feasibility study. Assessing the potential for large-scale agricultural crop and livestock insurance in Punjab Province, Pakistan', World Bank, [s.l.].

WBG 2018b. *Better Data, Better Resilience:* Lessons in Disaster Risk finance from Uganda', Disaster Risk Financing and Insurance Program (DRFIP), [s.l.].

WBG (2019a) 'Sahel Adaptive Social Protection Program, annual report 2018', IBRD/World Bank, Washington D.C.

WBG (2019b) 'Case study. The Philippines. Transferring the cost of severe natural disasters to capital markets', World Bank, [s.l.].

World Health Organization (WHO) (2015) 'Report of the Ebola interim assessment panel', WHO, [s.l.]..

WHO (2018) 'WHO guidance for contingency planning', WHO, Geneva.

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Cover image: Devastated area in Aceh province, Indonesia.
Image: Yoshi Shimizu / International Federation of Red Cross and Red Crescent Societies

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