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A Strategy for all Seasons: Disaster Resilience and Climate Change

Climate change conjures up ideas about incremental temperature rises and tiny rises in sea levels. But sudden shocks are also possible as a result of more frequent extreme weather events; the effect of heat on our infrastructure; and sinking cities increasingly exposed to the power of the sea. If disaster struck, how wrong could things go? And how well would we meet the challenge of getting back to normal?

According to a UN study, on average more than 226 million people globally are affected by disasters associated with natural hazards every year.[1] In the Netherlands, there is an existential need to protect our assets against climate-related disasters. But there is also an interest in helping other countries become more climate-change resilient, for instance to secure key economic interests at home relating to food security or keeping supply networks open.[2]

This HSD Issue Brief explores the need for societies to develop resilience to disasters related to climate change; the challenges that need to be overcome; and the opportunities for HSD partners and other stakeholders to address the need for greater resilience together. It argues for a more comprehensive approach to climate-related disaster resilience that goes beyond shoring up infrastructure, and for greater involvement of the private sector.

What is resilience, and how does it relate to climate issues?

The term 'resilience'

The idea of resilience originated in ecology, and was defined in 1973 by Canadian scholar C.S. Holling[3] as "the potential of a particular configuration of a system to maintain its structure/function in the face of disturbance, and the ability of the system to reorganize following disturbance-driven change."[4]

Although originally developed as an ecological term, today the concept of resilience is applied to thinking about how to protect urban or industrial zones as well as wildlife areas. This broader understanding is helpful in thinking about the broader impact of climate change and how it affects social and economic security.

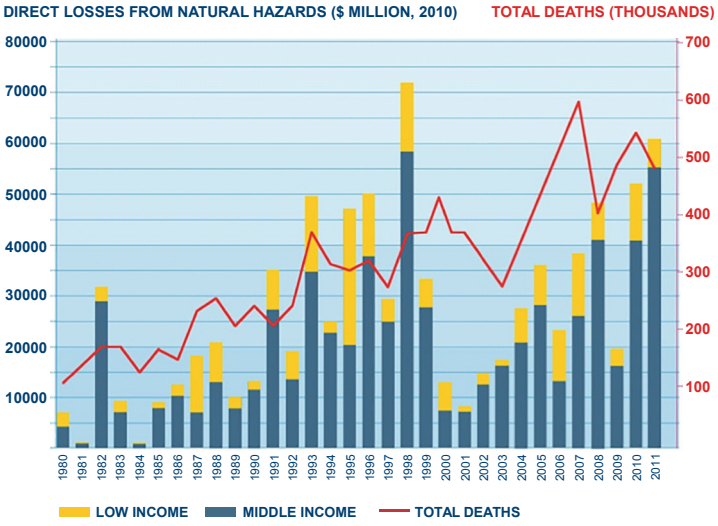

Figure 1 Direct economic losses and fatalities in low and middle income countries. Source: Munich RE

Operationalising resilience

What would a disaster resilience strategy look like? To make the concept of resilience more concrete, it is important to think about "resilience *of* what to what."[5] Ecological, infrastructural, social, economic, and financial factors all play a role, and should be considered integrally:

	Vulnerabilities	Solutions
Ecology	Land; agriculture; water.	Water engineering; land drainage; flood defenses; warning systems.
Infrastructure	Power grid; transport networks; cyber communication.	Backup systems; resilient design.
Society	Healthcare; public order.	Responsiveness of emergency services; incident tracking; emergency supplies; good governance/institutions; research, education, and training; impact assessment of climate change on different communities.
Economy	Industry; trade.	Rethinking locations of plants; countries of operation; logistical channels; reducing climate footprint of economic activity.
Finance	Markets; savings; investments.	Insurance; risk mitigation.

Table 1 Potential solutions to various kinds of climate-induced disruptions

The key to improving resilience to climate change lies in realising that actions and measures are not enough on their own: instead, resilience should be seen as an ongoing commitment, in which people and businesses interact with their environment. The EU's Horizon 2020 research programme reflects this approach to resilience, underlining the need to "integrate and address human and social dynamics in crises and disaster situations" and to anticipate implementing alternative means.[6]

Another good example is "prevent-protect-promote" schemes, which aim at increasing opportunities to communities by promoting sustainability and building resilience to disasters resulting from climate change.[7] Poor people have generally less resilience to natural disasters, and are at increased risk of losing life, assets, and livelihoods in natural disasters. In such contexts, social protection and labour systems, policies and programmes help individuals and societies manage risk and volatility and protect them from poverty and destitution.[8]

What are the key challenges and needs?

Forging the policies and strategies set out above is easier said than done. Various challenges could arise, grouped around three categories:

1 Creating the right incentives for people, businesses and public authorities;
2 Having the strategies and means available to address climate change – related risks;
3 Ensuring that all stakeholders collaborate and understand their respective responsibilities.

A lack of incentives

Being a long-term, intergenerational issue, the effects of climate change are often very difficult to forecast. Hence, investing in climate resilience can be an unappealing proposition for businesses as well as governments. It can be unclear what it is that needs to be invested in,[9] while the payoffs are often uncertain: for instance, future market conditions are just as important, and these can often simply not be estimated in the long run. As a result, governments and businesses have failed in the past to take sufficient preventative measures to mitigate the effects of climate change. Today, when long-term resilience strategies are being considered, there is again a real risk that such strategies fail to be adopted, or only in piecemeal. If so, the price we are likely to pay will be higher than before.

Absence of strategies, insufficient means

A second, but related challenge is the difficulty for countries, communities, or companies to put together adequate disaster resilience strategies or to muster the means to implement them. To begin with, this can be the result of a simple lack of know-how. Stakeholders may not be sufficiently aware of the risks they run, the solutions available, or how these could be implemented in the most efficient way.

Another problem is the tendency to focus resilience strategies on preventing disasters that *have already* occurred, instead of a broader approach to defend against a multitude of disasters that *could* occur. This is the mistake planners are trying to avoid in the wake of Hurricane Sandy.[10] Here, "[t]he business response [is] largely a continuation of existing practices based on a historical picture of past risks, and often fails to adequately consider changing climate and weather conditions."[11]

Devastation wrought by Hurricane Sandy in 2012

Quite apart from strategies, stakeholders may not have the financial or physical means to implement their resilience strategies, or be willing to commit these. Being a matter of opportunity cost, it can be difficult to choose between the possible costs of disasters versus the certain costs of resilience. Indeed, financing for resilience may be more difficult to obtain for those companies that are most at risk to the impact of climate change.[12] Also, companies and governments alike are finding it hard to insure against climate-induced risks, given the potentially huge claims that insurers may face.

A lack of understanding about responsibilities

The key to addressing the above points often lies in the third challenge, namely the need to bring stakeholders together and to agree to sharing responsibilities and making long-term commitments. That this can be tricky has been amply shown in global climate negotiations over the past two decades.

There are three main challenges in terms of fostering cooperation. The first is free-riding. In particular with government-driven initiatives, there is a temptation for stakeholders not to contribute if benefits (i.e. disaster resilience) can be enjoyed without contributing.[13] Secondly, disaster resilience strategies could become politicised, for instance if there is a mismatch between who contributes and who benefits. Third, the urgency to address the impact of climate change can be perceived differently depending on priorities of various stakeholders, and the extent to which they are affected.

Practical solutions for fostering resilience

Building on the growing understanding and existing expertise on climate change resilience strategies, a number of solutions can be pursued by businesses, governments and societies to jointly surmount the challenges identified above. These include:

1 Creating incentives to invest and contribute;
2 Developing inclusive and comprehensive understandings and strategies for disaster resilience;
3 Finding new opportunities for products and markets.

Creating the right incentives

Within the private sector, there is increasing awareness about the cost of climate change – related damage. When floods hit Thailand in 2011, the entire worldwide supply of microchips was disrupted.[14] This and other examples show that global companies often need on resilience strategies to be able to operate in vulnerable countries, thus providing incentives to mitigate the impact of climate change in high-risk locations.[15] A good example is an initiative by one UK beverage firm to integrate small farmers into its Nigerian supply chain by assisting in their transition to growing drought-tolerant sorghum crops and to increase their crop yield.[16]

Another kind of incentive would be to pursue no-regret options, which the World Bank describes as "policies and actions that make good sense to implement whether or not the consequences of climate change turn out to be as projected."[17] Third, insurance companies can help to ease the investment risks associated with climate change adaptation.[18]

Aline te Linde, a consultant with Twynstra Gudde, thinks that insurance companies could do more to provide positive incentives to businesses to become more climate-change resilient: **"In some countries, insurance companies give negative incentives in that they only want to pay compensation in case all the preconditions and precautions have been strictly observed. Instead, businesses could be offered lower insurance premiums if they invest in disaster risk reduction and resilience strategies."**

Developing inclusive and comprehensive understandings

An integrated approach means considering all stakeholders in the triple helix, and all aspects of climate change and disaster resilience. According to the World Bank, such an approach requires "sustained, long-term and flexible programs, and better coordination between the adaptation and disaster risk management agendas."[19]

The best Dutch example is the Delta Commission which in 2008 presented a comprehensive plan for reinforcing Holland's water management infrastructure until 2100.[20] It adopts an incremental and continuous approach to tackling climate change in the long run, rather than a large-scale single investment today for tackling problems the day after tomorrow. Associated with this is the Knowledge for Climate (*Kennis voor Klimaat*)[21] programme, which aims at stimulating collaborative research projects on climate resilience. These Dutch initiatives could possibly be further integrated into EU schemes as well, something which is encouraged in the Horizon 2020 research programme.

Jan Kwakkel, a policy specialist at Delft University of Technology, praises the Delta Commission initiative, but thinks it still needs to prove itself: **"Given the long-term agenda that the Commission aims to implement, it remains to be seen whether it can sustain its approach over the course of various elections and governments taking charge. In addition, there is a need to consider the impact of climate change even more thoroughly than it is today when it comes to planning and designing vital infrastructures such as roads, rail, energy and cyber."**

One way to reduce the risk of free-riding in long term schemes to tackle climate change and build disaster resilience is by creating a peer-pressure network, giving the incentive for all to meet their commitments. Such a strategy could work because "[b]usinesses are often focused on their operations, peers, sectors and markets. It is therefore necessary to communicate through key economic sector channels, and their specific resilience challenges and opportunities to improve uptake."[22]

Creating markets, offering funding

Turning climate resilience into an opportunity also means creating new ways for doing business. Access to grants and subsidies help to create such opportunities.

The EU has various investment programmes in this regard, including Horizon 2020 (which dedicates about 35% of its funds to climate-related research) and the LIFE Fund.[23] In the United States, an example is a foundation that awards funding and facilitates government cooperation to project design which increase the resilience of coastal communities, high-density urban environments, and ecological networks in areas of the United States affected by Hurricane Sandy.[24]

In terms of market opportunities, the Netherlands is already active in developing solutions to water-related challenges in a

number of countries throughout the world through the Dutch Water Partnership.[25] Financing is also made available through the government's 'Top sectors' initiative, which supports market-based projects in some thirty countries worldwide.[26] Knowledge for Climate also provides financing for climate-related research projects.

Concluding observations

Climate change is real. It is a global issue, and it affects our citizens in many ways. And not only because climate change leads to rising sea levels, thus threatening our livelihoods behind our dykes, but because climate change has disruptive effects that reverberate across the globe. Droughts can lead to revolts elsewhere in the world. Floods halfway around the world can disrupt critical food, energy and commodity supplies here in the Netherlands. But climate change also impacts socio-economic conditions in many countries, which in turn can lead to conflict and further disruptions. Hence, building disaster resilience against climate change is a means to improving our own safety *and* security.

The Netherlands prides itself on its ingenuity in water and infrastructural engineering – which enjoys a deserved worldwide reputation. At the same time, rapid changes in weather patterns also compel us to upgrade our own infrastructure, which in turn stimulates different strands of knowledge, solutions and strategies. In this way, climate change is also an engine for further innovation.

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