

Towards a holistic approach to disaster response

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**HARVARD COLLEGE REVIEW OF
ENVIRONMENT & SOCIETY**

WHEN DISASTER STRIKES

**Climate Resilience &
Community Response in the
Wake of Natural Disasters**

Issue No. 5 | Spring 2018

LETTER FROM THE EDITOR & TABLE OF CONTENTS

Welcome to the fifth issue of the Review of Environment and Society. This year, we have set our sights on understanding disaster response and climate resilience.

We have brought together articles from environmental bloggers, economists, disaster response teams, and our own Bryan Hu to look at the importance of climate resilience and community response in the wake of disasters.

Our authors outline current disaster response practices, how they are actively being improved, and highlight areas of concern in our political system. We hope you appreciate reading their thoughts as much as we have.

Happy reading,



Devin Clark
Editor-in-Chief
Harvard College Review of Environment and Society

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ABOUT THE REVIEW

A publication at Harvard that seeks to provide a platform for connecting students, researchers, business and political leaders, and the public to enable integrative discussion that is paramount to developing successful solutions to our current environmental issues.

While much of the contemporary discourse on environment and society have been focused on either one or the other, this publication provides a robust multidisciplinary discussion on the full gamut of competing pressures and interests relating to the environment.

MASTHEAD

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Towards a Holistic Approach

To Disaster Response

Michael Faure

Michael Faure is a professor of comparative and international environmental law, and the Academic Director for the Maastricht European Institute for Transnational Legal Research.

1. Three types of disasters

Disasters happen all the time. Since early mankind natural disasters like bush fires, heavy rainfall, flooding, volcanic eruptions and earthquakes have threatened mankind's very existence. Of a more recent date, mostly since the Industrial Revolution, mankind has also been threatened through disasters related to the negative effects of technological developments. Explosions of industrial installations, industrial fires, marine oil pollution and even nuclear accidents, have also had devastating effects. Of even more recent origin is a third type of disaster that is equally man-made, terrorism. The main difference between technological disasters on the one hand, and terrorism on the other, is that in case of technological disasters, classic legal remedies (such as imposing strict liability or mandating the purchase of liability insurance) could be employed to reduce disaster risk, whereas this is obviously more difficult in the case of terrorism.

An important paradigm shift has occurred in the sense that (potential) victims and the public at large no longer accept Oliver Wendell Holmes's adage "The loss lays where it falls", meaning that victims just have to accept the bad luck of being hit by disaster. Also as a result of mass media, disasters trigger a lot of attention from politicians and a corresponding need to provide some form of disaster response. The question that arises from an economic perspective, is whether the disaster response (for example providing full compensation to victims of a disaster) is always economically efficient and desirable. That question is all the more pressing since there is not only an increasing tendency of politicians to provide generous compensation to victims after a disaster; there is equally overwhelming evidence that the damage resulting from disasters is increasing. In that respect it is striking that whereas the insured losses resulting from man-made disasters remained constant from 1970-2007, the losses resulting from natural catastrophes increased substantially (Kunreuther 2008, 5).

2. Goals of disaster response

A disaster response system should ideally fulfil two goals: 1) provide adequate compensation to victims of a disaster and 2) provide adequate incentives for disaster risk reduction. From an economic perspective it may not seem obvious to

argue that providing compensation to disaster victims should be a policy goal. However, a major difference between an “ordinary” accident (not involving a large amount of victims or property damage) and a catastrophe is precisely the fact that given the magnitude of the disaster its impact may have disruptive effects on society as a whole and consequently also on the economy. A nuclear accident, for example, could wipe out an entire neighbourhood and also claim the houses which served as collateral to back up a large amount of debt, potentially leading to a financial crisis. But economists have also pointed out that there exists a link between the goal of victim compensation and the second goal of disaster risk reduction. If this interrelationship between both goals is disregarded, the compensation could negatively affect ex ante incentives to invest in prevention of disaster, and therefore increase rather than decrease the disaster risk. Providing ex post compensation to victims may generate high political rewards. Providing compensation after the occurrence of a disaster is so politically attractive, that the government will often find it impossible to resist payment (Hirschleifer 1953; Viscusi 2010). Many countries therefore provide large amounts of compensation to victims after a disaster. For example, after hurricane Katrina (2005) the federal government committed a total amount of \$88 billion to response, recovery and rebuilding efforts

(Dari-Mattiacci and Faure 2015, 187-188). A problem is that this ex post compensation is often politically motivated and inefficient. Empirical research shows that payments by the US Federal Emergency Management Agency (FEMA) are often motivated by politics rather than by need (Gerrett and Sobel 2003). The inefficiency relates to the fact that ex post payments by the government may dilute the ex ante incentive for investments in disaster risk reduction. Potential victims, for example those living in flood-prone areas, count on ex post compensation, which thus dilutes incentives for

prevention. Ex post government compensation was therefore qualified by one author as a “catastrophic response to catastrophic risk” (Epstein 1996). In addition, government provided compensation may not only dilute incentives to invest in disaster risk reduction, it may also create an incentive not to purchase insurance.

In the words of one scholar: “Solidarity kills market insurance” (Gollier 2005, 25). This problem, referred to as the “charity hazard” (Raschky and Weck-Hanneman 2007) has also been proven empirically: the willingness to purchase insurance decreases when potential victims can count on government compensation in the wake of disaster (Van Asseldonk et al. 2002).

These examples show that there is a clear interrelationship between ex post compensation mechanisms and the

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incentives to invest ex ante in disaster risk reduction. This is also related to the fact that politicians may be rewarded too lightly from ex ante disaster risk reduction, and too highly from ex post compensation. The result may be systemic underinvestment in disaster prevention and overinvestment in ex post compensation (Depoorter 2006). It shows the necessity to be aware of the fact that the various phases of disaster response, precaution, relief and recovery, are interrelated (Dari-Mattiacci and Faure 2015). As a result, an integrative, holistic perspective is necessary whereby ex post instruments for compensation are chosen that provide efficient ex ante incentives for disaster risk reduction.

3. Efficient instrument choice

From the previous analysis it follows that the goal of ex post victim compensation should be realised by using instruments that equally have a positive effect on the incentives for ex ante disaster risk reduction. In answering the question of which instruments might be appropriate to achieve that goal, the distinction between the three types of disasters, mentioned in the introduction, is of relevance again. The starting point should be that whenever an injurer can be identified, whose acts or omissions were the cause of a disaster, liability rules can be employed. The economic advantage of holding a tortfeasor, like an operator of a polluting plant, liable for the consequences of the disaster, is that a liability rule will provide excellent incentives for ex ante prevention: in order to avoid having to pay ex post

compensation, operators will be incentivised to invest in ex ante disaster risk reduction. However, it is not enough to provide for a liability regime as the magnitude of a disaster could easily outweigh the assets of an operator. For that reason, the liability regime should be accompanied with financial guarantees such as bonds, or mandatory liability insurance, guaranteeing that the operator will be able to meet its obligations.

The use of liability rules has the advantage that it can combine the goal of compensation with the goal of providing ex ante incentives for prevention. This has advantages both from society as well as from the business world's point of view. The use of liability rules and mandatory solvency guarantees that mala fide operators would not be able to use the corporate structure (with its limited liability) to engage in hazardous activities, thus externalizing risk to society and de facto to the tax payers. And a structural liability regime also has the advantage of creating a level playing field for bona fide businessmen. It prevents rogue traders from distorting opportunities by creating hazardous activities with potentially insolvent companies. A generalised liability regime combined with mandatory solvency guarantees implies that all enterprises need to comply with the same safety levels, and thus all businesses face comparable costs.

An important limitation of liability rules is, however, that it can only be employed when an injurer can be identified and held liable, in other words with technological

disasters. With natural disasters and terrorism, liability rules can not usually be applied. An exception would constitute the case of a so-called hybrid disaster whereby the natural disaster was caused by human failure. An example would constitute the failure of the government to prevent the construction of a building in flood-prone area, or on the slope of a volcano. But in most legal systems the scope of this public authority liability is limited as a result of immunities (De Geest 2012). For natural disasters and terrorism another efficient solution should therefore be found.

4. Market solutions for disaster response

4.1 First party insurance

The instrument which has been generally advocated as the optimal solution, as it can realise both victim compensation and provide incentives for disaster risk reduction, is first party insurance held by victims. It is an insurance scheme whereby potential victims, for example of damage as a result of a hurricane or flooding, would purchase insurance to cover themselves and their property. As insurers need to remedy the moral hazard risk that is related to insurance, they will require risk-reducing measures from the insured, and adapt the premiums accordingly. Risk-related premium setting makes the potential victims aware of their risk exposure and provides incentives for prevention (Priest 1996). If this is the ideal solution that can meet both goals of a disaster response mechanism, why is this not used at a wider scale, and why is there still a problem? Authors have indicated that even for climate change related storms, hurricanes and other damage, first party insurance could in principle be used (Telesetsky and He 2016).

4.2 Market failures

Empirical evidence shows that notwithstanding the principal advantages of insurance, it is in practice often not used. The reasons relate to problems on the

"The problem with disaster insurance is that, given the low probability and high damage nature of a disaster, the insured may never 'benefit' from the premiums paid."

demand side as well as the supply side. On the demand side, individuals often have an "it will not happen to me" mentality (Kunreuther 1996, 175) as a result, they underestimate the probability of disasters. Individuals often consider insurance as an investment, and expect a return during their lifetime. The problem with disaster insurance is that, given the low probability and high damage nature of a disaster, the insured may never "benefit" from the premiums paid. Finally, as already indicated, the generous ex post compensation by the government may lead to the mentioned charity hazard, which could reduce incentives to purchase insurance. The consequence of this artificially low demand is that there is

overwhelming empirical evidence that potential victims underinsure, even in areas with high exposure to disasters. For example, after hurricane Katrina, it appeared that in some areas less than 20% of potential victims had purchased flood insurance (Daniels et al. 2006). Similar empirical evidence relates to earthquakes. The demand for earthquake insurance increases the year after an earthquake happened, but if in the subsequent two years no new earthquake took place, many policies are again cancelled.

Problems also arise on the supply side. Insurers consider catastrophes “difficult to predict” (Gollier 2005), often leading to correlated losses, and to losses where the magnitude of damages is substantially larger than the capacity of the insurance and reinsurance market (Froot 1999).

4.3 Remedies

There are, however, remedies possible to cure the mentioned market failures. An obvious remedy to solve the problem of the lacking demand for earthquake insurance is to provide comprehensive compulsory insurance (Kunreuther 1968). It has the advantage that it will provide automatic coverage and, through the risk differentiation employed by the insurer, also incentivise disaster risk reduction (Priest 1996).

The remedy proposed to deal with the supply side problem (lacking capacity) is to have the government support the catastrophe insurance market by acting as the insurer of last resort. This then leads to a multi-layered programme whereby, after insurers and reinsurers have provided their full capacity, a last layer of compensation is provided by the government. The major advantage of this model, especially compared to ad hoc ex post compensation, is that it supports the market mechanism in a structural manner and still provides incentives for disaster risk reduction (Bruggeman, Faure and Heldt 2012).

Both solutions have been implemented in various legal systems. Mandatory disaster insurance has been introduced in France in 1982 (Cannarsa, Lafay and Moréteau 2006) and has been followed now in many other territories, such as Belgium, Spain, Norway and Taiwan (see for comparative overview Faure and Hartlief 2006). In France, homeowners who voluntarily purchase housing insurance are, as a result of regulatory duty, automatically insured against damage caused by natural disasters. This model is also largely supported by literature, and advocated as a remedy in the US, especially after consideration is given to the impacts of Hurricane Katrina (Kunreuther and Pauly 2006). The remedy on the supply side, where the government acts as the insurer of last resort, is implemented, again, in France, where the mandatory insurance against natural catastrophes is supported by the government finance Caisse Centrale de Réassurance (CCR) that provides unlimited reinsurance. In the US, in some cases the government acts as primary insurer. See for example the California Earthquake Authority (CEA) created in 1996 after the 1994 Northridge earthquake, and in other cases federal support is provided for flood insurance via the National Flood Insurance Programme (NFIP).

4.4 Implementation problems

Notwithstanding the major advantages of a comprehensive mandate combined with a government intervention as insurer of last resort, this model is not always implemented to its full extent. One problem is that it may be difficult to implement mandatory insurance on the basis of risk-dependent premiums when vulnerable groups, especially those living in areas that may be affected by disasters, cannot afford to pay risk-related premiums. The answer to that problem is to introduce a system of vouchers that individual homeowners would receive on the condition that specific risk-reducing

"The solution to those facts is not to simply use the public purse to provide more ex post compensation after yet another disaster took place."

measures would be taken. The advantage of this model is that insurance premiums still reflect risk, increasing risk awareness of potential victims. The voucher system, which again only provides subsidies if specific risk-reduction measures are introduced, can also avoid the charity hazard related to ex post government compensation (Kunreuther 2008).

Specific design issues may arise. In France, the mandatory insurance is coupled with a mandatory additional premium for the disaster cover (of 12%) laid down in legislation. That may unnecessarily restrict competition (Van den Bergh and Faure 2006). Ideally the intervention of the government as insurer of last resort should also require risk-related premiums (Levmore and Logue 2003), which is more than often not the case (Bruggeman, Faure and Heldt 2012). The NFIP provides subsidised premiums that do not sufficiently reflect risk, and thus do not provide adequate incentives for disaster risk reduction. For that reason the NFIP has been criticised.

An important political problem is that politicians often impose the introduction of mandatory comprehensive disaster schemes, since ad hoc compensation gives politicians larger political benefits than investments in ex ante prevention (Depoorter 2006). A proposal in Germany

to introduce mandatory disaster insurance in 2004 failed for a similar reason (Schwarze and Wagner 2007). In spite of these implementation challenges, it remains important to realise that only a holistic integrative perspective to disaster response, taking into account the fact that the design of ex post compensation can have a crucial influence on the ex ante incentives for disaster risk reduction, is the only way towards a sustainable solution for disaster response.

5. Towards a sustainable solution

The statistics and predictions are clear: climate change will lead to more storms, heavy rains and hurricanes, all leading to increasing damage. The solution to those facts is not to simply use the public purse to provide more ex post compensation after yet another disaster took place. It is urgently needed to think ex ante about the preparedness for the inevitable disaster before it strikes again. That preparedness also entails working out a structural ex post compensation mechanism which provides appropriate incentives for disaster risk reduction. Mandatory comprehensive disaster insurance, supported by a government intervention as insurer of last resort, can reach that goal and should therefore be implemented at a much larger scale than is currently the case.

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Towards a Holistic Approach to Disaster Response

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