Executive Summary and Recommendations

Preparing for High-impact, Low-probability Events

Lessons from Eyjafjallajökull

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A Chatham House Report

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The frequency of 'high-impact, low-probability' (HILP) events in the last decade signals the emergence of a new 'normal'. Apparent one-off high-profile crises such as 9/11, Hurricane Katrina, the Macondo oil spill and the Japanese earthquake and tsunami were all mega-disasters requiring rapid responses at a global level, marking the beginning of a crisis trend. But lower-profile, persistent events such as flooding, droughts and cyclones have been shown to have equally serious impacts, raising new questions about the way in which we perceive risk and prepare for disruptive events.

These events can manifest themselves not only as 'black swans' – which by nature are impossible to predict – but also as known hazards such as floods, hurricanes or earthquakes, which, owing to the low likelihood of occurrence or the high cost of mitigating action, remain un- or under-prepared for. There are also crises such as pandemics which typically unfold over weeks, months or a few years, for which the scope or timing remains unknown even with preparations. Events such as the 2011 drought and subsequent food crisis in East Africa have also raised troubling questions about the way in which the international community responds to 'slow-motion' disasters which build up over several or many years.

The globalization of production and optimization of supply chains have increased systemic efficiencies in the global economy but have exacerbated the speed and scope of contagion in the event of shocks. They pose particular threats to key industries – especially high-value manufacturing – and to the just-in-time business model. The consequences of HILP events spread rapidly across sectors and borders, often with second- or third-order impacts that are hard or impossible to predict. The 2003 SARS outbreak, for example, cost businesses $60 billion, about 2 per cent of East Asian GDP. The devastating earthquake in March 2011 may have lost Japan 10 per cent of its capital stock – equivalent to around 20 per cent of the country's GDP – with wider knock-on impacts for global companies such as Toyota and Sony, which were forced to halt production.

In an increasingly connected global economy and society more people are (and will continue to be) affected by shocks, irrespective of whether 'high-impact events' are actually becoming more frequent or not. To explore our preparedness for HILP events in this context, Chatham House has examined the ash cloud that spread across Europe in April 2010 to draw lessons for other HILP events. In particular the analysis considered the nature of decision-making and coordination before, during and after the ash cloud; the impact of scientific uncertainty; the economic consequences and the role of communications.

A complex risk environment

Despite considerable efforts to improve scientific understanding and reform risk management approaches, governments and businesses remain insufficiently prepared to confront HILP crises and effectively manage their economic, social, political and humanitarian consequences.

Current contingency planning often assumes the return of the *status quo ante* after a crisis. But this approach may be inadequate in a world of complex economic and social risks, especially when combined with slow-motion crises like climate change and water scarcity. Slow-motion crises such as these build over many years, but are likely to result in a higher frequency and greater severity of shocks. Often there are several steps between an event 'trigger' and the social consequences that result.

National risk management structures – based on classifying events by tiered levels of threat and implementing specific contingency measures – may therefore need to be reconsidered. Instead, senior leaders and

decision-makers will need to develop and roll out overarching strategies which consider the full range of preparedness and response capacities, and establish clear frameworks for crisis decision-making.

Risk matrixes which categorize risks by common consequences that require a generic response (such as earthquakes or floods) and those that require a more specific response (such as pandemics) can provide a more useful framework for decision-making. This approach has its own limitations; it may not always capture interrelated risks (that flooding could lead to foot and mouth disease for example). But building generic institutional capacity to plan and respond to any type of event will create a broader platform to ensure greater preparedness overall.

Beyond certain thresholds governments are the responders of last resort – they are often expected to step in and take charge of emergency responses during major crises. However, sectoral responses are also critical, especially where crises involve major engineering challenges or have highly technical dimensions. This is the case, for example, in the rapid production of vaccines or in technology failures like the Macondo oil spill and Fukushima meltdowns.

Speed and scope of economic contagion

Instruments of risk management have traditionally concentrated on 'normal' procedures which regard extremes as unlikely. Recent shocks highlight the need to plan also for worst-case scenarios given the nature of our increasingly globalized and interconnected world.

The impacts of future crises are unlikely to remain local – regardless of their origins – and will likely affect more than one country or region. The vulnerabilities of globalized supply chains and particularly the just-in-time business model are likely to be exposed by any disruption lasting more than a few days.

Evidence from a range of recent events, notably the 2010 ash cloud, the March 2011 earthquake and tsunami in Japan and the floods in Thailand in 2011, indicates that key sectors and businesses can be severely affected if a disruption to production centres or transport hubs persists for more than a week. This was confirmed by a survey of businesses about the 2010 ash cloud – many said that had the disruptions continued for a few days longer, it would have taken at least a month for their companies to recover. It is also the case that planning by government and industry organizations for an ash-cloud event had failed to consider a timeframe of more than about three days. One week seems to be the maximum tolerance of the 'just-in-time' global economy.

Yet for business, deviating from the just-in-time model means potentially offsetting short-term profitability. The challenge therefore for both business and governments is establishing how to balance the cost of resilience and the impact of worst-case scenarios – and who should pay.

Navigating conflicting interests amid uncertainty

The existence of competing and mutually exclusive claims to certainty is often unavoidable during any crisis situation. As the 2010 ash cloud over Europe demonstrated, pre-existing rules and guidelines will come under severe pressure during a crisis particularly if worst-case scenarios have not been explored and in the absence of flexible but credible decision-making structures. Policy-makers have some freedom to take emergency measures in response to a short-term crisis, but uncertainties and conflicts of interests will inevitably surface during a longer-term event, complicating the response process as political and economic pressures grow.

Transparency, especially during and after a crisis, can help ensure the decisions are made on the basis of the best available evidence (recognizing uncertainties), build public confidence and manage vested interests. Policy-makers need to give close attention to mapping the complex political, institutional and industrial interests that surround the key stakeholders in critical areas of the economy, during and after an event.

Battling for the airwaves

Scientific and technology uncertainty is notoriously difficult to communicate, especially when it comes to

articulating risks to the public – whether over climate change, bird flu or terrorism threat levels.

The public would benefit from increased and quality coverage of scientific opinion by the media. Governments could help give voice to independent scientific opinion by involving scientists in public briefings and other information dissemination activities. There is also a critical window of opportunity for authorities to engage effectively during a crisis situation. Reacting slowly can cede control of the message to other stakeholders who have quite different interests. On the other hand, acting rapidly but without a clear strategy will affect credibility.

Communications strategies across all forms of traditional and social media should also be built into scenario-planning and exercises. Organizations that engage with the public and key stakeholders in normal times, building their presence, reputation and network, enjoy a significant advantage when disaster strikes. This is especially true of social networks. But it is clear that traditional media continue to be hugely influential, including in the social sphere. Stakeholders also need a contingency plan in case systems are compromised; recent crises have shown that modern communications networks can be fragile and lack redundancy.

Improving information and coordination mechanisms

Governments must also ensure that science and uncertainties are translated into a set of recommended actions. Identifying 'no-regret' options in such strategies makes sense whether or not a specific threat actually materializes in the future. For example, existing social safety net programmes can build contingency arrangements so that the delivery of cash transfers or execution of public works after natural disasters can be rapidly scaled up. This same capacity can be used to cope with 'man-made' crises such as food, fuel and financial shocks.

Early warnings, which are by their nature uncertain, must be quickly followed by recommended steps, making it easier for decision-makers to take timely action and be held to account. Innovative mechanisms to mobilize resources automatically once warning systems are triggered should be explored.

Scientists need to work collaboratively with civil servants, the private sector and civil society to agree on the most appropriate set of recommended actions and present these to decision-makers in a transparent fashion. In the case of a continuously evolving crisis this needs to be a fluid and iterative process; the recommended actions should be presented together with analysis to help decision-makers identify which courses of action are most amenable to their specific risk preferences.

Creating a robust process for resilience

To get the right balance between planning for specific 'known' events and creating generic responses for events that are rare or unexpected, governments must strengthen planning processes to anticipate and manage shock events: from clarity in the chains of command (especially where multi-jurisdictions are involved) to activating and connecting independent knowledge networks with policy-makers, to building common approaches in the management of complex risks.

There are common activities and actions that are relevant in the majority of disruptions. For example, evacuation processes will remain largely the same whether for hurricanes, earthquakes or a terrorist attack such as 9/11. Planning for specific threats will bear fruit only if the reality matches the scenario-planning. However, governments and stakeholders can identify robust – but not necessarily 'threat-specific' – processes to mitigate disruption.

Recommendations

Stress-testing risk mechanisms

1. *Industry bodies and safety regulators should work in coordination with governments and businesses to stress-test risk-related practices in critical infrastructure sectors* and to examine whether policies reflect the real costs and risks associated with future infrastruc-

ture decisions in worst-case scenarios. This should be supported by interactions – before, during and after an event – between scientific advisers and national civil contingency agencies to ensure that decision-making during a crisis is based as far as possible on scientific and technical evidence.

2. *Red-teaming HILP scenarios with key decision-makers (politicians as well as agencies) is essential to enhance preparedness in coping with the unexpected*. A multi-sector voluntary agreement on participation in planning, exercises and crisis response should be established, led by governments and industry. Transport and communications are two priority sectors, as they are critical in any crisis response. These scenario-building exercises can also help identify particularly affected social groups and countries to enable rapid financial and practical support where national organizations are unable to cope or where the consequences are cross-border in nature.
3. *Sharing best practice and, where relevant, capacity, especially among industrial sectors and governments.* There are a limited number of cross-cutting responses to the consequences of a crisis (rapid technological 'fixes', evacuation, treating sick people, communications systems etc.), compared with hundreds of potential risks. Company-led and sectoral responses are especially critical when it comes to highly technical issues or engineering failures.
4. *Emergency preparation and response mechanisms should be transparent and subject to public accountability.* Governments should introduce a requirement for competent authorities to conduct post-crisis impact assessments. These would consider how crisis decisions were taken, the basis of risk decision-making processes and the consequences (positive and negative) for the environment, society and economy. This would both help ensure continuous improvement in future crises, and enhance the transparency of risk-based decisions to the public.

Stepping up communications in crises

5. All actors, especially *regulators and government bodies, should step up planning for communications in a crisis* including a robust website (for example, a 'dark site' prepared in advance but only made available to the public when a crisis hits). National science institutions should work together to develop, strengthen and promote effective guidelines for the communication of scientific and risk-related information for media and science institutions during a crisis, reflecting the new opportunities and challenges presented by social media.
6. *There should be independent, high-quality hubs (national or regional) for up-to-date risk notification and provision of scientific information in a crisis* – supported by governments, businesses and industry associations – that are critical scientific institutions that can be expected to play a role in future crises. For example, a o*ne-stop centre* should be created to aggregate information and advice from official sources with information provided by individuals via social media networks. This would become known in advance as the go-to place in a crisis for stakeholders, with enhanced capacity to meet huge increases in traffic during a crisis.

Enhancing business resilience and responses to shocks

7. *Governments should work with the insurance industry to set up a global pooling system for reinsurance to address future disruptive events and review existing arrangements* regarding the provision of state support to businesses during HILP events. Although state aid can fulfil a vital role in alleviating paralysis during and immediately following an event, concerns remain around issues of anti-competitiveness legislation and market distortion.
8. *A multi-disciplinary reference library for quantifying the impact of shocks should be established in relevant international institutions such as the World Bank or the International Monetary Funds.* Analysts can systematically build up a library of observations that can be drawn on when preparing for similar shocks in the future. Mistakes made in impact studies can also be used to improve predictions, creating a more reliable reference system to provide faster and more accurate

analysis when faced with recurring events, and to improve policy planning.

9. *The private sector needs to invest additional resources in training and investment in 'business resilience', supported by governments, especially for small businesses.* A new international standard for preparedness and continuity management systems (ISO 22301) for organizations is due to be published in spring 2012. In parallel, governments could also promote the ISO mark across industry and the public. This would help ensure a competitive advantage for those demonstrating a commitment to robust business continuity management.
10. *Businesses should undertake cost-benefit analysis of options such as shifting to regional hubs and storage centres for non-perishable goods to avoid urgent intercontinental transportation.* While transport risks will be more difficult to overcome for perishable goods trade, in some instances different packaging and storage methods may permit delivery by land and sea instead of air. Indicators of business resilience should be developed that can actually be audited or reported on and passed on to stakeholders or the stock market, to bolster incentives for investing in resilience.