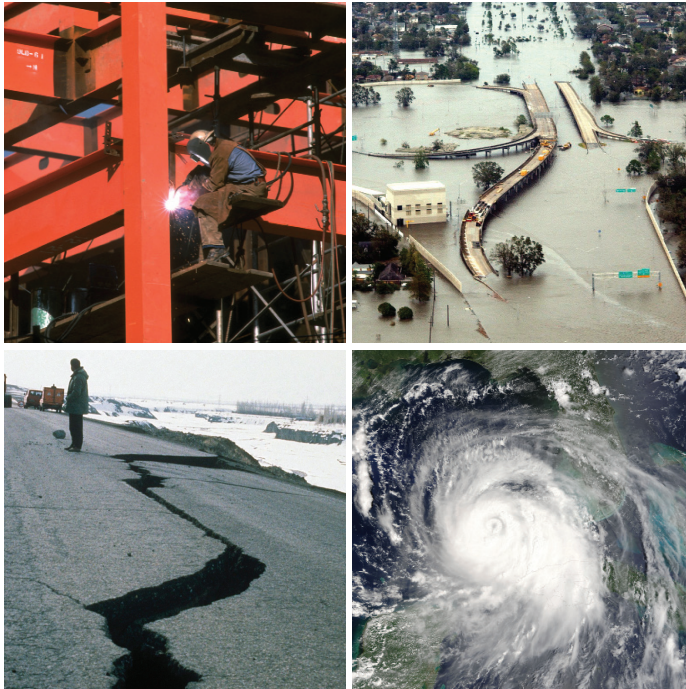


Building Resilience to Natural Disasters: A Framework for Private Sector Engagement



World Economic Forum

in cooperation with

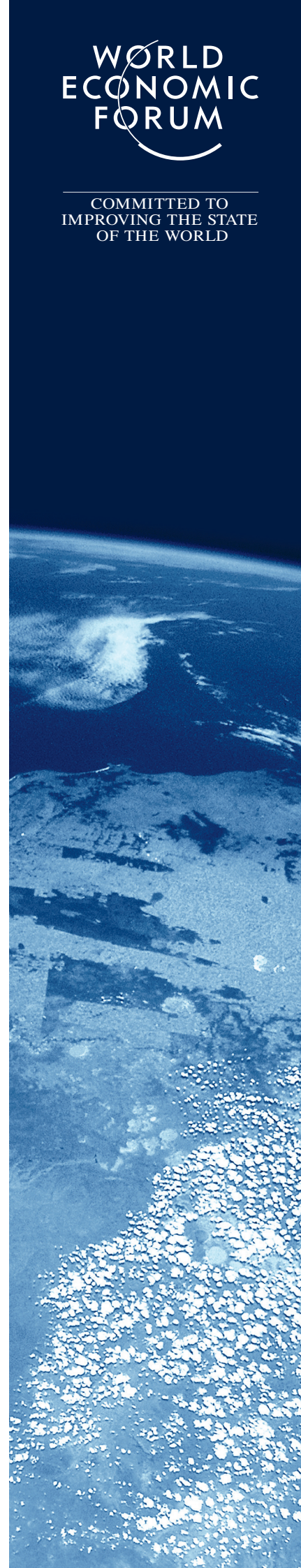


THE WORLD BANK



United Nations
International Strategy for Disaster Reduction

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World Economic Forum

91-93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland
Tel.: +41 (0)22 869 1212
Fax: +41 (0)22 786 2744
E-mail: contact@weforum.org
www.weforum.org

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Contents

Preface	4
Introduction: Natural Disasters 2007 – Unprecedented Costs, Unprecedented Opportunities	5
Overview: Private Sector Priorities and Rationale	7
Catalysing Deeper Industry Engagement	17
For Further Study	18
Footnotes	18

Preface

This report is part of a series of multistakeholder projects aimed at catalysing action on key global challenges. The unprecedented frequency and costs of natural disasters and the projected increase of their severity due to climate change are posing significant economic challenges and new risks for vulnerable populations. New approaches and investments aimed at building resilience to natural disasters are required by all actors to help stem future losses. New frameworks for cooperation are emerging and the financial savings from such investments in resilience promise to be significant.

To deepen understanding of the private sector's role in building resilience, the Forum facilitated a year-long series of dialogues in New York, New Delhi, Cape Town, Washington DC and Geneva involving a total of approximately 200 participants from corporations, governments, academia and civil society. Organized in partnership with the World Bank and the United Nations International Strategy for Disaster Reduction (UNISDR), these dialogues were augmented by private sector interviews conducted in partnership with Dalberg Development Advisors and with input and review from the International Finance Corporation, the US Department of Homeland Security and the Prevention Consortium.

Based on these consultations, this report recommends a series of concrete actions that key industries can take, in collaboration with governments and civil society, to strengthen the global capacity to withstand disasters. *Building Resilience* also presents dialogue participants' broader findings for mainstreaming resilience into core business activities. As such, the report serves as a preliminary roadmap for deepening industry engagement in disaster risk reduction and for catalysing innovative public-private partnerships (PPPs) for this purpose.

With the impacts and costs of natural disasters significantly influenced by the collective approach to their management, this report concludes there is ample opportunity for realigning investment to reduce future losses. *Building Resilience* aims to make a contribution to current thinking on how best to use these opportunities to address the growing global challenge posed by natural disasters.

The World Economic Forum would like to thank its team that managed this project in partnership with the World Bank and UNISDR and drafted the final report: Shruti Mehrotra, Associate Director, Humanitarian Relief and Disaster Management; Annabel Hertz, Global Leadership Fellow, Partnerships for Humanitarian Relief and Disaster Management; and Jesse Fahenstock, Associate Director, Global Risk Network. The Forum also thanks Fabienne Stassen Fleming, Senior Editor, Kamal Kimaoui, Associate Principal, Production and Design, and Kristina Golubic, Graphic Designer.



Richard Samans,
Managing Director,
World Economic Forum

Introduction:

Natural Disasters 2007 – Unprecedented Costs, Unprecedented Opportunities

In 2007, the world witnessed unprecedented financial losses due to natural disasters.¹ Over the last year, South Asia, West Africa, Latin America, the Caribbean, Europe and North America have all suffered significant losses from earthquakes, wildfires and floods. The number of natural disasters has grown from an average of 150 a year in 1980 to over 450 a year.

According to Swiss Reinsurance Co. projections, the flooding in Great Britain and Hurricane Dean in the Caribbean will cost the global reinsurance industry US\$ 35 billion, compared to US\$ 12 billion for natural disasters in 2006.² The rapid growth in catastrophic insurance claims underscores current Intergovernmental Panel on Climate Change (IPCC) projections for climate change related trends that increase the severity and frequency of floods, hurricanes and other extreme weather events.

However, no industry projections capture the undocumented or uninsured losses in developing countries. Moreover, IPCC assessments for a global mean loss of 1-5% of gross domestic product (GDP) per 4 degrees Celsius of warming project that developing countries will experience larger GDP percentage losses, and costs will be significantly higher than the aggregate for high exposure populations with low adaptation capacity.³

These impacts are magnified by population growth, urbanization and the industrialization of areas such as fluvial plains and coastlines, which have historically served as ecological buffer zones to disasters. In some cases, such as the US Gulf states, insurers may no longer offer policies to populations in hurricane prone or other high risk areas.

In an interconnected world, losses incurred from natural disasters affect individuals, critical public infrastructure and ecosystems on which individuals and firms depend, as well as the broader economic and increasingly complex environment in which the public and private sectors operate. Thus, new investments aimed at building resilience⁴ to natural disasters are required by all actors to help stem future losses.

The financial savings from increased investments in resilience promise to be significant. For example, according to the US National Institute of Building Sciences, after the consolidation of losses, approximately 90% of disaster-related expenditures currently go towards relief and reconstruction, whereas for each one dollar invested in prevention, four dollars can be saved in disaster response costs. Further cost-benefit analyses of such investments are being developed by Provention Consortium.

Moreover, the ability to “bounce back” from natural disasters is increasingly relevant for companies with global operations as well as for local industries. The growing sensitivity of the global economy to supply chain disruptions has heightened each company's stake not only in formulating business continuity plans but in extending its core business practices and competencies towards ensuring the overall stability of the economic environment. Investments by locally established international firms can be critical to smaller economies that cannot offset losses with public financing.

In this context, new frameworks for cooperation and for mainstreaming resilience are emerging. For example, the Hyogo Framework for Action on Disaster Reduction (adopted by 168 governments in 2005) and the UN International Strategy for Disaster Reduction established national platforms for disaster risk reduction seeking to solicit private sector input into resilience strategies. Provention Consortium's efforts to mainstream resilience into international financial institutions' lending policies provide a model for mainstreaming resilience in project financing.

In September 2007, the European Union announced a Global Climate Change Alliance to help poor countries prepare for natural disasters and “climate proof” development and poverty reduction strategies, including through the use of systematic climate risk assessment tools.⁵

However, even with the growth in costs and opportunities associated with disasters, the private sector has remained engaged in resilience through specific projects rather than comprehensive, industry or cross industry-wide initiatives. Moreover, corporations face the challenge of competing priorities when considering resiliency measures or partnerships.

To further assess these challenges and identify ways to catalyse greater private sector engagement, the World Economic Forum facilitated a year-long series of dialogues in 2006-2007 in New York, New Delhi, Cape Town, Washington DC and Geneva, involving a total of approximately 200 participants from corporations, governments, academia and civil society to consider private sector priority contributions and the potential of PPPs for replicating successes.

These dialogues, organized in partnership with the World Bank and the UN International Strategy for Disaster Reduction, were augmented by private sector interviews conducted in partnership with Dalberg Development Advisors.

This report presents the dialogue participants' "priority actions" and their broader findings for mainstreaming resilience into core business activities. As such, this report can serve as a preliminary roadmap for deeper industry engagement and for catalysing innovative PPPs.

With the impacts and costs of natural disasters largely determined by the collective approach to their management, there are ample opportunities for realigning investment to markedly reduce future losses.

Overview: Private Sector Priorities and Rationale

The framework below was utilized by dialogue participants to elaborate activities for the private sector in building resilience. Four general areas of opportunity were established in reference to four areas of potential losses associated with natural disasters (see Figure 1).

Pursuing each of the four areas of opportunity in tandem creates a more systematic approach to building resilience. For example, the better the monitoring and preparedness for natural disasters, the more effectively communities can prioritize socio-physical investments to offset potential losses which, in turn, helps limit physical and broader economic damage, creating clear financial incentives to reinvest in monitoring and communication (see Figure 2 - pg. 8).

As direct beneficiaries of risk transfer and loss reduction, **Financial Services and, more specifically, Insurers & Reinsurers** are best

positioned to assess and evaluate the risks of natural disasters. However, each industry is in a strong position to leverage its expertise. For example, **Engineering & Construction** firms have a clear standard-setting role in land use planning and building design.

ICT & Telecom can introduce the best monitoring and communications systems, while **Utilities & Transportation** provide critical infrastructure and contingency services that are critical for business continuity and emergency management during natural disasters.

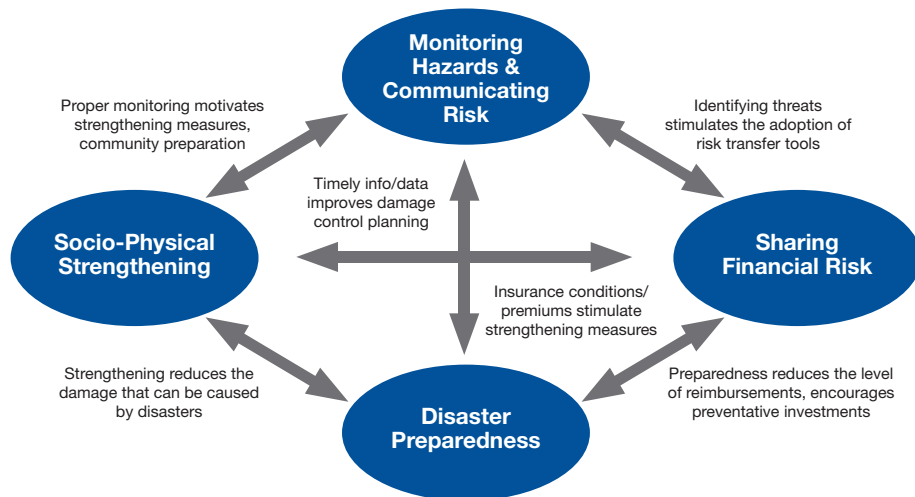
However, the opportunities available to all industries are numerous. For example, because of the strong link between natural disasters and epidemics, **Pharmaceuticals & Health** have a major role in providing early-warning diagnostic kits to communities and campaigning for medical preparedness.

Figure 1: Opportunities Pertaining to Potential Losses (examples)

Potential Losses	Areas of Opportunity			
	Monitoring Hazards & Communicating Risk	Socio-Physical Strengthening	Sharing Financial Risk	Disaster Preparedness
Natural & environmental resources and buffer zones	Forecasting, loss modelling, satellite reporting, diffusion of information and links to communities	Dams/sea walls, watershed and floodwater management, irrigation services, environmental standards	Weather derivatives	Flood management, GIS databases
Built environment	Automatic alarm systems, community warning systems, reporting and public transparency for infrastructure risk assessment	Land use planning, building codes, construction standards & oversight, retrofitting, sewerage draining, community classification	Disaster insurance pools, catastrophe bonds, mandatory catastrophe insurance for business and homeowner loans	Contingency service plans, sewerage draining, desalination plants, protection of power sources
Business & economic continuity	Business information kiosks	Supply chain resilience, disaster proof screening of investments/loans	Index-based insurance, risk swaps, micro-insurance	Staff training, market for redundancies, diversification of communications technologies
Human & social capacity	SMS warnings to mobile users, diagnostic kits, inclusion of disaster management into education and curricula	Campaigns for vaccinations and against slash-and-burn agriculture (forest-fire prevention) and terracing in rural areas	Reporting/public transparency for infrastructure risk assessment, microinsurance	Early-warning alarms and systems, shut-down and evacuation plans, emergency facilities, online inventory of emergency supplies, digital platforms for disaster management

Source: Dalberg Development Advisors

Figure 2: Areas of Opportunity Are Mutually Reinforcing



Source: Dalberg Development Advisors

Due to the extent of their reliance on and use of the natural environment, **Agriculture & Extractive** industries have substantial opportunities to invest in natural buffer zones as well as irrigation, flood and watershed management and technologies, while **Manufacturing** firms are critical to the success of supply chain protection and best practices.

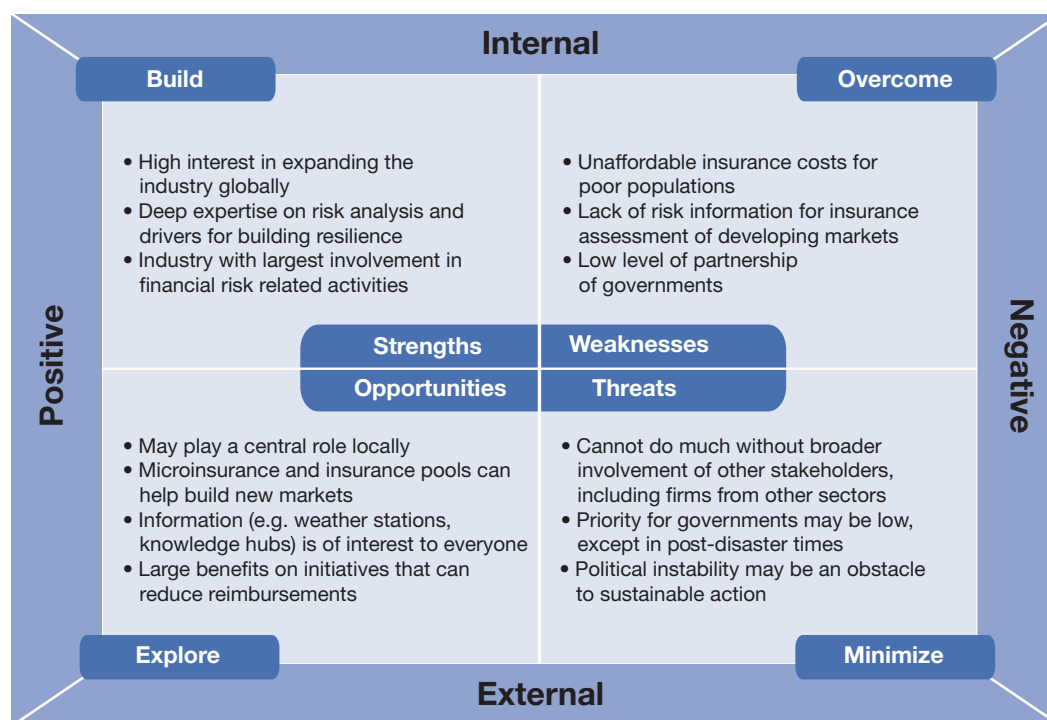
Travel & Tourism also has enormous outreach capacity given the number of communities in which the industry operates and the extent of its supply chain. Additionally, it has a vested interest in maintaining the overall health of economies from both the perspective of consumers as well as from that of stable environments for travel.

Finally, by highlighting the need for new approaches to disaster prevention, **Media & Entertainment** can raise awareness of these issues through news and popular culture.

The Forum identified four industry communities that have historically been the most active in or relevant to building resilience to explore particular opportunities and recommend priority actions: **Insurers & Reinsurers, Engineering & Construction, ICT & Telecom and Utilities & Transportation**. For each industry, public-private partnership models were examined with a view to identifying appropriate "lessons learned".

Insurers & Reinsurers

Insurers & Reinsurers have a special role to play in that they can help spur other industries to build resilience by linking all the relevant measures they have taken to insurance policy premium discounts. Indeed, participants noted that the more the industry could mobilize other industries, the more it would reduce its own future disbursements. A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis, however, demonstrates that a lack of market information and a need to act with other industries pose obstacles to wider action:



SWOT Analysis: Dalberg Development Advisors

Priority Actions

- 1. Classify communities at risk and proactively communicate findings.** By sharing “public good” information more widely, insurers can help the general public, businesses and governments make better informed decisions regarding the planning, siting and purchasing of residential and industrial developments, including supply chain operations. Raising the profile of risk-related information can thus increase the accountability of all sectors in avoiding future losses.

Market Development: Mexico’s Modelling Software

Description: Universidad Nacional Autonoma de Mexico’s (UNAM) current efforts to develop software, based on methodology already in use by Mexico’s government, will give insurers tools to calculate losses and run scenarios for damage, helping to rationalize pay-out policies, align risks with the market and better regulate industry.

Opportunity: Replicate through government–industry partnerships

Translating risk information into community-based early-warning systems is a related priority:

**Community Warning:
Mozambique Flood Warning System**

Description: This system is sponsored by Munich Re and GTZ through which certain villagers have been nominated for measuring daily precipitation and water levels at strategic points. Critical situations are reported via radio and, if widespread, an alarm is raised. A system of coloured flags is used to signal a flood warning and pre-designated helpers are sent out armed with megaphones to raise the alarm. Areas at risk are evacuated.

Opportunity: Replicate through government–industry partnerships

2. Develop innovative insurance products – including weather-based insurance – for (untapped) markets, linked to microlending and telecommunications networks. In addition to mechanisms offering microinsurance products that build into existing microcredit or housing credit schemes, weather indexed and crop insurance were mentioned as high priorities for facilitating adaptive measures in drought prone countries. These models require long-term thinking and links to farmers already using cell phones to communicate weather information.

**Innovative Mechanisms:
African Climate Adaptation Development Programme**

Description: Swiss Re’s programme, based on the company’s success in providing low-income markets with weather risk transfer instruments in India, will provide drought insurance to rural African villages.

Opportunity: Replicate model with governments and villages

3. Promote the use of catastrophe bonds. As an alternative to reinsurance, these bonds will protect national economies in the event of a natural disaster that could bankrupt the state, though participants recognized that no catastrophe has triggered the use of this mechanism; therefore, the final impacts of the insurance are still untested. However, as Mexico’s Treasury Secretariat is now also analysing the potential for issuing bonds to protect public finances against hurricanes, there may be scope to create a model with broader criteria for replication in other countries.

**Catastrophe Bonds:
Mexican Parametric Earthquake Bond**

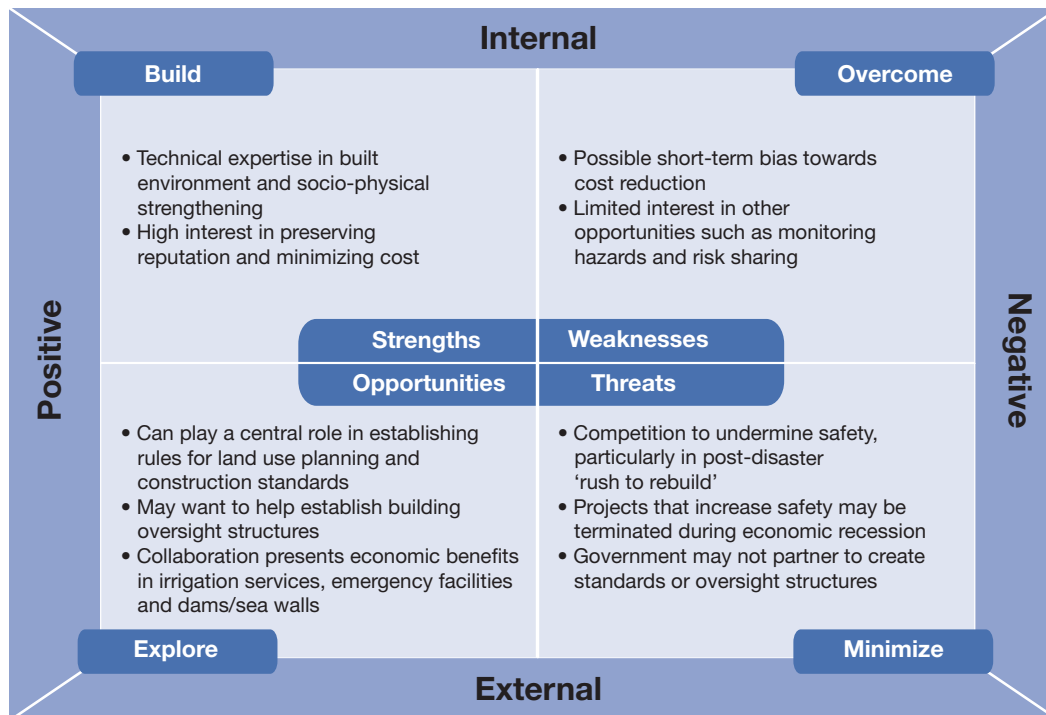
Description: Designed to optimize insurance for public assets and sponsored by the Mexican government, Swiss Re and the World Bank, these bonds pool insurance for lower premiums and for hedging the federal disaster budget. Fixed payments are made in the event of earthquakes above a certain magnitude.

Opportunity: Replicate arrangement with governments globally, expand to include hurricanes and other natural disasters

Engineering & Construction

Engineering & Construction firms are critical to building resilience, since a majority of loss of life in natural disasters is the result of building collapse. According to the SWOT analysis, the industry can be hampered by 1) the tendency for governments to “rush to rebuild” after a natural disaster, creating an atmosphere in which firms may cut back on safety in order to win bids, 2) the tendency to abandon resilience-building activities during economic downturns or shocks.

However, the priority actions identified envision the development of new product and business lines and the opportunity to reduce liability and increase a reputation for quality. The greater the transparency and public awareness, particularly during rebuilding periods, the greater the firm is able to establish higher standards in conjunction with strengthened legislation.



SWOT Analysis: Dalberg Development Advisors

Priority Actions

1. Target retrofitting of vulnerable buildings in seismic zones. It is estimated that more than half of human casualties from earthquakes are the result of unsafe infrastructure. This is particularly relevant with populations increasing in urban cities where buildings and overall living conditions are unsafe.

Retrofitting: Seattle's Project Impact

Description: This programme targeted the most vulnerable homes – typically wood-frame houses built before the 1970s which are held on a concrete foundation by gravity. It offers a free set of pre-engineered plans for homeowners (so an engineer is not needed), a fast-track procedure to execute the bolt-down work, training for homeowners/contractors and a tool-lending library.

Opportunity: Construction-material retailers can partner with communities to diffuse standards and technology

2. Ensure that land use planning is based upon principles of resilience. The costs of all subsequent interventions are reduced if risks are identified initially, and high-risk areas are properly zoned to avoid buildings and infrastructure altogether. Taken together with retrofitting, this approach offers significant impacts on future losses:

Land Use Planning: British Earthquake Consortium for Turkey (BECT)

Description: Following the 1999 earthquake in Turkey, **with the sponsorship of the Turkish and British governments** and British engineering and construction firms, BECT pooled corporate expertise and resources to identify earthquake-resilient areas better suited for industrial and residential development.

Opportunity: Replicate model in other disaster exposed regions

3. Strengthen standards and oversight. It is particularly important to ensure that the legal requirements of building codes adhere to the highest safety standards, including norms that are above those required by law. It was noted that in the wake of disasters, governments are often under humanitarian and political pressure to rebuild and therefore may be prone to hiring the most competitive bidder whose safety standards may be lower than the “ethical” minimum.

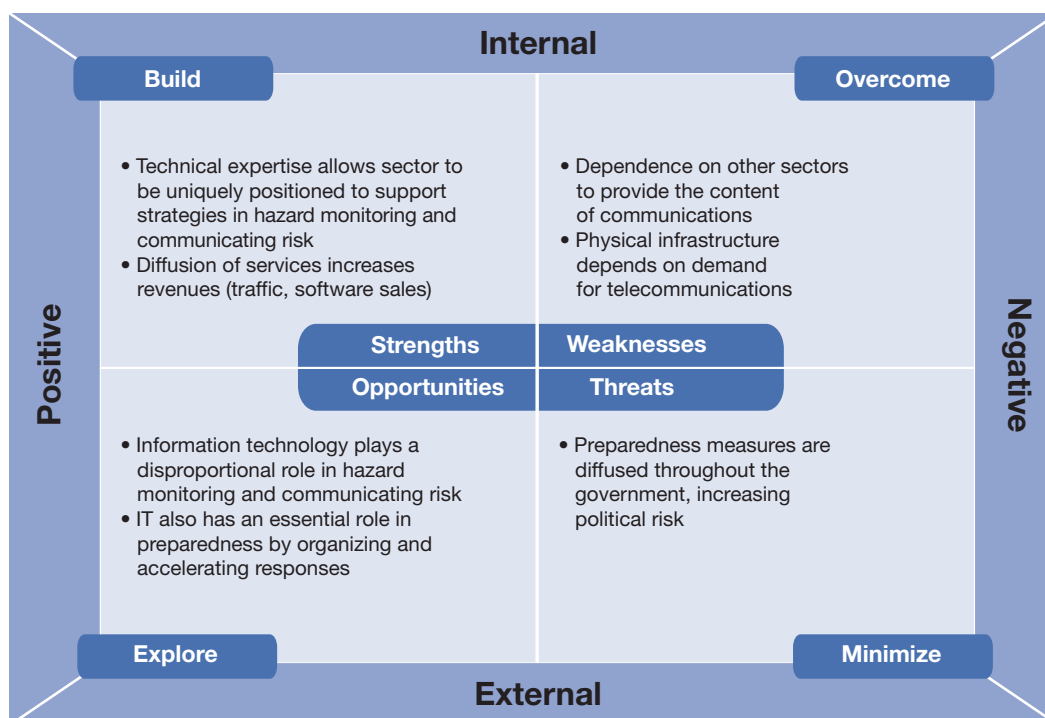
Standards and Oversight: Fiji Building Standards Committee

Description: Private firms oversee the preparation of a National Building Code, which sets minimum standards to reduce disaster-related losses and hurricane insurance premiums. Upgraded homes are inspected by an engineer and issued a certificate, which is required to obtain cyclone insurance and mortgages.

Opportunity: Replication by Engineering & Construction firms partnering with the insurance industry

ICT & Telecom

Through their major role in expediting and making natural-disaster management faster and more effective, Information Communication Technology (ICT) and Telecommunications (Telecom) companies benefit from the provision of new systems and services that improve communication and coordination. The application of new technologies to existing systems also holds promise for making resilience more effective. As the SWOT analysis indicates, however, industry contributions require market demand and economies of scale for technology or the content that is provided by partners:



SWOT Analysis: Dalberg Development Advisors

Priority Actions

1. Convey risks and resilience building in innovative ways. The increasing use of the Internet as a public awareness and educational tool, and marketing vehicle, presents numerous opportunities for communicating risk and mobilizing resources for resilience.

For example, companies can provide **Internet connected kiosks** to largely unconnected rural communities in order to convey disaster-relevant information. Internet search companies can donate **advertising space to promote resilience** or **sponsor online competitions** for students to come up with planning solutions. Telephone

manufacturers and service providers can provide users with **emergency information via text** or emergency phone numbers as part of their monthly calling plans.

Online donations pledged for natural-disaster relief could be pooled to finance resilience measures in affected countries. (The majority of individual donations to communities experiencing natural disasters are processed through NGO websites.)

Knowledge Hub:
South Asian Floods

Description: By providing a regional flood information hub for South Asia (Bangladesh, Bhutan, China, India, Nepal, Pakistan), this public-private partnership aims to promote cooperation in the sharing of hydro-meteorological information, leading to reduced vulnerability by providing timely/reliable warnings to save lives and property.

Opportunity: Replicate model in other regions, in partnership with IT and media firms

2. Diversify technologies used for early-warning systems and disaster management.

Specifically, it is necessary to create scalable, back-up communication systems that can work across various technologies (e.g. bandwidths, analogue or digital radios).

For example, further to the 2007 earthquake in Peru, national telecom operators and the Transport and Communications Ministry will create a special emergency phone network connecting the presidential office, the police and fire departments and health institutions.

Technological Diversification:
EGERIS

Description: Launched in 2003, EGERIS demonstrates how systems can combine GPS, GSM, PMR (Professional Mobile Radio) and other technologies to give first responders in Europe real-time information for disaster management for use by various European authorities. EGERIS equips responders with hand-held portable devices linked to mobile command-centre vehicles, which in turn interface with broader efforts.

Opportunity: Replication by governments and ICT firms

3. Create real-time databases for use by decision-makers and the general public.

These databases allow the rapid assessments of disasters/emergencies, enabling resources to be mobilized quickly. Services such as Google Maps can provide a global GIS-based platform for these databases.

Real-time Data:
National Database for Emergency Management

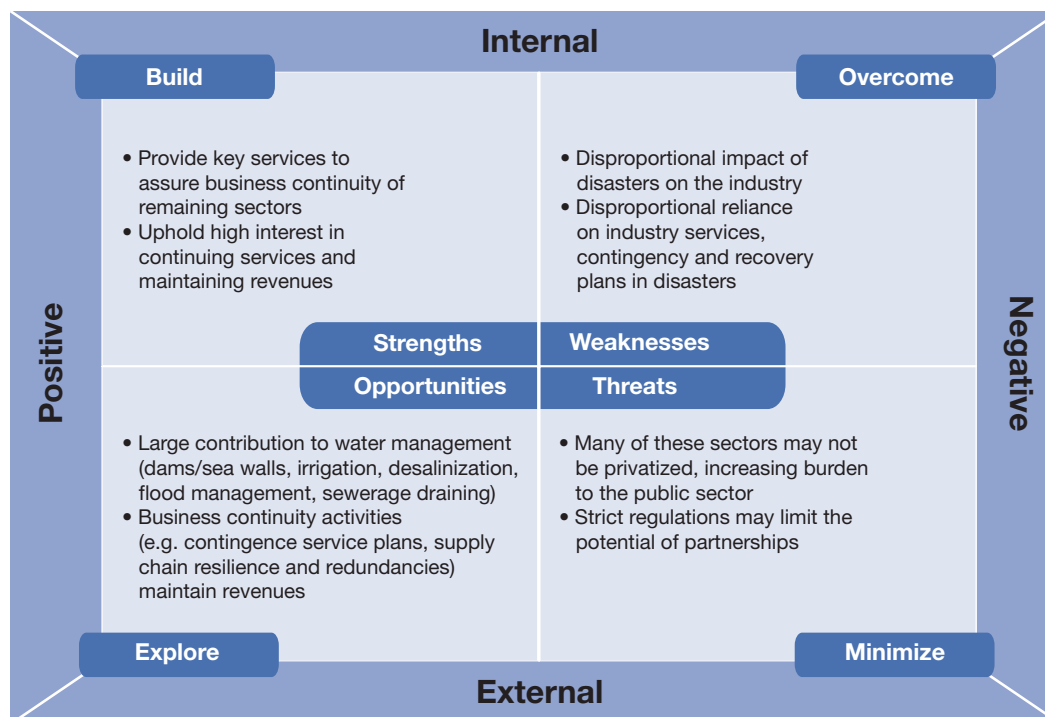
Description: India's Ministry of Home Affairs' (MHA) GIS-based platform for Decision Support includes hazard zoning, incident mapping, natural resources and critical infrastructure at risk, resources available for response, and real-time satellite imagery. This allows quick assessments of a disaster's impact and the planning of adequate resource mobilization.

Opportunity: Leverage online geographic databases such as Google Maps to provide a global GIS-based platform

Utilities & Transportation

By protecting their physical plants and supporting infrastructure, Utilities & Transportation industries gain revenue from the provision of uninterrupted service and the extension of existing services. Moreover, business continuity of dams, pipelines, power plants and roads is critical for all other industries to function. Thus, resilience in critical industries can prevent exponential damage. The water sector, for example, is indispensable to most other sectors while relying on the energy sector to power its equipment and on the transportation sector to deliver supplies.

However, as the SWOT analysis shows, where utilities are not privatized, the burden for resilience may fall disproportionately on the public sector, increasing the need for private sector support for critical infrastructure protection either directly or through taxes. Of particular importance to participants was the water sector and related availability of fresh water supplies for drinking and irrigation:



SWOT Analysis: Dalberg Development Advisors

Priority Actions

1. Reinforce infrastructure. Based upon independent quality assurance and natural hazard impact assessments, the resilience of the system and the weaknesses of components must be determined. **For power utilities, high standards of inspection, rehabilitation and maintenance of dams must be established.** The vulnerable components of water, power and telephone lines at risk in floodplains need to be raised or buried in order to be protected during floods. Water

treatment plants need to protect chemicals from being released into floodwaters.

For flooding, preventative maintenance, particularly the **regular maintenance and reinforcement of levees**, is critical. Highway agencies and railway companies can map flood hotspots and coastline surge patterns for more **rigorous audits and the maintenance of drains and sewer systems**.

2. Create contingency service plans and products. For power companies, the installation of permanent generators in designated evacuation sites can help guarantee back-up services during emergencies. Similarly, water and sanitation companies can invest in desalinization plants in the dry zones of flood prone areas to draw water from the ocean and provide freshwater to populations. This can be done in partnership with companies that maintain bottling plants or mobile water tanks to help ensure regional distribution.

Moreover, anticipating increased flooding and sea level rises, and as a supplement to local flood and levee management, the Dutch water management company, Waternet, is exploring **designated areas that can be flooded** – and potential rooftop catchments on offices – to deal with excess water during floods.

Agreements with private bus and other transport companies, for example, could help ensure populations at risk are evacuated, building on the example of the free or subsidized transport of relief supplies provided by British Airways, FedEx, DHL and UPS after the 2004 South Asian Tsunami.

3. Establish early-warning alarm systems.

The resilience of individual utilities can be tested through regular drills that require staff to practise contingency plans and test emergency radio and other systems. Pilot projects for early-warning systems can help test both contingency plans and the effectiveness of alarm systems. Industry associations can extend existing broadcasts to a signal over the Internet that would be converted to an auditory alarm to alert employees and customers, and automatically initiate shutdown procedures.

**Automatic Alarm:
Japan's Seismic Early-warning System**

Description: Launched in 2006 and financed by participating companies, the system rapidly analyses an emerging seismic event and alerts railway operators, construction firms and other businesses 10 to 30 seconds before an earthquake starts with the goal of shutting down power plants and speeding trains.

Opportunity: Replicate model with associations and governments in other seismic zones

Catalysing Deeper Industry Engagement

In addition to the priority actions for industry specified above, the dialogues pointed to the general need for accelerating the integration of the private sector into existing platforms and activities, and for helping create an enabling environment for policy reform, corporate leadership and innovation.

The overall trend in natural-disaster management still emphasizes event-specific responses over prevention, and private sector leadership for stand-alone pilot projects over comprehensive, cross-industry approaches.

Dialogue participants identified the following necessary broader steps for increasing the engagement of the private sector in efforts to build resilience:

1. **Governments should maintain their central role in strategic agenda setting, but reach out more systematically to the private sector.** The majority of resilience PPPs have been created in a context of public expectations for government accountability, with governments still maintaining primary responsibility for action. However, a more targeted outreach could help tap private sector engagement. Participants reiterated that during the general mobilization and relief efforts that follow each disaster, governments can highlight the private sector role in resilience measures that reach far beyond the current disaster.
2. **Insurers & reinsurers should take a stronger lead in championing all sectors' efforts.** While these industries have already undertaken leadership and pilot projects in building resilience, greater mobilization requires an even stronger role. Although they need to take action in tandem with other industries, these industries are nevertheless best positioned to lead other industries. Visible and vocal champions are critical in this endeavour.
3. **Companies should integrate better cost-benefit analyses for resiliency measures into their business strategies and communications.** As long as these costs remain vague, it is more difficult for companies to effectively champion prevention. Even as methodologies for elaborating the cost-benefit analysis of resiliency measures are still being developed, it is valuable for businesses to raise awareness of global business impacts, quantifying the cost of past losses as well as the cost of the specific resiliency measures undertaken, particularly through the media.
4. **Industry champions should increase community involvement and raise the public visibility of the priority actions they undertake.** At the local level, champions can provide incentives such as community needs assessments, signing ceremonies with local officials and the involvement of SMEs for effective implementation. These activities should be linked to public outreach campaigns, for example on disaster-proof building standards, marketing "safety" more prominently (i.e. the "seismic security" of housing) and promoting resilience as part of business advertising.
5. **Businesses should channel input into national-disaster platforms and strategies linked to a high-level government process or office.** Business can channel their input into local, national, regional and global natural-disaster prevention planning, including the UN's International Strategy for Disaster Reduction, for example through a global private sector advisory group. Conversely, governments could employ chief risk officers to liaise with companies, and create an institutional home for related PPPs under government affiliated auspices.
6. **Companies should develop PPPs that employ their core competencies and test mechanisms and models in highly vulnerable countries.** PPPs that engage corporate leaders and build capacity directly, rather than through philanthropic initiatives, make better use of corporate expertise and result in more sustained company involvement. To this end, the expectations of PPPs should be clear from the outset (e.g., will companies contribute funds, research or experience?).
7. **The private sector should increase its support for improvements in public sector capacity and the public sector should enhance incentives for private sector action.** Companies should make the case, in a highly visible way, for increased funding for more public goods research, such as weather stations, that communicate risk information to the public, and for public infrastructure and related expenditures in general. To incentivize the private sector, governments can provide tax credits to companies that undertake relevant activities.
8. **Financiers should incorporate considerations related to natural-disaster resilience in lending arrangements.** An evaluation of natural-disaster management plans when private banks consider financing investment opportunities will help establish the link between business sustainability and resilience. The International Finance Corporation, for example, currently requires disaster risk insurance for all of its investments and loans, helping to set industry standards.

For Further Study

The momentum created in the immediate aftermath of natural disasters has generated short-term partnerships and recent examples of innovation in each priority area that could help set new standards and best practices. **However, a benchmarking process for building resilience still needs to be developed and made clear and consistent,** perhaps through the development of industry indicators.

However, even before establishing industry benchmarking tools, companies should consider including **natural-disaster resiliency metrics in their Corporate Social Responsibility reporting** or as part of their sustainability efforts. This would help them pioneer new best practices, standards setting and accountability. Companies have a critical role to play in **documenting and disseminating best practices and linking them to a corporate strategy for building resilience.**

Following on these multistakeholder discussions and the preliminary recommendations to be issued at the World Economic Forum Annual Meeting 2008, possible areas of further work include:

- Industry feedback on the report with a view to further community engagement, possibly in the context of regional fora and other venues where innovative PPPs can be developed;
- The creation of pilot projects;
- Further research, including industry specific work and the input of experts;
- The dissemination of best practices at the regional, national or municipal level.

Footnotes

¹ Natural disasters include earthquakes, floods, droughts, landslides, volcanoes, tsunamis, wildfires and severe storms such as hurricanes, cyclones, typhoons and tornadoes.

² Associated Press, 10 September 2007. www.swissre.com

³ Intergovernmental Panel on Climate Change, Working Group II. *Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability* (Summary for Policy-makers).

⁴ Building resilience can be defined as any activity that strengthens the capacity of societies to withstand and minimize the human and financial losses resulting from natural disasters.

⁵ EUROPA. "EU Commission proposes a global alliance to help developing countries most affected by climate change." 18 September 2007. <http://europa.eu/>



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