New Approaches on Public Private Partnerships for Disaster Resilience

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Advisory Resources for Best Practice Examples

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Executive Summary

In the September 2011 Senior Disaster Management Officials Forum and subsequent November high level dialogue, APEC ministers committed to facilitate Public-Private Partnerships (PPPs) to strengthen APEC economies’ emergency preparedness and expedite recovery from disasters. Following up on this commitment, the United States funded this study to identify progress made in the region to develop and sustain new PPPs in the area of disaster resilience.

A resilience-based approach to disaster management is needed to enhance the ability of economies to withstand and recover from the impacts of natural disasters and emergencies. In essence, disaster resilience is about the ability to manage change and recover from impacts without compromising long-term prospects. Experience of economies throughout the APEC region proves the importance of a multi-stakeholder approach to disaster resilience that engages the private sector at every stage in the disaster risk mitigation, preparation, response, and recovery process.

The report gathers best practice examples from across APEC demonstrating successful private sector engagement to build disaster resilience. The selected case studies exemplify the potential benefits of cooperation between government, businesses and the not-for-profit sector to build resilient communities, industries and crucial infrastructure and services. These best practice examples were grouped under six categories and include the following:

1. **Resilience Efforts at the Economy Level**: A few economies have developed frameworks to help advance a resilience-based approach to disaster management through strategic engagement of the private sector in resilience efforts. These frameworks are based on the understanding that shared responsibility across all sectors of society is needed. Case studies in the category include:
   - Australia - National Disaster Resilience Strategy - p. 10
   - United States - The Private Sector Division of the US Federal Emergency Management Agency - p. 15

2. **Partnerships for Improved Community Resilience**: The resilience of a community is determined by its capability to organize itself both prior to and during times of need. Communities must be able to recover from disaster impacts without compromising long-term prospects. Businesses have much to contribute to community resilience – beyond financial resources this includes physical assets, technology, and expertise. In doing so, they do not only help meet community needs but also create business benefits, such as greater brand visibility or employee satisfaction. Case studies in the category include:
   - Chinese Taipei – Employing 7-ELEVEN chain stores for early warning - p. 19
   - Philippines - Building Preparedness Capabilities of Local Government Units and Communities - p. 24

3. **Business Contributions to Reducing Risks through Recovery (Building Back Better)**: Disaster recovery needs to go beyond restoring and reconstructing physical structures and living conditions. Instead it needs to adopt a long-term perspective and enable a greater level of resilience by integrating...
risk reduction concerns into recovery efforts. To help realize this opportunity of ‘building back better’ business needs to be engaged before, during and after natural disasters. Case studies in the category include:

- Indonesia – Coordinating Engagement of Engineering and Construction Companies in Disaster Response. - p. 29
- Thailand- Providing a flood-resilient village design for high-risk community - p. 33
- United States – From Disaster Fund to long-term Investment in Resilience Planning - p. 36

4. Collaborative Efforts to Enhance Business Resilience: Businesses provide employment, goods and services, and in many economies operate critical infrastructure services. At the same time, they consume public and other private sector services. Business resilience is a public interest as business disruptions can lead to major economic losses and can significantly impact the long-term growth of economies. Governments therefore share the responsibility of ensuring business resilience. Case studies in the category include:

- United States – Information Sharing Platform for Business Continuity - p. 43

5. Collaborative Efforts to Enhance Infrastructure Resilience: Critical infrastructures provide essential services on which the community depends such as power, water, health, communications systems and banking. In most APEC economies critical infrastructure is privately owned or operated on a commercial basis. It is the infrastructure owners and operators who best understand the risk they face and who can best determine necessary risk mitigation strategies. Case studies in the category include:

- Australia – Critical Infrastructure Resilience Strategy - p. 48
- Australia - Water Sector Mutual Aid Agreement - p. 52
- Malaysia - Improving Emergency and Operating Procedures for Hydropower Stations - p. 55
- New Zealand - Assessing Infrastructure Vulnerability and related Community Impacts - p. 57

6. Partnerships for Pre-Disaster Risk Financing through Agricultural Insurance: Disaster relief and reconstruction costs are immense and in many economies a large part of these costs are not insured. When insurance coverage is low, it is mostly governments that have to absorb these costs. Agricultural insurance plays a significant role in reducing risks in those economies that depend on food production. Insurance reduces a farmer’s exposure to crop failures and related income losses and thus increases their ability to invest in farm productivity (Swiss Re 2011). Case studies in the category include:

- PRC – Reinsuring Beijing’s Agricultural Insurance Scheme - p. 61
- Vietnam – Pilot Agricultural Insurance Scheme - p. 65

Throughout the APEC region evidence can be found for the effectiveness of private sector engagement in resilience efforts. Case studies identified through this study report represent singular examples of successful partnerships between government, business and non-governmental organizations. With few exceptions, these examples do not stem from concerted effort at government level but rather from the innovative thinking and leadership of committed individuals, singular authorities, organizations or businesses. To encourage greater private sector engagement there is a need for the public sector to:
• play an active role in building business understanding of a resilience-based approach to disaster management and advocating collaborative endeavours,

• better understand and communicate business opportunities of collaborative efforts for disaster resilience,

• organize multi-sector fora that enable regular dialogue, sharing of best practices and lessons learned, and to

• establish strategic approaches, mechanisms and frameworks for public-private collaboration, that encourage the creation of new and innovative ways for business engagement.

Understanding and capabilities of both the public and private sector need to be built in order to move from singular success stories to cooperative, mutually beneficial efforts at larger scale.
Introduction

In the September 2011 Senior Disaster Management Officials Forum and subsequent November high level dialogue on disaster resiliency in Honolulu, APEC ministers committed to facilitating Public-Private Partnerships (PPPs) to strengthen APEC economies’ emergency preparedness and expedite recovery from disasters. The Minister’s Declaration at the conclusion of the forum called for action on the following items:

- Provide businesses with tools to help them prepare
- Facilitate the movement of goods and services during disasters
- Promote community based approaches
- Support research and education
- Promote public-private partnerships

Building on those recommendations the United States conducted a self-funded study to identify progress made in the region to develop and sustain new PPPs that embody the principles endorsed at the APEC High Level Policy Dialogue on Disaster Resiliency, share strategies for successfully implementing those programs, and identify common elements through best practice case studies which can be adopted and replicated by other APEC economies.

This study benefits from information provided by numerous APEC economy representatives, established literature on the subject of public private cooperation to promote disaster resilience, and inputs from private sector and other expert contacts.

The study begins with a short overview of disaster resilience, followed by a description of the potential benefits of public-private cooperation to improve the resilience of communities and economies to the effects of natural and man-made disasters. These introductory sections are followed by a series of case studies that highlight interesting and innovative partnerships established in APEC economies. Finally, a conclusion section distills several key themes occurring throughout the case studies.

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Disaster Resilience

The APEC High Level Policy Dialogue on Disaster Resiliency in November 2011 highlighted the importance of reducing disaster risks and strengthening community resilience. Across the APEC region it is increasingly being recognized that a resilience-based approach to disaster management is needed to enhance the ability of economies through the region to withstand and recover from the impacts of natural disasters and emergencies.

The definition of ‘disaster resilience’ differs slightly depending on the context in which it is being applied. However, at the core of all definitions is the need to build capacities and capabilities to adapt to change and recover from impacts. The text box below describes the definition of disaster resilience being used for this report.

**Defining Disaster Resilience**

“The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.”

UN/ISDR, Terminology on DRR, 2009

“Disaster Resilience is the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses - such as earthquakes, drought or violent conflict - without compromising their long-term prospects.”

DfID, 2011

The application of the definition of disaster resilience is informed by the context – “resilience of whom or what?” – as well as the hazard – ‘resilience to what?’. In the context of communities, resilience is determined “by the degree to which the community has the necessary resources and is capable of organizing itself both prior to and during times of need” (UN/ISDR 2009, UN/ISDR Terminology on Disaster Risk Reduction).

The need to enhance the organizational capacities of communities both before and after a disaster emphasizes the importance of a holistic approach. This holistic approach draws together all areas of disaster management (prevention/mitigation, preparedness, response, and recovery) in a manner in which they complement and enhance one another. Application of a holistic approach is equally important in the context of business resilience and the resilience of critical infrastructures and services.

The Australian Government’s approach to Critical Infrastructure Resilience includes the new concept of ‘organizational resilience’. This concept requires organizations (including both businesses and government agencies to develop enhanced capacity to manage unforeseen or unexpected risks in order to ensure continuity of operations. The ‘disaster resilience’ approach acknowledges that it is not possible to foresee, plan or mitigate all kind of potential risks or hazards. Unforeseen or unexpected risks and hazards require building ‘adaptive capacity’ which is determined by the pool of assets, expertise and resources that can be mobilized during times of needs.
Importance of Private Sector Engagement

Experience of economies throughout the APEC region has time and again proven the importance of a multi-stakeholder approach to disaster resilience that engages the private sector at every stage in the disaster risk mitigation, preparation, response, and recovery process. In many cases, the public and private sectors have common goals and can create important synergies when they can pool resources to monitor, assess, and address risks. Without strong collaboration, different members of the public and private sector may each attempt to promote disaster resilience in patchwork manner, which can result in gaps and overlaps in effort. Achieving integrated and coordinated disaster resilience requires shared responsibility. When effective coordination between public and private stakeholders is established, this can initiate a virtuous cycle, where improved information and communication motivates better planning and investments in building more resilient communities. The figure below summarizes this cycle.

Figure 1 – Virtual Cycle of Increased Public Private Coordination for Disaster Resilience

Adapted from: Dalberg Development Advisors in World Economic Forum, 2008

The United States Federal Emergency Management Agency (FEMA) has identified the following eight general benefits of public-private partnerships for disaster resilience:

1. **Enhanced situational awareness.** The public and private sectors both rely on timely information on disaster risks to make sound decisions related to planning, operations, customer and employee safety, and supporting communications. Information may include such things as real-time situation updates, the likelihood or severity of disaster risks, the availability of relief supplies from local vendors, or the status of operation of elements of the critical infrastructure. Information may be shared through structured situation reports or through other forms such as Twitter feeds, verbal accounts, or video/photo submissions.
2. **Improved decision-making.** Access to more complete, timely, and accurate information contributes to better risk assessment and mitigation strategies by both government and the private sector. For examples, both government agencies and businesses are better able to design and implement their risk mitigation strategies when they better understand what potential risks exist, their likelihood, what others are doing to mitigate these risks, and what resources are available that might be leveraged in the case on an emergency.

3. **Increased access to resources.** Cooperation between the public and private sectors tends to increase the availability and improve the efficient use of resources dedicated to disaster resilience. Resources are defined broadly to include not only goods and services, but also the strategic and technical knowledge of leaders from the private and public sectors.

4. **Expanded reach and access for communication efforts.** Communication is crucial to vital to the effectiveness of disaster resilience, preparedness and recovery efforts. Prior to a disaster, it is important to share information on how best to prepare businesses, institutions and households for potential disasters. In the time of disasters, it is vital to share information on how to respond and where to seek resources. Leveraging private sector networks provides additional avenues to access vital information.

5. **Better coordination with other efforts by segments of the private sector.** Both the public and private sectors are involved in all stages of the emergency management cycle. Close coordination through ongoing partnerships improves planning, preparedness, and response by all participating. This coordination may be facilitated by regular meetings of representatives of the public and private partners, but is increasingly being organized through virtual networks of stakeholders. These networks not only share information and pool expertise to improve resilience, but also provide a mechanism to coordinate partners in the case of an emergency response situation.

6. **Increased effectiveness of emergency management efforts.** Public-private partnerships improve the strength of emergency management through increased mutual understanding of all parties involved. All parties are better equipped to take appropriate action when preparing for or responding to an emergency when they understand the capabilities, limitations, and requirements of all involved public and private entities.

7. **Strong relationships, built on mutual understanding.** Strong working relationships are crucial to the successful management of emergencies of all types. Proper coordination both prior to and during an emergency relies on mutual respect of all stakeholders, and understanding and appreciation for the important role that each stakeholder plays. If these relationships are established well before a disaster hits, the result is faster, more effective response and recovery.

8. **More resilient communities.** Improvements in collaboration, coordination and communication between government and private sector partners ultimately increases the capacity of communities and localities to prevent, protect against, respond to, and recover from major incidents.

The benefits of government-business cooperation for disaster resilience have borne themselves out through the experiences of numerous economies in the APEC region. For example, several economies have established networks or councils of public and private sector stakeholders aimed at improving the flow of information on disaster risks and mitigation strategies (see the Florida Business Continuity
In other cases, new technologies have been leveraged to ensure that real-time information on disaster risks can be more easily disseminated (see the Chinese Taipei and 7-ELEVEN partnership p Error! Bookmark not defined.).

There are certain industries within the private sector in which the government may have a special interest in promoting and establishing partnerships. For example, several economies have established specific strategies to ensure the continuity of services by operators of critical infrastructure, such as water, electricity, and distributors of basic goods, such as grocery stores and gas stations (see Australia Critical Infrastructure Resilience Strategy, p. 48). In several cases these Strategies are accompanied by working groups that regularly exchange on issues related to disaster risk reduction and response (see Australia National Disaster Resilience Strategy, p. Error! Bookmark not defined.).

Similar initiatives have also been developed with the engineering and construction sectors of some economies to better facilitate repairs to the infrastructure in the wake of a disaster (see Indonesia: Disaster Resource Partnership, p. 29). In addition, some economies have engaged in industries that might pose some risk to the surrounding communities if materials are not properly handled, for example the fertilizer and chemical industries (Mexico Cooperation with the Chemical Industry Association, p. 40).

**Best Practice Examples of Cooperative Approaches for Disaster Resilience**

The present report gathers best practice examples from across the APEC region that demonstrate successful private sector engagement in building disaster resilience at various levels and sectors. In identifying best practice examples the focus was on initiatives that contribute to:

- Understanding, communicating and reducing risks
- Understanding, communicating and reducing vulnerabilities
- Preparedness planning and capability development
- Recovery strategies that account for long-term needs

The selected case studies exemplify the potential benefits of cooperative approaches between government, businesses and the not-for-profit sector to build resilience of communities, industry sectors and crucial infrastructure and services.

These best practice examples fall under six main categories:

**Resilience Efforts at the Economy Level**

A few economies have developed frameworks to help advance a resilience-based approach to disaster management that includes a more strategic engagement of the private sector in resilience efforts. These frameworks are based on the understanding that shared responsibility across all sectors of society is needed. They aim to advance cooperative relationships for a more effective disaster management.

The following best practice examples have helped guide progress and consolidate lessons learned on private sector engagement. Their successful implementation draws from strong inter-governmental
commitment and the abilities of a leading institution to convene a multi-sector forum that provides benefits to all involved.

- Australia: National Disaster Resilience Strategy (NDRS)
- United States: The Private Sector Division of the US Federal Emergency Management Agency (FEMA)

Partnerships for Improved Community Resilience

The resilience of a community is determined by its capability to organize itself both prior to and during times of need. The aim is to enable communities to recover from disaster impacts without compromising long-term prospects.

Businesses have much to contribute to community resilience – beyond financial resources this includes physical assets, technology, and expertise. In doing so, they do not only help meeting community needs but also create business benefits, such as greater brand visibility or employee satisfaction. The following best practice example show that collaborative efforts between the private and public sector can help leverage resources and expertise for community resilience and create beneficial outcomes for all involved.

- Chinese Taipei – Employing 7-ELEVEN chain stores for early warning
- Malaysia - Enhancing Public Disaster Awareness and Preparedness Through School Programs
- Philippines - Building Preparedness Capabilities of Local Government Units and Communities

Business contributions to reducing risks through recovery (building back better)

Disaster recovery needs to go beyond restoring and reconstructing physical structures and living conditions. Instead it needs to adopt a long-term perspective and enable a greater level of resilience by integrating risk reduction concerns.

The increased public awareness, multi-sector engagement and significant private sector contributions made after a disaster, provide an opportunity to ‘build back better’. To help realize this opportunity business needs to be engaged before, during and after natural disasters. In doing so, understanding of disaster management needs and capabilities can be build which will enable effective disaster risk reduction in a post-disaster context.

The private sector contributes significantly to disaster response and recovery efforts through the provision of financial and in-kind donations as well as expertise. A few specialized companies are being employed to support recovery efforts such as construction and engineering companies. The following best practice examples show how business can make sustained contributions through engagement beyond donations or contractual employments.

- Indonesia - Coordinating Engagement of Engineering and Construction Companies in Disaster Response
• Thailand- Providing a flood-resilient village design for high-risk community
• United States – From Disaster Fund to long-term Investment in Resilience Planning

Collaborative Efforts to Enhance Business Resilience

Businesses provide employment, goods and services, and in many economies operate critical infrastructure services. At the same time, they consume public and other private sector services. Continuity of business operations is thus key to mitigating the effects of a disaster and encouraging swift recovery after a disaster. Small and medium-sized enterprises (SMEs) are particularly vulnerable to disasters or other major disruptive events. They form important parts of other businesses’ supply chain, but have fewer resources at hand to assess and mitigate risks.

Business resilience is a public interest as business disruptions can lead to major economic losses and can significantly impact the long-term growth of economies. Governments share the responsibility of ensuring business resilience. The following best practice examples show how strong business-government collaboration can help enhance disaster preparedness and business continuity. Such partnerships are needed to help those companies with fewer resources at hand to develop own contingency plans and systems.

• Mexico – Business-Government Agreement for Resilience of Chemical Industry
• United States: Florida Business Continuity Information Network

Collaborative Efforts to Enhance Infrastructure Resilience

Critical infrastructures provide essential services on which the community depends such as power, water, health, communications systems and banking. In most APEC economies critical infrastructure is privately owned or operated on a commercial basis. It is the infrastructure owners and operators who best understand the risk they face and who can best determine necessary risk mitigation strategies.

Critical infrastructure systems are typically highly interdependent. Failure or disruption in one sector can lead to disruptions in other sectors. For example, most infrastructure sectors, such as water or telecommunications, rely on electricity.

The following best practice examples showcase effective business-government partnerships that have brought together the different infrastructure sectors in a non-competitive environment. These partnerships have helped build resilience by enhancing capacities of both business and government and by establishing channels for effective communication and information sharing.

• Australia – Critical Infrastructure Resilience Strategy
• Australia - Water Sector Mutual Aid Agreement
• Malaysia - Improving Emergency and Operating Procedures for Hydropower Stations
• New Zealand - Assessing Infrastructure Vulnerability and related Community Impacts
Partnerships for Pre-Disaster Risk Financing through Agricultural Insurance

Disaster relief and reconstruction costs are immense and in many economies a large part of these costs are not insured. When insurance coverage is low, it is mostly governments that have to absorb those losses. Governments are expected to pay for relief and recovery efforts and finance the reconstruction of public infrastructure or even support private rebuilding efforts. Insurance can reduce the financial burden of disaster recovery on governments.

But insurance companies themselves are at risk from significant losses – losses related to excessive amount of claim expenditures, for example, when a natural disaster affects an insurer’s client base. Reinsurance provides insurance coverage for insurance companies. In the light of major disasters reinsurance helps insurers to manage their risks by absorbing some of their losses.

Agricultural insurance plays a significant role in reducing risks in those economies that depend on food production. Insurance reduces a farmer’s exposure to crop failures and related income losses and thus increases their ability to invest in farm productivity (Swiss Re 2011)

The following best practice examples introduce public-private partnerships in the agricultural insurance sector that have helped absorb the financial consequences of disasters. They contribute to an economy’s resilience by help prepare for those risks that cannot be mitigated.

- PRC – Reinsuring Beijing’s Agricultural Insurance Scheme
- Vietnam – Pilot Agricultural Insurance Scheme
Resilience Efforts at the Economy Level

- Australia: National Disaster Resilience Strategy (NDRS)
- United States: FEMA Private Sector Division
AUSTRALIA: NATIONAL STRATEGY FOR DISASTER RESILIENCE

Brief Description

The National Strategy for Disaster Resilience (the Strategy) was adopted by the Council of Australian Governments (COAG) in February 2011.

The Strategy is the result of government collaboration to reform disaster management approaches in Australia. In the context of Australia’s susceptibility to natural disasters, COAG oriented this new strategy around a whole-of-nation resilience-based approach to disaster management. This approach acknowledges that a national, coordinated and cooperative effort is needed to enhance Australia’s capacity to withstand and recover from emergencies and disasters (COAG, 2011).

Key elements underlying the strategy include:

- **Multi-hazard:** While the Strategy focuses on natural disasters, the approach it articulates is also applicable in preparing communities to deal with other disasters such as pandemic, animal disease and terrorist events (COAG 2011).

- **Whole-of-government approach:** In the context of Australia’s constitutional arrangements, state and territory governments have responsibility for emergency management within their jurisdictions (Darby 2011). The Strategy emphasizes the need for collaboration across and within governments of all levels on all phases of disaster prevention, preparedness, response and recovery. (COAG, 2011)

- **Shared responsibility:** The Strategy promotes shared responsibility; in which political leaders, governments, business and community leaders, and civil society all contribute to achieving integrated and coordinated disaster resilience (COAG 2011). The Strategy recognizes the importance of aligning responsibility for risk with those best positioned to make effective and informed decisions.

Based on the understanding that resilience is a collective responsibility the Strategy outlines the roles of government, business, the non-government sector and individuals in enhancing Australia’s capacity to withstand and recover from emergencies and disasters. It sets out concrete steps that government agencies at all levels can undertake to reduce risks posed by natural disasters and better support communities to recover from disasters. It also promotes actions communities and businesses may take to be more self-reliant and prepared to take responsibility for the risks they face. (COAG, 2011)

The figure below summarizes the major roles of the four players.
Figure 2 – Role of Government, Business, Individuals, NGOs and Volunteers in Australia’s National Strategy for Disaster Resilience

Source: Adapted from COAG 2009

The National Strategy for Disaster Resilience is supported by seven strategic priorities that can be summarized as follows:

1. **Leading change and coordinating effort:** Leadership is required at all levels of government and within businesses and communities to ensure that all parties understand their roles and responsibilities in all phases of disaster prevention, preparedness, response and recover

2. **Understanding risks:** Disaster resilient communities are communities that understand local disaster risks, how they might affect the community, and how to mitigate their impacts. Promoting the development and sharing of knowledge of these risks is central to improving the disaster resilience of the nation.
3. **Communicating with and educating people about risks:** It is not enough for the government or industry to have knowledge about disaster risks, this information must be shared between the private and public sectors and communicated to the community.

4. **Partnering with those who effect change:** Partnerships between the public sector, private sector, academia and non-profit organizations can yield important synergies and improve the flow of information regarding potential disaster risks and effective mitigation strategies. Joint actions can lead not only to more efficiency, but also helps to develop the relationships needed to respond effectively in the face of a disaster.

5. **Empowering individuals and communities to exercise choice and take responsibility:** It is not enough that individuals, businesses and communities have accurate information about disaster risks in their localities. They must also understand how potential disasters will affect their communities and operations and have the capacity to develop and implement strategies to mitigate the disruptions caused by such disasters.

6. **Reducing risks in the built environment:** Information on the nature and likelihood of disaster risks must be incorporated in the planning and construction of the physical infrastructure. This should include both land use planning and building standards.

7. **Supporting capabilities for disaster resilience:** To promote effective a resiliency, all organizations need to understand and be capable to take on their roles in the case of a disaster. Further, local plans for disaster response and recovery should not only aim to resolve the immediate needs of the communities, but also consider community vulnerabilities and measures for disaster risk reduction (CAOG 2011).

**Progress on Implementation**

Since the adoption of the Strategy in February 2011, implementation has been proceeding apace. An Implementation Plan was created that describes Ministerial decisions and lays out priority actions, responsibilities, deliverables and timeframes. The plan includes actions to be undertaken by the Australia-New Zealand Emergency Management Committee (Australia's national senior officials emergency management forum), and other relevant intergovernmental and non-government bodies. Over the course of implementation, the plan is evolving in order to better achieve the Strategy’s seven strategic priorities (Ward, 2012).

A major focus of the first 18 months of the Strategy’s implementation has been building stronger relationships with the private sector. This engagement has helped to bring about some significant achievements in the critical infrastructure and insurance sectors. Work has also focused on small and medium sized enterprises (SMEs).

- **Insurance sector:** In response to the 2010-11 floods, the Federal Government rolled out a set of new regulations to standardize the definition of ‘flood’ used in home building, home contents, small business and strata title insurance policies. Additionally, it is moving to require that consumers of this kind of insurance be provided a one-page fact sheet with key information about their policies. The Insurance Council of Australia (ICA) also made changes to its Industry Code of Practice to provide clear timeframes for claims handling, including during declared catastrophes. In addition to this work, the ICA is creating a building materials resilience rating.
tool, which will help homeowners and homebuyers assess the resilience of individual properties to the major climate risks faced in each region of Australia.

− **Critical Infrastructures:** The Strategy supports measures to develop business-government partnerships to enhance the resilience of Australia’s critical infrastructure through the Trusted Information Sharing Network. More information on the work in this area is provided in the Critical Infrastructure Resilience case study (see p.48).

− **SMEs:** Australian governments are working to improve business continuity planning for SMEs for better disaster preparedness and resilience. The Federal Government is reviewing and updating Government web-based information on this subject to ensure it is accessible and easily understood. The Federal Government is also making efforts to ensure greater and regular liaison between small business officials and officials from emergency management authorities. These authorities along with Federal Government quantitative research agencies (such as the Bureau of Meteorology and Geoscience Australia) have access to real time information about impending threats and scale needed for preparatory action by SMEs.

The focus of much of the initial work related to the Strategy has been on business engagement over the short to medium term. For example, the National Disaster Resilience Communication Strategy aims to make an impact in the short term by providing the public with more accurate information about the disaster risks facing their communities and businesses. In the medium term, improved land use planning and improving access to risk information and hazard mapping will create the policy environment and capacity to build more resilient communities.

### Lessons Learned and Potential for Replication

The initial experience in implementing the Strategy reinforces the observation that disaster resilience is most effective when it is a shared responsibility across all sectors of society. To succeed, it will be important that business and community leaders, as well as the not-for-profit sector, embrace this approach.

Improving disaster resilience at the national level is a long-term process that requires continual effort and cannot be fully achieved in a set timeframe. Under Australia’s federal system of government, agreement on such a process needed to be achieved through an effective governance structure that was able to endorse and drive activities across the federal, state and local governments. In Australia, implementation of the Strategy is driven by the Standing Council on Policing and Emergency Management (a Ministerial level council) and the Australia-New Zealand Emergency Management Committee. Improving resilience nationally requires continuous commitment from senior government and emergency management officials but also requires the joint commitment and concerted effort of all sectors of society. (Ward 2012).

### Sources


UNITED STATES: FEMA PRIVATE SECTOR DIVISION

Brief Description

The FEMA Private Sector Division was created to provide a permanent mechanism to implement FEMA’s approach to private sector engagement. Since its foundation, the Private Sector Division has been undertaking a number of strategies to “develop meaningful public-private partnerships and facilitate private sector innovation and networking across FEMA” (FEMA 2012 A). This portfolio of activities promotes a whole community approach to disaster readiness, response, and recovery. The initiatives currently led by this office include:

- **National Business Emergency Operations Center (NBEOC):** The NBEOC is FEMA’s clearinghouse for information sharing between public and private sector stakeholders to prepare for, respond to, and recover from disasters. NBEOC membership is voluntary and open to all private sector stakeholders, including large and small businesses, associations, universities, think tanks, and non-profits.

- **Private Sector Representative Program:** Ninety day rotation of a nominated member of the private sector into the National Response Coordination Center (NRCC), and serve as resident member of the NBEOC.

- **Training Opportunities:** Works with training providers such as the Emergency Management Institute and the Center for Domestic Preparedness to develop and promote training opportunities for the Private Sector on all stages of the emergency management process.

- **Tabletop Exercises:** Starting in 2010, they have provided access to tabletop exercises designed to help organizations to test their readiness to respond to a hypothetical situation, such as a natural or man-made disaster.

- **Grants:** Starting in fiscal year 2011, the Homeland Security Emergency Management and Tribal Grant Programs were opened up to allow the use DHS grant funding to support the public-private collaboration. Suggested uses of grant funding include, but are not limited to: (1) support for the salary of a public-private partnership coordinator or facilities for coordination activities; (2) support for software and tools to promote communication and information sharing between the public and private sectors; (3) funding for joint training and exercises; and (4) support for meetings, events and conferences.

In addition to these initiatives that operate on a continual basis, the FEMA Private Sector Division also helps to organize events to raise the profile of the strong potential of increased cooperation between the

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Private Sector Division Purpose Statement

“Communicate, cultivate and advocate for collaboration between the U.S. private sector and FEMA, to support FEMA’s capabilities and to enhance national preparedness, protection, response, recovery, and mitigation of all hazards.”

Private Sector Division Vision Statement:

“Establish and maintain a national reputation for effective support to our private sector stakeholders through credible, reliable and meaningful two-way communication.”

Source: “About Us” FEMA Private Sector Division Website, 2012.
private and public sectors to strengthen the economy’s resilience to disasters. In 2011, FEMA organized the first national conference on “Building Resilience through Public-Private Partnerships,” which brought together 250 participants in person and additional attendees by webcast. This conference was repeated in July 2012, bringing together more than 300 attendees, including 156 from the public sector and 145 from the private sector (81 for-profit, 48 non-profit and 16 academia). Topics discussed were diverse, including defense, international, youth preparedness, faith-based initiatives, as well as private sector needs (FEMA 2012 B).

**Progress to Date of Implementation**

During the first four years of the FEMA Private Sector Division, the staff has noticed a continued, significant growth in the use of PPPs for disaster resilience and response. This growth is relatively widespread, but has been strongest in those areas that experience frequent disasters, such as Florida and Louisiana. This growth can be attributed both to a general increase in the use of PPPs as well as the strong outreach of FEMA and those in their network. The national conferences have been well attended, increasing in attendance from 2011 to 2012. In 2011, FEMA increased private sector participation in its National Exercises from around 65 organizations to well over 3,000, and its tabletop exercises have been downloaded more than 8,000 times, showing strong interest of all stakeholders. Also, local liaisons have been established all of FEMA’s 10 Regions, to help to promote the development of PPPs (FEMA 2012 C).

Their work on promoting information sharing between the public and private sectors during emergencies has also yielded positive results. Prior to a disaster, private sector entities register to be a part of FEMA’s disaster partner list. During a disaster, the private sector representative resident in the NRCC gathers and disseminates crucial information to the list including up-to-date information on the availability of services and open/close status of suppliers and retailers. This information helps all parties to better coordinate their activities and ensures the provision of supplies not locally available.

**Lessons Learned and Success Factors**

In its experience through the past few years, FEMA has discovered that the most effective public-private partnerships have similar core attributes. FEMA has come up with the acronym “PADRES” to describe these attributes, which stands for: Publicly Accessible, Dedicated, Resourced, Engaged, and Sustainable. The attributes are further described as:

- **Publicly Accessible**: The contacts, leadership, skills, information, resources, and capabilities of the collaborative partnership are recognized by, available to, and accessible by the general public. This ensures that before, during, and after an incident, the general public has trust and confidence in the partnership to provide accurate and timely information and meaningful services.
- **Dedicated**: Successful partnerships have identified a full-time liaison or other organizational structure to staff and manage the public-private partnership and implement the partnership’s strategic plan.
- **Resourced**: Resourced partnerships have funding, facilities, tools, and staffing available to support partnership efforts.
• **Engaged:** There should be active support, participation, and two-way communication by public and private sector leadership and members in a successful partnership. The partnership actively trains, exercises, prepares, responds, recovers, and mitigates.

• **Sustainable:** Sustainable partnerships are supported by strategic plans, funds, and resources necessary for long-term viability. Activity takes place around the year, and throughout the emergency management cycle** (FEMA D).

From its establishment about four years ago, the FEMA Private Sector Division has rapidly expanded the set of activities and services they provide. This strong growth can be attributed in part to dynamic leadership, both within FEMA and with private sector partners. The development of new initiatives has been the result of a willingness to take calculated risks, and build on existing successes. Most importantly, however, this progress has been the result of a process of relationship and trust building. The office, including its leadership, looks for ways to maintain communication with stakeholders in the private sector and local governments. This communication is conducted through multiple channels, including a list-serve that disseminates information and data, personal letter from the director to all new applicants to the private sector list, outreach by local liaisons, and regular learning events and conferences to get people engaged on a person-to-person basis.

**Sources**


Partnerships for Improved Community Resilience

- Chinese Taipei: Employing 7-ELEVEn chain stores for early warning
- Malaysia: Enhancing Public Disaster Awareness and Preparedness Through School Programs
- Philippines: Building Preparedness Capabilities of Local Government Units and Communities
CHINESE TAIPEI: DISSEMINATING DISASTER INFORMATION THROUGH 7-ELEVEN'S CHAIN STORES

Brief Description

The Office of Disaster Management launched a project in late 2011 and early 2012 to recruit convenience chain stores as means to undertake situation reporting and information dissemination. The aim was to provide better access to up-to-date information during emergencies in order to help townships’ emergency response operations to work more effectively and efficiently (Li and Chen 2012).

The Uni-President Corporation, which manages 7-ELEVEN chain stores in Chinese Taipei was the first partner willing to participate in the project. One of the largest corporations in Chinese Taipei, Uni-President owns a dense network of 7-ELEVEN chain stores, numbering over 4,800 retail outlets throughout the economy. The store is particularly prevalent in urban areas, where over 70 percent of the population of Chinese Taipei lives (Li 2012). Given this expansive network, 7-ELEVEN has the potential to support emergency preparedness at a much localized level. Furthermore, the dense distribution of 7-ELEVEN creates an important opportunity to collect early warning data for natural disasters at community level. This is particularly advantageous as 7-ELEVEN operates twenty four hours a day, seven days a week. In critical situations, such as the approach of a typhoon, stores can promptly disseminate information to customers and facilitate situation reporting (Li and Chen 2012).

To facilitate the dissemination of information, each 7-ELEVEN is equipped with a LCD panel at the cashier’s station with an interface that displays and disseminates relevant emergency information. During the 2012 typhoon season (May to October) 7-ELEVEN has been piloting the use of these LCD panels to inform customers of the flood potential in the immediate area and to provide real-time typhoon tracking information. In case of flood conditions, salesclerks at 7-ELEVENs report their observations of water levels on a real-time basis to the Water Resource Agency, the government agency responsible for flood management. Information related to confirmed cases of flooding will be disseminated to agencies responsible for emergency operation during typhoon or floods (Li and Chen 2012).

Lessons Learned and Success Factors

The initial piloting of this information dissemination effort during the 2012 typhoon season has proved to be successful. Because 7-ELEVEN provided real-time weather information to its customers in the past, customers were receptive to the additional information provided by the upgraded system. In turn, the increased information helped 7-ELEVEN as well, because the information appears to stimulate sales of umbrellas or disposable raincoats when people become aware of the potential rain.

Objectives of Initiative:

To provide better access to up-to-date information during emergencies in order to help townships’ emergency response operations to work more effectively and efficiently.

Source: Li and Chen 2012
Furthermore, the collaboration between the Office of Disaster Management and Water Resources and 7-ELEVEN has been strong. National Center for Disaster Reduction expert Wei-Sen Li credits the strength of this collaboration on three factors:

1) 7-ELEVEN has a long-standing commitment to providing strong customer service
2) The Office of Disaster Management and Water Resources had the necessary IT resources to achieve end-to-end information integration and dissemination; and
3) Top-down policy discussions and the bottom-up response were well managed to efficiently reach consensus on this issue.

While the pilot was successful in improving the dissemination of information, the Office of Disaster Management and Water Resources is currently considering additional efforts to target people not adequately captured by this effort and raise public awareness. For example, while 7-ELEVENS are readily available throughout urban areas, they are less prevalent in rural and remote areas. The Office of Disaster Management and Water Resources is currently considering alternatives to better reach these segments of the population.

**Potential for Replication**

Plans for replication of the approach within Chinese Taipei are already underway. At the time of the publication of this report, the Office of Disaster Management and the Water Resource Agency were in contact with other chain stores to explore the willingness to join. Eventually, over 3,000 additional state-run and private gas stations may also become involved in the joint operation of flood situation reporting (Li 2012).

Furthermore, given the prevalence of 7-ELEVEN stores and other similar chain stores globally, this model may represent an interesting option for dissemination of disaster-related information elsewhere in the APEC region.

**Sources**


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MALAYSIA: ENHANCING DISASTER PREPAREDNESS OF SCHOOLS THROUGH POPULAR CARTOON CHARACTERS

Brief Description:
In 2008 AnimasiaStudio Sdn. Bhd. (Animasia) and MERCY Malaysia entered into a partnership to build a culture of disaster preparedness amongst students. MERCY Malaysia is a non-profit organization working on medical relief, sustainable health related development and disaster risk reduction activities for vulnerable communities in both crisis and non-crisis situation. Animasia is a major animation service provider in Malaysia. “Bola Kampung” a.k.a. “Football Kidz” is one of the company’s most popular television series for children aged four to fourteen. Mixing football and traditional village lifestyle, the story illustrates the transformation of a group of characters from different backgrounds.

One of MERCY Malaysia’s key programs is the School Preparedness Program that seeks to raise awareness and understanding of disaster risk reduction. The program includes a school preparedness workshop for students and a disaster risk reduction workshop for teachers:

1. The school preparedness workshop engages students in discussions on disaster preparedness needs at home and at school, in a risk mapping exercise of school facilities, and in the preparation of action plans for hazard and risk reduction. It further introduces evacuation procedures and early warning communications. The workshop typically culminates in a student-led performance to deliver disaster awareness lessons to other students, families and friends.

2. Supported by the Ministry of Education, the disaster risk reduction workshop trains teachers in community-based disaster risk management, preparedness needs and hazard mapping. The workshop is designed as a training of trainers (TOT) and introduces a school preparedness workshop module. Participants are sought to implement the module at their schools and thus help expand the reach of Mercy Malaysia’s school preparedness program.

The School Preparedness Program has been conducted in numerous schools throughout Malaysia, typically, focusing on disaster-prone locations. Since the start of the program in 2007, 5424 students from 149 schools participated in the school preparedness workshop and 520 teachers have been trained through the Disaster Risk Reduction Workshop. The program aims to build a culture of disaster preparedness and increase the capacity of primary and secondary schools to respond to disasters.

Animasia’s popular ‘Bola Kampung’ characters were used as ambassadors of MERCY Malaysia’s School Preparedness Program. Animasia contributed creative ideas and artwork design to Mercy Malaysia for developing materials that help build understanding of disaster preparedness in primary and secondary schools. These materials included a video, posters, workbooks, flashcard games and board games. The studio further mobilized its business associates who sponsored 3,500 ‘Bola Kampung’ t-shirts and provided other merchandise such as DVDs, bags and stationaries.

Objectives of Initiative:
The partnership between MERCY Malaysia and Animasia contributes to building a culture of disaster preparedness and increasing the capacity of primary and secondary schools to respond to disaster. Characters of a popular cartoon series are used to convey disaster preparedness messages.
Animasia’s contribution to MERCY Malaysia’s School Preparedness Program has been significant as the studio helped create materials more appealing and captivating to school children. Due to the popularity of the ‘Bola Kampung’ characters, the newly designed materials do not only leave a greater impression with students but also help the program reach a wider audience. Materials are being brought home by students and are shared with family and friends. Due to their popularity MERCY Malaysia has started using the materials also in its community disaster preparedness programs.

Due to the success of the partnership Animasia’s support is now being extended to other programs by Mercy Malaysia, such as a public health campaign. The partnership provides a good example of the impact that can be achieved if a business engages itself as a strategic partner whose contributions go beyond financial donations and instead include expertise and business networks.

**Lessons Learned and Potential for Replication**

The success of the partnership between MERCY Malaysia and Animasia draws from the fact that the strategic focus (or business) areas of both parties provided a good fit. Animasia’s contributions to this partnership went beyond financial donations and instead leveraged the studio’s core competencies and assets in the area of children entertainment. This helped increase the appeal of MERCY Malaysia’s education materials for primary and secondary school students. While this partnership demanded a more labor-intensive, time-intensive and long-term involvement of the studio it helped create a win-win situation. MERCY Malaysia’s school preparedness program gained greater appeal and Animasia’s cartoon characters’ reached an audience in a more interactive way beyond the TV series.

Animasia’s strong commitment to its partnership with MERCY Malaysia draws from the company’s understanding that its expertise in children entertainment can make a contribution to children wellbeing and education. The company’s strategic areas of its corporate social responsibility (CSR) program include, among others, MERCY Malaysia School Preparedness Program and work with numerous orphanages (e.g. provision of stationaries and entertainment products as well as organization of children activities).

Organizations that seek to build strategic partnerships with businesses need to acknowledge the differing motives of both parties and allow for results that benefit all involved. Continuous and honest communications are crucial to manage differing views and expertise and enable the successful realization of a shared goal.

MERCY Malaysia supports the replication of its School Preparedness Program in other economies and provides training and technical support for the implementation of the program. In 2010, for example, MERCY Malaysia partnered with ‘Save the Earth Cambodia’ in implementing the program at a provincial teachers training center, one high school and five secondary schools in the drought-prone district of Kaos Krala, Battambang province, Cambodia. In 2011, the replication was continued at the Phnom Penh regional teachers training centre and Battambang teachers training centre, as well as in 20 selected schools in Phnom Penh and Battambang respectively. Selected training materials designed in cooperation with Animasia have been used for the project replication in Cambodia and other regions, e.g. Brunei Darussalam. The wide application of the materials has been made possible since they were prepared in Bahasa Melayu and/or English and contain descriptive pictures.
Sources


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PHILIPPINES: BUILDING PREPAREDNESS CAPABILITIES OF LOCAL GOVERNMENT UNITS AND COMMUNITIES

Brief Description

The Corporate Network for Disaster Response (CNDR) is a network of corporations, business associations and corporate foundations. It seeks to build the capacities of the business sector and Filipino communities to effectively prepare for and manage disasters.

Noah’s Ark Project is CNDR’s main project under its community-based disaster risk management (CBDRM) program and was initiated in 2010. The project was initially established by the Lighthouse Alliance, a consortium of 15 organizations. CNDR had been asked to develop and implement the project. The Albay Public Safety and Emergency Management Office (APSEMO), a government unit responsible for preparedness and emergency services at the province of Albay, provided technical support to CNDR in the conceptualization and implementation of Noah’s Ark Project. After the project was implemented at the first pilot site CNDR took over the project and is now continuing it in partnership with its members.

To date the project has been implemented in seven communities in five cities and one municipality with funding from the network’s corporate members. The aim is to build the capacity of Local Government Units (LGUs) and flood preparedness of residents in all high-risk communities in these cities and municipality. The project is implemented at Barangay (community) level, the smallest level of independent LGUs. The project period is typically six months in each community and requires funding of around 600,000 Philippine Peso (or about 14,400 USD).

CNDR is the project proponent and responsible for project implementation. Corporations or corporate foundations provide funding and mobilize employee volunteers to support individual project activities. The main project partner in the communities is the Barangay Disaster Risk Reduction and Management Council (BDRRMC), which is responsible for the entire disaster management chain (under the Republic Act 10121). In many cases the BDRRMCs, which is headed by the barangay captain and consist of councilors and representatives from local civil society organizations, are not active due to lack of capacity.

In Macasandig, Cagayan De Oro City, CNDR’s corporate project partner is Smart Communications, Inc. (Smart), the Philippine’s leading wireless service provider. The project site contains seven flood-prone districts with a total of 2,714 households. Macasandig is highly prone to flooding during the annual monsoon and typhoon season since it is a low lying area located along the Cagayan river. For example, in December 2011 Macasandig was severely hit by Typhoon Sendong, which led to 500 cases of casualties and missing people.

Objectives of Initiative:

Noah’s Ark Project is implemented at flood-prone communities throughout the Philippines with the aim to develop capacities of local government units and communities for effective disaster preparedness.

A major concern is the development of evacuation procedures and centers and a key project activity is the community early warning and evacuation drill. The aim is to have zero casualties during future disasters.
The project started in March 2012 and was ended in August 2012. With funding from Smart, CNDR provided training to the BDRRMC and community volunteers on community-based risk assessment and management. CNDR also helped set up critical emergency systems, procedures and facilities. Smart mobilized employee volunteers to provide crucial support during the different project activities, helped arrange transportation for different project activities and organized local and national media to report on the project.

The project helped define the structure and responsibilities of the BDRRMC and built its capacity for community-based risk management. Local community maps were developed that depict hazards, resources and vulnerable community groups. A flood early warning system and evacuation plan were established and camp management systems for evacuation centers were enhanced. An emergency communication protocol was set-up and a contingency plan tested and agreed upon. Seven newly formed task units are now supporting the BDRRMC’s work. These task units are responsible for warning, communication, evacuation, transportation, security, medical support and relief. The project also helped gain commitment from the Philippine Atmospheric Geophysical and Astronomical Services (PAGASA) to support Macasandig’s new early warning system through the provision of timely warning information.

A community flood drill was one of the most important project activities and nearly 1,000 residents participated. The one-day exercise was conducted by BDRRMC with support from CNDR and Smart’s employee volunteers. The aim was to test the effectiveness of the contingency plan developed under the project. The exercise enhanced community understanding of preparedness needs and improved early warning and evacuation procedures (Panlilio, 2012).

Through the project, the local government gained a better understanding of the value of partnerships with the business sector, academia and civil-society organizations. A shift in mind-set was achieved for both the local government and the community away from a focus on disaster response to early preparedness building.

Smart believes that investing in community resilience contributes to a better business environment as it directly benefits the company’s customers, employees and business partners (who are part of the community). Community-based disaster risk management (CBDRM) is an important part of Smart’s corporate social responsibility (CSR) strategy. The company seeks to support activities that help community preparedness and response capabilities, and works with local government departments to enhance automated weather monitoring stations. Smart seconded selected employees to attend a comprehensive Training of Trainers (TOT) program organized by CNDR as a part of the company’s commitment to engage in additional Noah’s Ark Project sites. The company sees a particular value in engaging its employee volunteers in CBDRM activities as this can contribute to staff morale, team spirit, and employee retention as employees develop pride in their work place. Being the leading wireless communications service provider in the Philippines, Smart sees a strategic fit in supporting disaster preparedness efforts. Communication services, such as those provided by Smart, play a crucial role in disaster management. The company has developed an SMS-based disaster information service called ‘infoboard’. Infoboard provides Smart’s customers regular updates on weather forecasts and precautionary measures. To date the system has only been launched in Albay province but Smart has plans to extend the service to other provinces.
Lessons Learned and Success Factors

Many of the lessons from the Macasandig project are only now emerging as the project has only recently been completed. Nonetheless, some lessons can be derived from this and other similar recent initiatives. In August 2012, seasonal monsoon rains and a nearby tropical storm lead to widespread flooding in the Philippines. Communities under CNDR’s Noah’s Ark Project in Northern Luzon and Manila region were affected by the flooding. Community training and capacity development of the BDRRMC proved to be successful, as the project’s target of zero casualties had been achieved in all communities.

The floods of August 2012 showcased the importance of mobilizing and training committed community volunteers to support the work of the BDRRMC. When a disaster hits, members of the BDRRMC are typically affected themselves and the capacity of the Council reduced. The project helped highlight the critical role of the BDRRMC and the community as first responders in any disaster situation. It became evident that with the community taking over greater responsibility for their own safety a more effective disaster preparedness and response can be achieved in all Noah’s Ark project sites.

The project design proved attractive to corporate donors who are able to ‘adopt’ a community at risk. The project design distinguishes itself through a series of clearly defined project activities that allow for the participation of employee volunteers, a short project period, and a transparent and rather low funding requirement.

Potential for Replication

The Noah’s Ark Project has been implemented in numerous flood-prone districts throughout the Philippines. It was designed by CNDR in such a way that it can easily be replicated and scaled up.

They key factors for a successful replication of the project include:

- Active participation and commitment of local government units and ideally an existing LGU with a mandate to work on community-based disaster risk management
- Vocal and committed community leaders that are capable of mobilizing their community and its resources
- Willingness of the community to become more self-reliant and to continuously build disaster preparedness capacities

CNDR has a strong interest in seeing the project being replicated and provides a Training of Trainers (TOT) program for the implementation of the Noah’s Ark Project for interested organizations. For example, Xavier University seeks to become a provider of technical support in the replication of the project in other high-risk communities throughout the Mindanao island group. It facilitated the implementation of the project in Macasandig and will attend a TOT to be conducted by CNDR and APSEMO.

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Business Contributions to Reducing Risks through Recovery (Building Back Better)

• Indonesia: Coordinating Engagement of Engineering and Construction Companies in Disaster Response
• Thailand: Providing a flood-resilient village design for high-risk community
• United States: Alabama CRC
INDONESIA: COORDINATING ENGAGEMENT OF ENGINEERING AND CONSTRUCTION COMPANIES IN DISASTER RESPONSE

Brief Description

The Disaster Resource Partnership (DRP) is a global alliance of Engineering and Construction (E&C) companies that aims to promote ‘cross-sector, professional, scalable and accountable humanitarian response to disasters that has the ability to meet growing demands to reduce suffering and save lives’ and that promotes an ongoing collaboration between the global humanitarian community, national governments and local E&C companies (WEF 2010).

“The DRP offers two levels of engagement – one at the national level through its National Networks, and the other at a global level. At the global level, the DRP aims to facilitate the deployment of technical experts to support humanitarian action after large-scale natural disasters through the international humanitarian cluster system.” (WEF, 2012)

National Networks are the main mechanisms through which the DRP works. They serve as ‘national coordination mechanisms’ taking into account economy specific needs. These National Networks ‘provide services in the form of direct action, assets and local technical expertise within a certain radius of a disaster’. They can import international expertise services from the global partnership. (WEF 2010)

Currently, there are three national networks, including India, Mexico and Indonesia. The DRP Indonesia National Network was announced in January 2011, and launched in June of the same year.

Typical services expected from the DRP Indonesia National Network include:

1. Pre-disaster
   - Support of the National Agency for Disaster Management (BNPB) and the working group of the Government of Indonesia in disaster response and contingency planning
   - Contribution to community-based disaster risk reduction programs, for example, provision of engineering expertise for rebuilding in ways that reduce future disaster risks (rebuilding better through risk reduction designs)

Objectives of Initiative:

The purpose of the DRP Indonesia National Network is to establish a partnership between humanitarian organizations, the government and the private sector with the aim to:

- Facilitate the coordinated engagement of the private sector, before, during and after natural disasters
- Facilitate the delivery of Engineering and Construction (E&C) expertise as and when needed
- Capture and share ‘best practice’ and institutional knowledge
- Provide a focal point and voice for the E&C sector in humanitarian coordination in Indonesia.

While the network focuses on disaster response it also aims to help build resilience through supporting the incorporation of risk reduction into rebuilding efforts.

Source: APEC 2011
2. **Immediately after a disaster** (72 hours – 2 weeks)
   - Temporary repairs to critical infrastructure, provide emergency shelter, and engineering first responder
   - Provision of strategic technical assistance (e.g. advice on rubble clearance)
3. **Relief** (2 – 12 weeks)
   - Temporary repairs to critical infrastructure, provide emergency shelter, and secondment of staff to NGOs
   - Conduct of needs assessment (leads to implementing programs)
4. **Recovery** (12 weeks – 3 years)
   - Facilitation of recovery activities such as building permanent housing (through company fundraising or corporate social responsibility programs) and implementing own recovery programs
5. **Ongoing**
   - Development of interagency and intersectoral relationships and networks
   - Contribution to fora and coordination mechanisms such as the Indonesian Platform for Disaster Risk Reduction

At the time of the writing of this report, ten E&C companies had joined the DRP Indonesia National Network. The Memorandum of Understanding (MOU) was signed on 27 January 2012. As members of the network, these companies contribute to the network’s objectives through monetary contributions, in-kind resources, technical expertise, and pre-established local networks (Rembeth 2012). Generally, private sector members of DRP national networks contribute to humanitarian response in various ways (Coordinating Ministry of People’s Welfare, The Republic of Indonesia, 2011):

- **Direct action**: Member companies operating in the disaster affected location immediately engage in emergency relief such as distribution of food, water, medical supplies and non-food items
- **Secondments**: Companies second individual staff members into NGOs or humanitarian agencies to enhance their capacities (usually when the company is not operating in the disaster affected area).
- **Local technical services**: Companies at a national level partner with local or national governments, academics, or NGOs to provide technical assistance. This could include, for example, clearing debris, repairing critical infrastructure, damage assessment and design, project management and construction expertise.

From the government side, the DRP Indonesia National Network includes the Coordinating Ministry for People’s Welfare, the Ministry of Public Works, the Ministry of Home Affairs, the Ministry of Health, and the National Agency on Disaster Management. International organizations and civil society organizations involved in the initiative include UNDP, UN-OCHA and ICRF.

Government bodies involved in the DRP Indonesia National Network help build capacity of the network’s private sector members through training in disaster management and on relevant national

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2 These include PT Wijaya Karya, PT Pembangunan Perumahan, PT Jaya Konstruksi, PT Total Bangun Persada, PT Tata Mulia Persada, PT AMEC BERCA Indonesia, PT Balfour Beatty Sakti, Dvy Sukamta and Partners, PT Waskita Karya, and PT Yodya Karya.
policies and mechanisms. Civil society members build the network’s understanding of humanitarian values and the need for accountability and build expertise in humanitarian response.

**Figure 3 – Structure and Key Partners of DRP Indonesia**

![Diagram of DRP Indonesia structure and key partners]

Source: Discussed and agreed on the first Steering Board Meeting, 21 March 2012

**Lessons Learned and Success Factors**

A first step in consolidating cooperation within the network was to build a common understanding of disaster management needs and capacities among the network’s individual members, which include government, civil society organizations, international organizations, and the private sector. This strengthened collaboration in a way that encouraged cooperation between companies that would typically compete with one another.

Central Cipta Murdaya (CCM) has played an instrumental role in the formation of the network. The company’s owner and chairman, Mr. Murdaya Po, personally pushed both the government of Indonesia and the ten members to sign the long awaiting MOU and provided significant resources for the roll out of the program (Rembeth 2012). The relevance of the network’s agenda to the Indonesian context and private sector leadership were the major factors behind the successful establishment of the network.

**Potential for Replication**

The DRP Indonesia National Network is one of three national networks that replicate the DRP model at the national level. Unidos por Ellos Mexico was founded in 1998 and the Disaster Resource Network India was established in November 2002. The framework for an economy to develop a DRP national
network is supported by the World Economic Forum which seeks to continuously increase the number of national networks. Key factors determining whether an economy is suitable include:

- the economy must be at high-risk from natural disasters,
- there must be a dynamic and organized private sector able to speak with a common voice (e.g. existence of chamber of commerce or other mechanisms), and
- there must be a clear need for private sector engagement and mobilization of private sector resources where impacts of disasters outsize n economy’s response and recovery capacity.

The World Economic Forum is currently in discussion with national governments to set up additional national networks, including others APEC economies. (White 2012)

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THAILAND: PROVIDING A FLOOD-RESILIENT VILLAGE DESIGN FOR HIGH-RISK COMMUNITY

Brief Description

Siam City Cement PLC. (SCCC) is a leading cement manufacturer and distributor in Thailand. SCCC offers and customizes cement and mortar products under the ‘INSEE’ brand.

In July 2012 SCCC completed and officially opened ‘INSEE Green Village’, a proto-type of a flood resistant village design. SCCC invested US$ 405,000 to help rebuild Baan KlongSai Village in Maharaj District, Ayutthaya Province, which had been severely damaged by the late 2011 floods. The village is located in a water catchment area vulnerable to annual flooding. Its residents are mostly day laborers working on or below minimum wage.

Fourteen houses were built for the village’s twenty-two households (eighty-three residents as of July 2012) on an area of 1.58 acres. SCCC was committed to help enhance flood resilience of the community by providing them with elevated houses. The houses are three meters above the ground and are connected by elevated boardwalks that can be used as a walkway and a boat dock during floods. Instead of wood, the houses were constructed using conwoodbatten, which is a water-resistant fiber cement. Provisions were made to ensure that sanitary systems could be used during floods.

SCCC also aimed to establish a ‘sustainable way of living’ that would help reduce the environmental impact of not only the village construction but also the villagers’ day-to-day life:

- Only building materials certified to environmental standards according to ISO 14021 were used for housing construction.
- All houses are cooled by natural ventilation enabled through vents under the roof and between walls.
- Five solar-powered lighting pylons have been installed for lighting communal village areas.
- A waste sorting system has been introduced that divides waste into three categories, namely recyclable, biodegradable and non-compostable. While the municipality will handle the non-compostable waste, recyclable items will be sold to local buyers and biodegradable waste will be processed in the village’s composting facility to generate fertilizer and biogas for use in cooking stoves. The facility has the capacity to produce an amount of biogas equal to six liters of fuel.
- Also, areas have been carefully selected for the planting of organic vegetables and a vertical garden.

Objectives of Initiative:

The partnership between Siam City Cement, academia and the company’s business partners aimed to build community flood resilience through the construction of elevated houses and boardwalks and improved sanitary facilities.
To introduce a more sustainable way of living, SCCC worked with the faculty of Engineering at the King Mongkut’s University of Technology Thonburi to provide the composting facility and cooking stoves and to hold community trainings on the use and maintenance of these facilities. The training sessions were designed after a thorough assessment of community perceptions and conducted in an informal, entertaining manner to ensure community buy-in. Additional community training sessions were held to help community members use and maintain other key facilities such as the solar lights and communal garden. The housing design was developed in collaboration with the Faculty of Architecture, Chulalongkorn University.

The involvement of the two faculties draws on a long-term partnership with SCCC. Their involvement in the design and implementation of INSEE Green Village has proven beneficial to the universities and SCCC. SCCC gained insights into the conceptual thinking and expertise of the two leading academic facilities. The universities and particularly students involved in the project had the chance to work with an actual at-risk community and think beyond textbook design concepts.

SCCC encouraged its business partners to engage in the project. Seven other corporations provided materials and business connections. These companies felt compelled to help communities affected by the floods and sought to make a contribution of long-term value. For all businesses involved, INSEE Green Village represented a more sustained contribution to disaster prone communities than typical flood relief donations. It also provided a good opportunity to build brand image, strengthen business relationships through collaborating on a joint cause, and gain valuable knowledge in the realization of flood-resistant architectural design concepts.

Lessons Learned and Success Factors

INSEE Green Village was initiated when a team of SCCC employees visited the severely damaged village after the late 2011 floods. SCCC initially distributed food and other necessities to the flood victims in Ayutthaya province. The company soon realized that its efforts had to go beyond relief to help build resilience of local communities. The company has a long-standing corporate social responsibility (CSR) program; supporting disaster relief activities has always been an important part of the program. Based on experiences and insights gained from the INSEE Green Village SCCC is now committed to expand its support to pre-disaster activities that help reduce disaster vulnerability of high-risk communities.

Transparent communications and continuous community involvement were important to help manage residents’ expectations and anxiety. Due to budget constraints SCCC was only able to construct one proto-type village. Unambiguous criteria for the selection of the village had to be developed and disclosed to justify the selection of Baan KlongSai village. Baan KlongSai village was selected as it was most severely affected and represented the area’s most vulnerable and disadvantaged community. Residents of the village were initially anxious about the fact that the entire village was to be destructed. Community trainings were conducted over a period of one month that helped villagers better understand the

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3Bangkok Komatsu provided heavy machinery, Petch Brand Products roofing tiles, Karat Faucet bathroom fixtures, Kohler (Thailand) sanitary ware, Channel 3 donated kitchenware and home appliances, Quality Concrete Products Co.,Ltd provided precast structures (e.g. planks, beams, and columns), and Kor Sri Suwan – a local construction materials store – facilitated collaboration with local authorities.
envisioned village design and incorporate their concerns. Transparent communication during all stages of the village construction was critical in mitigating any potential conflict situations. Equally important was the agreement on a set of basic rules such as SCCC’s final decision on the project outcome. Local authorities provided valuable support for the communication process with villagers. The local municipality provided facilities for community meetings. These meetings were also attended by local government officials who showed their clear support for the project.

SCCC also encountered technical challenges related to the design and construction process, which represented a new area of expertise. Close cooperation of the SCCC project team with the Faculty of Architecture, Chulalongkorn University, helped overcome this challenge.

**Potential for Replication**

Replication of the project is highly reliant on funding. INSEE Green Village was based on the successful collaboration and voluntary contributions by a group of committed businesses and academia. A large-scale replication would require additional and sustained funding sources complemented by the business sector.

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UNITED STATES: COASTAL RECOVERY COMMISSION OF ALABAMA (CRC)

Brief Description

Often times, responses to natural or man-made disasters focus primarily on mitigating the immediate damage done to local eco-systems, infrastructure, and economies, without taking a wider view of promoting greater resiliency to such disasters in the future. In the wake of the BP Oil Spill, the Coastal Recovery Commission of Alabama (CRC) was created to promote a more long-term perspective on the spending of disaster funds. This was done primarily through the development of a framework to prioritize projects to improve regional resilience to both natural and man-made disasters through a consultative process. In Fall 2010, shortly after spill, they created a set of best practices for resiliency planning, identifying four key categories of interventions: Healthy Environment, Healthy Society, Healthy Economy, and Insurance. The CRC assigned regional leaders to lead efforts under each of those headings, and conducted a large number of open forums to gather ideas and request input from community and business leaders (CRC 2010).

The main criteria for evaluating projects included: (1) expected impact on coastal recovery; (2) effect on resilience defined as the ability of economic entities to maintain function and recover quickly from a disaster; (3) transformation of the region’s ability to develop a vision to sustainably improve quality of life, commerce and environment; (4) promotion of regional solutions to regional challenges (CRC 2010).

The Commission was made up of business and civic leaders, primarily from Alabama’s coastal counties of Mobile and Baldwin. Members of the Commission include representatives from the government agencies and institutions, as well as members of civil society organizations and leaders from the local business community. A relatively comprehensive list of participants is provided in the figure on the following page. Regional business leaders were particularly important in providing their input on recommendations with respect to building a more resilient “Healthy Economy” (CRC 2010).

In its Roadmap to Resilience, CRC recommendations under the category Healthy Economy relate to four sectors of the economy at risk to natural and man-made disasters: fisheries, tourism, small businesses, and long term economic development. Some examples of recommendations, with respect to fisheries, include: (1) creation of an Alabama Gulf Fisheries Marketing and Promotion Board, (2) independent seafood testing to reassure the public, and (3) modernization of the fisheries industry to encourage innovative technologies to help the Gulf fisheries industry compete with non-Gulf rivals. One of the recommendations of the Coastal Recovery Commission of Alabama small-business subcommittee’s was the Disaster Bridge Loan Program, modeled on an approach used for past disasters. This program aimed to help businesses that have lost their collateral due to the disaster and who need capital quickly to ensure the survival of their business (CRC 2010).

Objectives of Initiative:

The CRC’s mission: “[To] build regional capacity for long-term resilience. We must position ourselves to respond not only to future oil spills but also to other forces beyond our control, including everything from Hurricanes to sudden shifts in the economic environment… we need to develop and implement strategies across a broad range of categories that strengthen our communities’ - and our region’s - adaptability and sustainability over time…”

Source: CRC Website
Lessons Learned and Success Factors

Because of an impending change in leadership in the Governor’s office, there were significant fears that the spending of the oil spill penalty money would become politicized. A plan with widespread legitimacy was required to avoid a series of counterproductive battles over access to oil spill penalty money. This sense of risk created impetus for a wide set of stakeholders to become involved and promoted a sense of urgency to the discussions that pushed the effort higher on leaders’ agendas (Brown 2012).

In this context, one key to the success of the CRC was the involvement of a committed core of state and regional leaders with powerful influence. Led by the publisher of the most powerful newspaper group in the state and initially organized out of the governor’s office, the effort enjoyed immediate credibility and attracted a critical mass of leaders with economic and political clout. Accustomed to viewing challenges
from broader perspectives, the core leadership group could nudge others beyond strictly parochial concerns and into a more productive conversation about long-term planning (Brown 2012).

The process of managing this wide public consultation was at times complicated. First, it was quite challenging to convene such a diverse group of leaders and organizations who were affected differently by the oil spill and who initially saw themselves in competition for relief funding. Also, it was at times difficult to reorient discussions to a long-term regional planning horizon, as opposed to focusing entirely on immediate needs in the spill’s aftermath (Brown 2012). While the planning process successfully involved a wide group of private sector stakeholders, it has been difficult to maintain the cohesion of the initial groups during the follow-up to the recommendations of the Roadmap.

Potential for Replication

An intentional focus on promoting resilience and the use of wide public consultations in the planning of use of disaster funds may be successfully incorporated into future similar disaster recovery programs. The experience of the CRC has shown that for this to be successful there must be strong leadership both within the government and without to ensure that the long-term planning horizon is maintained. Furthermore, there must be sufficient opportunities for the public to engage in the process, to ensure that strong interests do not drive the process.

Sources

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Collaborative Efforts to Enhance Business Resilience

- Mexico: Cooperation with the Chemical Industry Association (ANIQ)
- United States: Florida Business Continuity Information Network
MEXICO: AGREEMENT BETWEEN THE STATE OF MEXICO AND THE NATIONAL ASSOCIATION OF THE CHEMICAL INDUSTRY

Brief Description

In 2012, the State of Mexico entered into an agreement with the National Association of the Chemical Industry (ANIQ) to improve disaster resilience and civil protection (ANIQ 2012). The aim is to improve strategies of public and private entities for disaster prevention, relief, recovery and response. The focus of the agreement is on emergencies connected with the transport of chemical materials or hazardous waste within the State of Mexico.

The National Association of Chemical Industry is a professional association, created in 1959. It currently represents over 95 percent of the private production of chemicals in Mexico through the participation of about 220 companies of different sizes and activities within sector. The ANIQ membership includes companies in the following sub-sectors: (1) adhesive and sealants, (2) biomaterials; (3) distributors; (4) specialty chemicals; (5) fertilizers and agrochemicals; (6) artificial and synthetic fibers; (7) lubricants and additives; (8) pigments and dyes; (9) chemicals for water treatment; (10) synthetic resins; (11) waterproofing; and (12) polyurethanes. ANIQ has numerous standing committees, including one focused on health and safety, whose activities aim to developing institutional guidelines on occupational health and safety that represent the interests of member companies and encourage continuous improvement in risk control (ANIQ 2012 B).

Under this agreement, which involves 125 municipalities, designated members of the National Association of the Chemical Industry will be trained to spread a culture of disaster prevention and risk reduction (Portal 2012). The training program is targeted towards ANIQ members in charge of coordinating the Comprehensive Responsibility Program of ANIQ, especially those working in areas including delivery, packaging, distribution, transport, transfer, storage, reception, safety, imports, exports, customs, logistics, traffic, labeling, classification, sales, purchases, commercialization, drivers of dangerous materials units, and training of service providers. The program includes 8 units:

- Legal framework (i.e. concepts and law related to the transport of dangerous materials and wastes)
- Classification of dangerous materials (i.e. definitions, types and examples of risks)
- Transportation documents (i.e. permissions, bills of lading, licenses, insurance policies, inspection registers and other important documents related to cleaning, delivery, reception or treatment of dangerous materials)
- Dangerous materials in combined cargo

Objectives of Initiative:

The major objectives include:

- “To improve governmental and industry capabilities and coordination.
- “To prevent and mitigate risks in a more effective way.
- “To serve people facing an emergency situation or disaster,
- “To foster a culture of prevention and self-responsibility,
- “To support society’s role by providing them with enough information to prevent and face associated risks.”

Source: ANIQ, 2012
• Security transportation measures
• Actions in case of emergencies
• Driving and transit of specialized vehicles

ANIQ maintains a list of all persons trained under this program. The training is being offered every three years to provide updated skills and knowledge, and new topics will be incorporated as the state of knowledge in this area evolves. This program is helping to generate a “culture of prevention” as well as a strong network of experts and persons interested in this topic. For some examples of the training programs offered by ANIQ please see their website at: http://webpublico.aniq.org.mx/Paginas/home.aspx.

In addition to the training program, the agreement also seeks to incorporate private sector expertise into the planning efforts of the municipal governments. The National Association of the Chemical Industry will provide information regarding the production, storage, and transportation of hazardous materials and wastes to the Emergency Information System of their local government. The aim is to reduce vulnerabilities through an effective disaster risk information system. The National Association of the Chemical Industry will also provide a database for the Hazard and Risk Atlas of Mexico City (Pereztrejo 2012). Further, the agreement seeks to strengthen coordination within the chemical and hazardous waste industry to reduce the risk of accidents and ensure the protection of people that may be affected by spills of hazardous substances on the roads of the nation’s capital (ANIQ 2012).

**Lessons Learned and Success Factors**

The Secretary of Public Safety, José Salvador Neme Sastré, has indicated initial optimism for the success of the program, stating that for the first time the State of Mexico has a reliable instrument, which contains detailed information on risk areas. Officials from the Mexican government have indicated that this initiative is already showing some notable successes, including:

• Fewer accidents and incidents involving chemicals and hazardous wastes
• Development of a culture of prevention
• Improvement in responsive capacity
• Increase in the number of personnel able to prevent and manage emergencies related to chemicals and hazardous wastes (ANIQ 2012).

One potentially important success factor was the involvement of academic specialists from the Faculty of Geography at the Autonomous University of Mexico State. Their involvement helped to ensure that the design of ensuing program is based on the latest information and that will become an effective tool for planning and the design of specific operations to combat natural disasters (Teotihuacan 2012).

Another important success factor was the existence of a professional organization that brings together almost all major players in the chemical industry in Mexico. ANIQ includes about 95 percent of the national private production of chemical products through its 220 member companies. It provides the ideal mechanism through which to organize the sector. Furthermore, the chemical industry and government were able to find common ground in their shared commitments to the people in their communities and
environmental safety. Coordination between these partners will lead to continuous improvements and the development of future agreements and procedures for safety operations (ANIQ 2012).

**Potential for Replication**

Replication of the agreement is being discussed for other states within Mexico. The initial scope of this agreement was for the jurisdiction of the State of Mexico at the local level. Given the success of the initial efforts, ANIQ is currently considering the feasibility to negotiate and sign with several other states. Additionally, ANIQ has signed agreements with the Ministry of Transport and the Ministry of the Interior, both at the federal level, as well as with the Ministry of Civil Protection of Mexico City and the Ministry of Public Security of the State of Mexico, at the local level (Lopez Ortiz, 2012).

Other economies may consider implementing similar agreements or training programs with their chemical and hazardous materials industry. For such an effort to succeed, it may be necessary to have already in existence a strong network or umbrella organization for the industry with which to partner. Further, the government may need to begin by establishing a dialogue with the industry to establish their common interests in the areas of accident prevention and environmental protection (ANIQ 2012).

**Sources**


ANIQ. APEC's Public-Private Partnerships Study - Mexico's case. Contribution to the EPWG, April 2012.


The idea for the Business Continuity Information Network (BCIN) emerged after the destructive hurricane seasons in 2004 and 2004. Communities in South Florida began to recognize the need for new solutions to better prepare for natural disasters and to respond to their impacts. Specifically, these communities came to realize the need to increase collaboration and information sharing between the public agencies, businesses, and the community at large (Luis 2012). With support from the Department of Homeland Security, the National Science Foundation, and IBM the Florida International University (FIU) began development of the Business Continuity Information Network (BCIN) in 2009. BCIN provides a virtual platform to share information as a means to promote business continuity during major natural or man-made disasters. This web-based service provides a portal through which local businesses, county emergency management, and local organizations can share critical information and support continuity efforts (BCIN 2012). Some of the major services provided by BCIN include:

- Links thousands of companies, NGOs and government agencies throughout Florida in a B2B community network to minimize business down time before and after a disaster.
- Enables and supports public-private partnership related to business continuity.
- Maintains and re-establishes critical flows of information as well as supports the reinstatement of elements of the supply chain and business ecosystem disrupted by disaster.
- Provides critical information on the status of facilities, logistics, financial network and availability of services prior to and after a disaster.
- Develops and disseminates analytical tools to aid business decision making in face of chaos (BCIN 2012).

In addition to these regularly offered services, BCIN has undertaken a number of exercises to test and to raise awareness regarding potential uses of their tools. For example, in July 2010, in a Miami-Dade company exercises, over 50 company attendees used BCIN systems for training exercises on emergency management (BCIN 2012).

The figure below demonstrates how the information held in the BCIN system may be utilized by a variety of different users both in the public and private sectors.
Source: Deng and Luis, 2012

One of the innovations of BCIN, and a factor that differentiates it from most other emergency information sharing mechanisms, is that it supports improved collaboration both within an organization and between organizations. The network supports virtual communities for individual businesses or government agencies, with which these organizations can better share information with internal parties. Additionally, the system supports information sharing on a wider basis by jurisdiction or geographic area, helping to improve coordination between organizations. For example, one tool supported by BCIN creates a B2B recovery marketplace, which helps individuals or organizations with specific recovery supply needs identify local sources – thus improving the efficiency of the recovery process and provided needed spending during a period of economic fragility (Luis 2012).

Lessons Learned and Success Factors

Over the past three years use of BCIN has grown beyond the pilot stage. The system is currently being used by more than 100 companies in local communities and County emergency management agencies in the south Florida area. This growing network of users facilitates the collaboration on disaster preparedness, response and recovery and benefits. Feedback from BCIN users has been overwhelmingly positive and suggests that the system may be used not only to share information but to support more complex tasks such as business continuity planning, or streamlined sourcing of goods needed for the recovery process.

One of the sources of success for BCIN is its roots within academia. BCIN is housed within and supported by FIU, and its main instigators are FIU faculty and staff. Due to the background of the organizers of the initiative, the development of BCIN has benefited from a strong emphasis on process improvement. The network’s interface and tools are refined based on constant feedback from simulations.
and desk exercises. Further, BCIN has served as a useful tool to develop the skills of future disaster management professionals. FIU uses BCIN tools in many of its disaster management classes to educate students on the process of disaster management, and the informational needs of businesses and communities during a disaster (Luis 2012). Also, both public entities and private businesses appear to have been particularly receptive to joining the network, due to the credibility of FIU in the area of disaster management.

Another source of the success of BCIN was the involvement of both private businesses and public sector agencies in the design of the network. At the outset of the development of the network, the organizers consulted widely with businesses about what information they require before and during a disaster to better prepare and recover quickly. The organizers also inquired with government agencies about their information needs, and what information they might be able to put at the disposal of the private sector. This input has been provided both through a series of questionnaires, as well as through the advice of business continuity officers or other staff of major corporations in South Florida, including Office Depot, Home Depot, and IBM. This input has continued through the exercises mentioned above (Luis 2012).

The business case for continuing the work of BCIN is clear. A study by the Insurance Information Institute (III) measured the economic impact of a disaster resulting in the permanent closure of about 1 percent of businesses in Broward, Miami-Dade, and Monroe Counties in Florida. The study found that this would result in the loss of as many as 13,500 jobs, more than $1.8 billion in lost sales and over $414 million in lost wages in the first year after a disaster. BCIN’s analysis suggests that, if their system were to help 5 percent of the companies in South Florida to accelerate their hurricane recovery by 1 week, it would prevent more than $200 million dollars of non-property economic losses (Zheng 2010).

One of the remaining questions for BCIN is its ultimate organizational structure. As mentioned above, it began as an initiative of FIU, and has been supported by the University as well as through grants and donations DHS and several foundations. If the network were to expand to cover a wider geographical area, it may become necessary to visit other options, such as integration of the network into the State or County Emergency Management offices, or through spinning the network off as a start-up (Luis 2012).

Potential for Replication

Given widespread usage of the internet and other communications technologies throughout APEC economies, this model has a strong potential for replication. BCIN has already been approached by emergency management professionals from other states within the U.S. and from several other economies, including China and Haiti.

The application of the idea, however, must carefully take into consideration the local context. In addition to the implementation of a new technological system, establishment of this type of network requires changes in the behaviors and expectations of its participants. The BCIN network enables a more open an immediate means to communicate information during a crisis. This information sharing may supersede the processes or institutions established previously, which can generate resistance. Further, the network can be of most use when there is a strong and effective emergency management agency, able to coordinate activities from the local to the national levels. On the other end of the partnership, it is important to have a private sector that is already engaged in business continuity planning, and which is capable of supporting a “healthy eco-system” of business continuity experts with the expertise to inform
the design and management of the network (Luis 2012). In the absence of strong public and private partners in the area of disaster preparedness and resilience, efforts should first be focused on creating a strong dialogue on the topic between the public and private sectors and building the capacity of key stakeholders.

Further, according to a FEMA review of the Miami-Dade County BRP, for a program like this to succeed a community needs to have strong member organizations that comprise diverse segments of the community that are motivated to take an active role. Organizations must be active not only during or after disasters, but should be engaged throughout the year. For the network to have value, member organizations must make use of it with frequent and timely communications on topics related to all phases of emergency management (FEMA 2011). BCIN has attempted to maintain this level of motivation through participation in regular emergency preparedness exercises.

Sources


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Collaborative Efforts to Enhance Infrastructure Resilience

- Australia: Critical Infrastructure Resilience Strategy
- Australia: Water Sector Mutual Aid Agreement
- Malaysia: Improving Cooperative Emergency Procedures for Hydropower Stations
- New Zealand: Assessing Infrastructure Vulnerability and Related Community Impacts
AUSTRALIA: CRITICAL INFRASTRUCTURE RESILIENCE STRATEGY

Brief Description

The Australian Government Critical Infrastructure Resilience (CIR) Strategy was launched by the Australian Government Attorney-General in June 2010. It represents a deepening of the Government’s approach to enhance the resilience of Australia’s critical infrastructure to all hazards. The CIR Strategy also contributes to Australia’s capacity to withstand and recover from emergencies and disasters. Disaster resilience is strengthened where communities have continued access to essential services provided by critical infrastructure organizations. This is the link between the CIR Strategy and Australia’s National Strategy for Disaster Resilience.

The CIR Strategy expands upon the previous Critical Infrastructure Protection (CIP) Program through the introduction of an organizational resilience approach. This approach recognizes the unique importance of “critical infrastructure organizations” to other businesses, governments and communities. The Strategy suggests that such organizations should be prepared to respond not only to foreseeable risks, but also to unforeseen or unexpected risks. A resilience approach to managing these risks encourages CI organizations to develop a more organic capacity to deal with rapid-onset shock. This is in preference to the more traditional approach of developing plans to deal with a finite set of scenarios. It is argued that organisations that build organisational resilience through distributed decision making, unified by a strong sense of ownership and purpose over the response priorities, and aided by adaptable tools and techniques, can give those organisations an enhanced ability to deal with both foreseeable and unforeseen events.

Scenario based planning still plays an important part in assessing whether organisations have developed an adequate resilience capacity and in choosing the best value-for-money tools. All decision makers, however, need to see all hazard risk mitigation and response as part of their role, and be empowered to carry it out. Tools and techniques that are part of normal business will be more successful than those that are only used when a specific plan is activated. This gives organisations a greater ability to adapt to events that may have been unforeseen or excluded from planning as being very low likelihood. In this way, CIR is achieved by undertaking traditional risk management/business continuity practices and organisational resilience initiatives. The constantly changing nature (and accelerating rate of change) of the economy, technology and society mean that past events are not an adequate guide to determining

Strategic Imperatives:

The Strategy has six complementary strategic imperatives to build CIR and achieve the Government’s aim and objectives. They are:

1. Operate an effective business-government partnership with critical infrastructure owners and operators
2. Develop and promote an organizational resilience body of knowledge and a common understanding of organizational resilience
3. Assist owners and operators of critical infrastructure to identify, analyze and manage cross-sectoral dependencies
4. Provide timely and high quality policy advice on issues relating to critical infrastructure resilience
5. Implement the Australian Government’s Cyber Security Strategy to maintain a secure, resilient and trusted electronic operating environment, including for critical infrastructure owners and operators, and
6. Support the critical infrastructure resilience programs delivered by Australian States and Territories, as agreed and as appropriate.

plausible future hazards (Commonwealth of Australia 2010). The table below describes some of the major features of this new approach.

<table>
<thead>
<tr>
<th>Critical Infrastructure Resilience Strategy</th>
<th>Foreseeable Risks</th>
<th>Unforeseen or Unexpected Risks</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>• Legal requirements</td>
<td>• Build capacity of organizations</td>
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<td></td>
<td>• Expand due diligence to investigate risks and vulnerabilities</td>
<td>• Enhance adaptive ability</td>
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<td></td>
<td>• Use a risk management approach</td>
<td>• Learn from incidents and near misses</td>
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<td></td>
<td>• Implement sectoral risk assessments</td>
<td>• Accumulate knowledge on organizational resilience</td>
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<td></td>
<td></td>
<td>• Manage complexity</td>
</tr>
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Adapted from: *Critical Infrastructure Resilience Strategy*, Commonwealth of Australia, June 2010

The inclusion of unforeseen and unexpected risks enhances the ability of critical infrastructure organizations to better adapt to evolving conditions. It helps them maintain their operations and even profitability in an environment of unanticipated risks. Organizational resilience moves beyond a one-size-fits all model to one where resilience is integral to the functioning of the organization (Australian Government Representative A, 2012).

A significant proportion of Australia’s critical infrastructure is privately owned or operated on a commercial basis. In most cases, the owners and operators of critical infrastructure are best placed to manage risks to their operations and determine the most appropriate mitigation strategies. The Australian Government recognizes that the best way to enhance the resilience of critical infrastructure is to partner with owners and operators to share information, raise the awareness of dependencies and vulnerabilities, and facilitate collaboration to address any impediments. The Government takes a sectoral focus in engaging with owners and operators to understand the vulnerabilities and dependencies in and across critical infrastructure sectors, and the risk mitigations being applied. The Strategy identifies seven key sectors. Services provided through these seven key sectors are crucial to ensuring national security, economic development, and community wellbeing:

1. Banking and Finance
2. Communications
3. Energy
4. Food and Grocery
5. Health
6. Transport (including aviation, land and maritime)
7. Water Services

One key tool to encourage business-government partnerships in the CIR Strategy is the Trusted Information Sharing Network (TISN) for CIR. The TISN was originally established in 2003 as a forum for the government and critical infrastructure organizations to share information on and develop strategies to mitigate risk. As part of Australian Government’s shift from a “critical infrastructure protection approach” to a “resilience approach,” the seven existing critical infrastructure groups were reformed in 2010. The CIR Strategy expands the focus of the TISN to include an organizational resilience approach within the seven Sector Groups, as well as two Expert Advisory Groups (Resilience and IT Security).
Furthermore, the Strategy includes the continued operation of the Oil and Gas Security Forum under the Energy Sector Group, and allows for the convening of Communities of Interest (CoI). CoI provide an opportunity for cross-sectoral consultation between owners and operators and government on specific matters. For example, CoI have been established to address pandemic and climate change issues (Commonwealth of Australia 2010). The TISN conducts annual all-sector workshops and regular information sharing through meetings, reports and electronic media including via public and secure websites. Furthermore, the Government frequently engages with the research sector to expand the resilience body of knowledge and develop new approaches to address any gaps in knowledge identified by CI stakeholders.

The make-up of TISN membership varies. All of the Sector Groups include a wide range of critical infrastructure owners and operators, including large and small organizations. Sector Groups regularly reach out to new members, including small and medium enterprises (SMEs). The groups find that broad, inclusive membership better supports the groups’ mission to build more resilient critical infrastructure.

Beyond the TISN, the Government also engages with businesses to identify critical infrastructure, share critical security and risk information, and develop security and risk mitigation strategies, particularly as it relates to the threat of terrorism under the auspices of the National Counter-Terrorism Committee (NCTC) (Commonwealth of Australia 2010B).

**Progress to Date of Implementation**

Since the Critical Infrastructure Strategy was launched in 2010, the Australian Government has undertaken a number of initiatives and activities to move its organizational resilience agenda forward. Some notable examples include:

- Establishment of a Resilience Expert Advisory Group that includes resilience experts and practitioners from the private sector, academia and government. This group provides expertise and is helping to inform the Australian Government’s organizational resilience approach.

- Publication of *The Organisational Resilience Position Paper*, which established a technical basis for discussions on the topic of the development of organizational resilience in Australia with a focus on critical infrastructure.

- Development of a training program on organizational resilience through the Australian Emergency Management Institute. This program raises awareness on the topic of organizational resilience and provides suggestions on how to build resilience capacity within an organization.

- Release of Research Paper 1: CEO Perspectives on Organisational Resilience. This paper investigates the viewpoint of more than fifty of Australia’s top CEOs on organizational resilience, including its value to, and strategies for implementation within, organizations (Australian Government Representative B, 2012).

The Australian Government regularly engages with TISN members to identify new activities and projects to enhance the resilience of Australia’s critical infrastructure. Some future activities include the development of several innovative tools to assist critical infrastructure owners and operators to reinforce resilience within their organizations. Some potential tools include an online handbook, tools for
benchmarking and self-assessment, and materials providing practical guidance. Another example of a new initiative is a workshop on emerging issues affecting critical infrastructure. The workshop will be held in late-2012, and will include stakeholders from both the private and public sectors. The workshop helps maintain a collaborative environment within the TISN for the discussion of critical infrastructure resilience issues (Australian Government Representative B, 2012).

The Australian Government regularly assesses progress on the implementation of the CIR Strategy. The government views critical infrastructure resilience as an ongoing process and, as a result, conducts occasional reviews to adjust the activities under each of the Strategy’s strategic imperatives. One means of assessing progress is through regular engagement with government and business stakeholders. For example, TISN Sector Group Secretariats help their sectors to track progress against their sector resilience work plans (as defined in the Strategy Supplement) to ensure that strategic imperatives are achieved. After five years of operation, the CIR Strategy will undergo a comprehensive review in 2015 to allow for adjustments (Australian Government Representative B, 2012).

**Lessons Learned and Success Factors**

Some initial lessons learned from the first two years of implementation of the CIR strategy include:

- Basing the implementation arrangements of the new strategy on the existing framework facilitated a more rapid adoption of a resilience culture in Australia’s critical infrastructure.
- Involving academia and public and private sector experts is helping to improve the design and implementation of organizational resilience activities and initiatives.
- Incorporating continual feedback is helping to ensure that the activities and initiatives implemented under the strategy take into consideration lesson learned and new ideas generated through the first stages of strategy implementation.

The comprehensive review in 2015 will help to identify the next phase of policy priorities and activities to guide future stages of CIR Strategy implementation.

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AUSTRALIA: WATER SECTOR MUTUAL AID GUIDELINES

Brief Description

The Water Services Sector Group (WSSG) is a forum for owners and operators of critical infrastructure in the water sector to discuss issues related to security and resilience. The WSSG is one of the seven Sector Groups of the Trusted Information Sharing Network (TISN) for Critical Infrastructure Resilience. It was formed to facilitate information sharing between owners and operators in the water and wastewater services sector on generic threats and vulnerabilities. It also seeks to identify and develop well-targeted strategies to mitigate risk and build resilience within their organisations and the sector as a whole. The WSSG’s members include the majority of Australia’s water services companies including Sydney Water, Queensland Urban Utilities, and the Water Corporation of Western Australia (Australian Government 2012).

In 2009 the WSSG and the Water Services Association of Australia (WSAA) endorsed the “Australian Water Sector Mutual Aid Guidelines” (the Guidelines). The Guidelines were developed with support of the Australian Government Attorney-General’s Department. They are based on the concern that large-scale incidents may either exceed the affected water organisation’s ability to respond or cause prolonged outages in the affected areas. In particular, the guidelines aim to provide support to smaller organisations that may have difficulty sustaining “around the clock” operations relying solely on their own resources. The Guidelines are meant to help coordinate the water sector’s response to large-scale incidents and outline a way by which water organisations, faced with an emergency beyond their ability to respond, can request assistance from unaffected water organisations. Mutual aid not only supports the timely provision of skills and equipment, it also promotes the sharing of experience and knowledge (Australian Government 2012).

The Guidelines provide that assistance may be requested for any emergency, whether natural, technological or manmade, that “affects or threatens to affect the health and wellbeing of people, animals and the environment as well as impacting on vital services, manufacturing and the economy” (WSSG, 2010). Utilities can use the Guidelines in cases where there are no other established relationships or sharing mechanisms in place (Australian Government 2012). Having these Guidelines established prior to a disaster or emergency helps streamline the process to request, coordinate and deploy resources, thus improving the timeliness of the response and in locating specialized personnel and equipment (WSSG 2010).

Objectives of Initiative:

The Australian Water Sector Mutual Aid Guidelines facilitate the provision of rapid, short-term disaster or emergency support to restore critical water and/or wastewater services.

The Guidelines were endorsed in 2009 to provide a mechanism through which water utilities may restore and sustain services during an emergency or disaster by calling on available resources from other unaffected areas in Australia.

Ultimately the Guidelines aim to enhance the resilience of the Australian Water sector and the communities that they serve.

Source: Australian Water Sector Mutual Aid Guidelines, 2010
In disaster events, utilities may request or offer assistance in the form of equipment, personnel, or expertise. A coordination cell is established at an unaffected utility. Consisting of a small team of 2-3 employees, the coordination cell works to match requests for and offers of assistance (Australian Government 2012). During an emergency, the assisting water utility initially pays the costs associated with the assistance it provides, with an agreement reached between the assisting and requesting utilities about how these costs may be reimbursed. Typical costs include the delivery of goods, as well as transport, meals and accommodation of assisting personnel (WSSG 2010). In the case of the Queensland floods, some assistance was provided at no charge for the first week, with cost-sharing agreements implemented for assistance beyond this time.

Since their endorsement the Guidelines have been tested in a number of exercises and actual emergency events. The first test was in December 2009 through Exercise Isabelle, based on a natural disaster affecting an Australian city. This exercise helped the WSSG to identify common practices and outstanding issues for the Group to resolve (TISN 2012). The effectiveness of the Guidelines was proven in January 2011 following the extensive flooding in South East Queensland and Victoria. For the first time, the water sector mutual aid guidelines were used to assist the water organisations affected by the floods. Then in March 2011, the mutual aid guidelines were used as the basis for the sector’s assistance to Christchurch after their earthquake (TISN 2012).

**Lessons Learned and Success Factors**

These initial experiences have demonstrated the value of the Guidelines. Utilities that received aid under the application of the Guidelines were able to access both staff and equipment in a more cost- and time-efficient manner. Some major benefits for aid-requesting utilities during large-scale incidents include:

- The ability to restore services significantly faster than they would be able to on their own
- Clear, concise and objective advice from a team of senior disaster managers and technical specialists
- Access to a larger pool of staff, unaffected from the incident, to respond to the emergency and to sustain their operational tempo
- Provision of customer service and call centre operators to supplement existing staff to provide timely and accurate information to customers on impacts to water supplies, and
- Assistance from insurance staff for disaster affected water organisations in preparing insurance claims (Australian Government 2012).

The relationships built between members through the TISN have been a major contributor to the success of the water services sector and the development of the mutual aid guidelines. These relationships continue to be used to access corporate knowledge from a diverse range of peers, improve communications between organizations and build and test internal plans prior to disaster seasons.

During the 2010-2011 disaster season it became apparent that while most water utilities were aware of the Guidelines, many had not considered how they could be best implemented. As a result the Guidelines are being updated to better reflect how utilities can incorporate them into their response plans. When the update is complete, training programs will be offered through the WSSG, and exercises may be held at individual utilities to test the application of the Guidelines.
Potential for Replication

The successful establishment of the Mutual Aid Guidelines was the product of strong industry-government cooperation and a determination to ensure continuous water services to the community. This type of approach might be emulated in other areas, but a few pre-conditions may apply. For example, there needs to be a well-established framework for business-government cooperation prior to the introduction of such Guidelines. The Guidelines cannot be developed in isolation from a broader program for business-government cooperation. In the case of Australia the framework was established through the effective business-government partnership of the TISN.

Furthermore, this example indicates the importance of emphasizing the benefits to the industry in order to get buy-in. Every utility may find itself in an emergency situation where it relies on assistance from others, thus mutual aid is in the interest of all.

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MALAYSIA: IMPROVING COOPERATIVE EMERGENCY PROCEDURES FOR HYDROPOWER STATIONS

**Brief Description**

Tenaga Nasional Berhad (TNB) is the largest electricity utility company in Malaysia. Its core business comprises the generation, transmission and distribution of electricity. It operates six thermal stations and three major hydroelectric schemes with a total installed generation capacity of about 12,000 MW. TNB provides 55 per cent of the total industry capacity in Malaysia.

In late 2010 TNB started the development of an Emergency Response Plan for its hydro power stations. The plan is being developed in close cooperation with all relevant bodies of the national government with the National Security Council being a key partner. The ERP development was initiated at the company’s own costs after TNB reviewed its existing emergency plans and felt that greater engagement of emergency authorities was essential.

In close cooperation with the National Security Council, a workshop on dam safety and ERP development was held in November 2010. Key personnel of TNB and all relevant government agencies at local, state and national/federal level attended the workshop. Flood inundation maps were developed and social, environmental, and economic impact studies conducted.

A Dam Safety ERP tabletop exercise and emergency drill followed in March 2012 at TNB’s Kenyir hydro power stations. The aim was to test the Emergency Response Plan and the operational interaction of TNB personnel and government agencies.

An emergency drill involving local communities at the Kenyir hydro power station is planned that will focus on early warning and evacuation.

The ERP development built capacity of both TNB and emergency related government agencies. It set clear emergency procedures for both sides, established communication channels and enhanced collaboration. An ERP document was developed that provides operational guidance to both TNB and all relevant state agencies during an emergency involving hydroelectric dams.

The emergency drill and tabletop exercise helped evaluate existing emergency operations at both TNB and government agencies. It contributed to a number of government agencies reviewing and adapting their existing Standard Operating Procedures (SOP), which thitherto had not included dam failure events. The government is also committed to increase public awareness and early warning with regards to dam failure events. Dam failure events that have been identified include probable maximum flood due to severe meteorological and hydrologic conditions, as well as dam failure caused by earthquake, poor dam maintenance, act of sabotage or terrorism.

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4 Such as the Royal Malaysian Police, Fire and Rescue Department, Public Works Department, Department of Irrigation and Drainage, Malaysian Civil Defence Department, Department of Social Welfare and Department of Information and Broadcasting
To date emergency response plans have been developed for four of TNB’s hydroelectric power dams. The ERP development involved two states (Terengganu and Perak) with more than ten districts. TNB is committed to develop ERPs for all its major dams.

**Lessons Learned and Success Factors**

The project required cooperation with numerous emergency authorities. Having the National Security Council lead the project proved crucial in getting all authorities committed. TNB is considered to be the main operator of Malaysia’s critical energy infrastructure and therefore there was a common interest in improving disaster preparedness and response capabilities.

The flood inundation maps developed through this initiative require continuous reviews and updates as population growth and rapid residential and industrial development affect the flooding area. The cooperative relationship developed between TNB and relevant government agencies are a crucial prerequisite for keeping the flood inundations maps updated.

**Potential for Replication**

Within the economy, plans are underway to replicate this program for water supply dams operated by the Federal Government and various State water authorities. This effort will help ensure the continuity of water supply to Malaysia’s population centers during a disaster.

When considering replicating this model in other contexts, it is important to ensure that there is a strong appreciation of the importance of securing the critical infrastructure among all parties. Moreover, the success to the project was critically dependent on the leadership of NSC. Such a lead agency must be designated, empowered and properly equipped to carry out the effort.

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bin Ab Rahman, Wan Mohd Fadli. Personal communication with the author. Disaster Management Division, National Security Council, Prime Minister's Department, Malaysia, 2012.
NEW ZEALAND: ASSESSING INFRASTRUCTURE VULNERABILITY AND RELATED COMMUNITY IMPACTS

Brief Description

The Auckland Engineering Lifelines Group is one of the numerous Lifelines Groups now established in virtually all regions of New Zealand. Lifeline Groups are self-funded, voluntary, informal organizations bringing together New Zealand’s essential infrastructure and services operators. They facilitate emergency reduction and readiness work to be carried out by their members. They provide a valuable forum for utility managers to address engineering and physical risk management aspects and interface with Civil Defense Emergency Management representatives. The various outputs from a Lifelines Group help Infrastructure and Emergency Managers at regional and local levels better understand the region’s vulnerabilities and maintain awareness of the importance of lifelines to the community at large (Ministry of Civil Defence & Emergency Management and the National Lifelines Coordinating Committee, 2003).

In 2009, the Auckland Engineering Lifelines Group (AELG) started work on the second phase of the Auckland Engineering Lifelines Project (AELP), which aims to investigate the regions’ infrastructure vulnerability to a range of natural and man-made hazards and to develop measures to reduce vulnerability.

The first phase of the project (AELP-1) was conducted between 1995 and 1999. The study developed information on four key hazards in the Auckland region, namely volcano, tsunami, cyclone and earthquake. It further assessed the vulnerability of essential infrastructures and services to damage from these hazards. The study also investigated the interdependencies between these infrastructures and services, identified practical strategies for reducing risk, and helped lifeline utility participants identify and implement mitigation and response strategies for their own networks. There were 40 participating organizations through AELP-1, including all of the region’s essential infrastructures and services operators and local authorities.

The second phase of the project (AELP-2) has the objectives of updating and extending results of the previous five-year project. The ongoing study not only updates hazards information and expands the list of hazards addressed, but also includes updated critical asset data mapped in GIS format, not available during AELP-1. The updated hazards and critical asset data is used to assess the vulnerability of assets to each hazard. It can also be used to evaluate the impact of infrastructure failure arising from potential...
hazards on lifeline utility services as well as the local economy (AELG, 2009). The extended list of hazards includes: local and distal volcano, earthquake, regional and distal tsunami, cyclone, climate change, and technology failure.

A simple workshop-based approach has proven time- and cost-efficient. During workshops, GIS maps of hazard / critical assets overlays are reviewed and participants assess the damage impact of hazards, as well as the service impacts and likely recovery times from that damage. While the workshop-based approach is similar to the one employed in AELP-1, the value of the outputs is improved by the accuracy of GIS data as well as the improved knowledge of the impacts of these hazards on infrastructure assets gained from a decade of AELG supported research, particularly in the area of volcanic ash impacts.

One of the key tasks for utilities participating in the study is to provide critical asset data in GIS format and information for the priority sites spreadsheets. These spreadsheets list each of the critical asset sites, and the other utilities that each service relies on to function (i.e. explores the interdependencies between lifeline utilities at a site level). Each utility can then use this understanding of critical utility and community sites in the region, and the extent to which those sites are dependent on their service, to prioritize their response to a significant service failure.

The main objective of AELP-2 is that lifeline utilities will:

- Have the latest hazard information available (in GIS files where available). This includes information for the existing hazards analyzed in AELP-1 (volcanic, earthquake, cyclone and tsunami hazards) as well as other priority hazards identified in the scoping phase.
- Have maps of critical lifelines and community sites (to enable them to take into account supply to these sites in prioritizing response and recovery).
- Understand the probable direct impact of hazards on their assets and services.
- Understand the impact of hazards on other utilities that they rely on, and the knock-on impact to their services (interdependency impacts), as well as the broader economic and community impact of the infrastructure failure arising from each hazard.
- Have knowledge of potential mitigation measures to reduce infrastructure vulnerability to hazards.

The first four hazard components of AELP-2 are expected to be completed by the end of 2012 (volcano, earthquake, tsunami and severe weather event).

**Lessons Learned and Success Factors**

Funding from AELG members and their extensive voluntary participation (alongside their main line of work) have been a major driver in the successful conduction of this project. AELG work is completely funded by AELG members, which include most of the utilities in the Auckland region including Auckland Airport, Auckland Council, Auckland Transport, Counties Power, Kordia, NZ Transport Agency, Ports of Auckland, Telecom, Telstra Clear, Transpower, Vector, Vodafone, Watercare and Wiri Oil Services. A number of other utilities contribute in terms of staff time input to projects.

The design of the study took into consideration the informational needs and interests of both the emergency management authorities as well as the operators of the region’s essential infrastructures and
services. One clear benefit for utilities engaged in the study is to gain access to an extensive inventory of hazard data in GIS or Google Earth format.

The ongoing benefits of interaction with other lifeline utility networks, which are highly interdependent, are also at the heart of the AELG mission. Similarly, the improved relationships between government emergency management agencies and lifeline utilities that are developed through these collaborative projects are invaluable during an emergency event (as was well demonstrated during the response to the Canterbury earthquakes in 2010 and 2011).

The mitigation work that has been undertaken around NZ as a result of lifelines projects has been well proven. AELP-1 and AELP-2 also highlight the necessity to build more resilience into lifelines infrastructure and some major programs are underway over the next few years to improve the resilience of these networks.

A key success factor is that the lifeline utilities themselves define and scope the project to ensure they receive value from it. Ongoing communication of study results and successes are also important, along with having a committed project manager driving the project and continuously following-up with utilities on the inputs required.

**Potential for Replication**

For AELP-2, the study was able to draw on data consolidated over the years after the first project phase (AELP-1) and the improved research available on infrastructure impacts from hazards. AELP-2 also benefitted from the close cooperation between emergency authorities and utilities established through the Auckland Engineering Lifelines Group (which was only initiated after AELP-1).

While these were beneficial factors in conducting the study, similar projects could be conducted in other APEC economies where data is not readily available and where there has been no track record of government-utilities cooperation. Where detailed hazard and asset data is not available, lifelines projects can initially draw on knowledge from experts in the field (eg: geological scientists and asset managers). In fact, the benefits from strengthening the relationships between lifeline utilities and government / emergency management agencies (as described above) are as valuable as the specific vulnerability assessments undertaken.

The approach needs to be tailored to the economy and the level of sophistication appropriate to the situation. The above simple workshop-based approach can be used in almost any context. However, where this work is of sufficient value and adequate funding available to collate electronic critical asset and hazard data, there are also software-based approaches that can be used to quantitatively assess the vulnerability of the utility networks to hazards. These software approaches can range from simple GIS map overlays (as per AELP-2) to more advanced software.

**Sources**


Partnerships for Pre-Disaster Risk Financing through Agricultural Insurance

- PRC: Beijing Agricultural Insurance Scheme
- Vietnam – Pilot Agricultural Insurance Scheme
PEOPLE’S REPUBLIC OF CHINA: REINSURING BEIJING’S AGRICULTURE RISK INSURANCE SCHEME

Brief Description

Natural disasters represent a significant risk to food security in China. Droughts, floods, typhoons, pests and diseases destroyed about 10 percent of the economy’s annual crops in the past decade (Swiss Re, 2011).

In 2007 the China Insurance Regulation Commission (CIRC) started work with the central and provincial governments to extend insurance to farmers across China to help improve their resilience to losses from poor harvests (Swiss Re, 2011).

With the backing of CIRC, the Beijing Agricultural Risk Insurance Scheme was then initiated in May 2007 to provide affordable insurance for the municipality’s farmers against actual crop, fruit and livestock losses due to natural disasters. Natural perils covered include flood, hail, wind, and rainstorm, as well as epidemic livestock diseases. Subsidized by the Beijing municipal government the scheme covers more than ten different subjects including crops, fruits, and livestock as of August 2009 (China Daily, 31.08.2009 and Reinsurance Magazine 18.07.2011). It was one of the few agricultural insurance schemes initiated in provinces and municipalities across China in 2007.

The new scheme helped make agricultural insurance in the municipality more commercially viable. To achieve this, the municipal government and participating insurance companies set premium rates that were substantially higher than before the initiation of the scheme. The insurance companies also receive 10 percent of the total premiums as subsidies from the municipal government to cover expenses such as those related to administrative costs. This has made the insurance scheme more attractive to participating insurance companies.

At the same time government subsidies have kept the premium affordable for farmers. In 2009, a farmer paid between 20 to 30 percent of the premium with government sponsoring the remaining 70 to 80 percent (districts and counties pay 20 to 30 percent of the premium and the municipal government subsidies 50 percent). For instance, farmers only paid 7 Yuan of the total 35 Yuan premium for pig insurance worth 700 Yuan. (China Daily, 31.08.2009)

In 2009 the Beijing Municipal Government entered into a partnership with Swiss Re, a global provider of reinsurance solutions, and China Reinsurance Group Corp (China Re Group), a state-owned re-insurance company (Swiss Re, 2011 and China Daily, 31.08.2009). The reinsurance cover purchased by the Beijing Municipal Government is designed to transfer risk from the government-funded agricultural insurance scheme to the reinsurance sector.

Objectives of Initiative:

The partnership between Swiss Re and the Beijing Municipal Government provides insurance cover for insurance companies participating in Beijing Agricultural Risk Insurance Scheme.

The overall objective is to improve farmers’ resilience to losses from poor harvests and stabilize their incomes – thus to increase agricultural output. (Swiss Re, 2011)
Under the terms of the contract, the insurance companies will be responsible for losses\(^6\) below 160 percent of the annual premium. Swiss Re and the state-owned reinsurer China Re will take up any losses between 160 and 300 percent and settle reinsurance payouts with the individual insurance companies. Losses over 300 percent will be covered by the Beijing Municipal Government’s Agricultural Catastrophe Risks Reserve (Swiss Re, 2011). Before the reinsurance agreement the government had to cover losses over 160 percent.

To date four insurance companies participate in the agricultural insurance scheme, which now covers the majority of farming households in the municipality. Through the reinsurance agreement the Beijing Agricultural Risk Insurance Scheme is now better able to cope with significant losses from natural catastrophes. Swiss Re sees the agreement as “the first major milestone in using reinsurance to support the management of catastrophe risks in agriculture for a regional government”.\(^7\) The company argues that a functioning insurance market can absorb a large part of the risks faced by individuals and business and lessen the financial burden of governments after a disaster.

In this regard the reinsurance agreement for the Beijing Agricultural Risk Insurance Scheme represents a major achievement in moving away from post-disaster government funding to pre-disaster risk management.

**Lessons Learned and Potential for Replication**

The Beijing administration’s use of agricultural insurance to stimulate productivity and its efforts to develop a viable insurance industry are a good example to other regions and economies with underinsured agriculture markets. These underinsured markets offer good business opportunities for insurance and reinsurance businesses.

There is no one-fit-all solution to develop a viable agricultural risk insurance scheme. Strong cooperation and trust is needed between the government and the insurance and reinsurance business involved to develop tailored solutions. This requires strong government interest and understanding of the need to move from post-disaster relief to proactive risk financing.

As more and more farmers buy insurance covers, not only will they benefit from protection against catastrophe losses, but they will also gain easier access to loans that are badly needed for investments in high quality inputs and improved farming equipment.

**Sources**


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\(^6\) Losses refers to payouts insurance companies need to make to farmers that exceed the value of premiums paid by these farmers. Significant payouts are, for example, claimed by farmers when a natural disaster has affected their crop, fruit and livestock.

\(^7\) Swiss Re, n.d.


VIETNAM: PILOT AGRICULTURAL INSURANCE SCHEME

Brief Description

In 2009 agriculture accounted for 20 percent of Vietnam’s GDP. It predominates as the main livelihood source of Vietnam’s population. The economy is the second largest exporter of paddy rice and coffee and the largest exporter of aquaculture (Swiss Re 2012).

Vietnam’s agricultural sector is highly prone to multiple natural disasters including tornadoes, landslides, droughts and particularly floods and tropical cyclones (GFDRR and World Bank 2010). Losses from natural disasters account for five percent of annual GDP and leave farmers unable to make investments for the next growing season or to repay loans (Trueb 2011).

To boost agricultural output and help mitigate the impact of poor harvests, the Vietnamese Government made substantial investments in the agricultural sector and established disaster relief programs. Under these programs affected farmers usually receive financial or in-kind support such as seeds, fertilizer or even the suspending of loan repayments (loan interest and principal payment) to banks (Vina Re 2012).

In 2011 the government started an agricultural insurance scheme as a pilot program in 20 provinces. The scheme was initially planned for the period 2011 to 2013 and provides crop, livestock and aquaculture insurance against natural disaster and epidemic disease. The government is committed to implement the scheme nation-wide after the successful completion of the pilot scheme (Swiss Re 2012).

The implementation of the agricultural insurance scheme is supported and guided by the Ministry of Finance (MOF) and the Ministry of Agriculture and Rural Development (MARD). Vietnam’s two largest insurers, Bao Viet and Bao Minh were appointed by MOF to participate in the design and implementation of the pilot program. They were selected due to their extensive network of branch offices and financial capacity. Reinsurance coverage is arranged by the Vietnam National Reinsurance Corporation, Vina Re. Swiss Re, a global provider of reinsurance solutions, was engaged to provide technical advice and reinsurance capacity, including expertise in calculating insurance premium rates (Swiss Re 2012).

Steering committees, consisting of government officials, have been established at central government, province, and district levels. They help implement the insurance scheme by supporting insurance companies in selling insurance policies and collecting fees.

The pilot agricultural insurance scheme combines different insurance policies including area-yield index-based insurance for rice crops and indemnity-based insurance for livestock and aquaculture. The two different insurance policies are further described in the following textbox.

Objectives of Initiative:

The Pilot Agricultural Insurance Scheme in Vietnam aims to improve the resilience of Vietnam’s agriculture sector towards impacts from natural disasters and epidemic diseases. It provides insurance cover for farming households for losses in rice crops, livestock and aquaculture.
To provide affordable insurance coverage to farmers, the Government subsidizes premium payments based on income levels of farming households. As a result subsidies are provided as follows:

- 100 percent of gross premium for poor households,
- 80 percent of gross premium for near poor,
- 60 percent of gross premium for other households outside the above two categories, and
- 20 percent of gross premium for big farms and businesses (Swiss Re 2012).

To support the distribution of the insurance product the agricultural insurance scheme takes advantage of Vietnam’s existing rural distribution networks. It works with farmer’s unions, women’s unions, and fertilizer suppliers. In each commune insurance policies are issued to a representative appointed by the

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**Area-yield index-based insurance scheme for rice farmers**

Area-yield index-based insurance provides coverage against fluctuations in the average yield of a large geographical area. Indemnity payments are made when the actual yield falls under a certain threshold. (Aginsurance Project, no date)

For the Vietnam pilot agricultural insurance scheme an area yield index was implemented in order to reach small rice farmers whose average farm size is 1 hectare and that cultivate up to four rice crops per year. The index cover is based on rice yields per season and commune as determined by the General Statistical Office (GSO). Payouts are made if the actual yield is below 80 percent of the average yield over the last five seasons. The shortfall in yield is multiplied by the pre-agreed price per ton of rice and multiplied by the area planted for each farmer. Since the yield index is based on official commune yield data, each farmer in a commune obtains a payout in case of a claim in function of the yield shortfall and his area planted. Farmers are required to purchase insurance for the entire cultivated area and for all crop seasons.

**Indemnity-based insurance scheme for livestock and aquaculture**

Indemnity-based insurance makes payouts to farmers based on actual economic losses incurred.

Under Vietnam’s pilot agricultural insurance scheme indemnity-based livestock insurance is provided for buffaloes, dairy and beef cattle, breeding and fattening pigs as well as for poultry. The insurance is offered to two types of farm operations: large farm businesses and individual households with clearly defined thresholds in terms of number of animals. The sum insured is based on a pre-agreed value per animal and is below market value.

Insured aquaculture species include prawn, white-leg shrimp, and two catfish species in the Mekong delta. The sum insured is based on replacement costs and takes into account the cumulative costs of feed to the date of loss as well as the pre-agreed value of stock that is brought into production originally.

For both, livestock and aquaculture, the insurance policy covers actual losses from natural hazards (storm, flood, drought, cold spell, frost, and tsunami) as well as specific epidemic diseases the outbreak of which is to be declared or confirmed by competent authorities. For epidemic diseases affecting livestock, insurance payouts are made for death and slaughter order of animals by the government.

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commune’s farmers (e.g. head of commune of local farmer’s union). The representative receives all necessary support from local authorities and signs-up the farmers interested in the insurance program. He is responsible for recording records all insurance relevant information, collecting the insurance premium from the farmers, and distributing claims payments. The scheme thus does not sell insurance policies to individual farmers but instead group policies to farmer communes. This approach helped reduce transaction costs and gain access to farmers (Vina Re 2012). 8

The penetration rate of the insurance scheme is still low. For instance, the scheme has been adopted for only about 2.6 percent of the total rice cultivation area in the pilot provinces. And farmers that have taken-up insurance are pre-dominantly the very poor farming households that enjoy a 100 percent subsidy on premium rates (Vina Re 2012).

**Lessons Learned and Success Factors**

The pilot agricultural insurance scheme faced a number of significant challenges. Vietnam lacks a viable agriculture insurance market, adequate data systems and reliable statistics including, for instance accurate, reliable, and timely crop statistics, animal mortality rate, or weather information services. Significant efforts had to be put in place to develop the insurance market and support it through a legal framework. The legal framework specified the financing source, set-up special financial regulations and insurance procedures. The agricultural insurance scheme is thus policy-driven.

Communication with farmers was important to manage their expectations and build understanding of area-yield index based insurance programs (e.g. explaining why individual claim payments are dependent on others’ losses). The agricultural insurance scheme was considered as an entitlement for government support rather than an insurance service to be paid for.

Communication was also key in managing expectations of the other multiple parties involved, including politicians, social organization leaders, administrators, and businesses. While overall the scheme aims to support less privileged farming households it also needs to consider requirements of commercially operating insurance businesses. All parties involved had to understand the challenges involved in implementing a scheme pursuing both social and commercial goals. An agricultural insurance scheme of this scale cannot progress as fast as smaller commercial schemes (Nguyen, 2012).

**Potential for Replication**

Agricultural insurance schemes play an important role in economies depending on food production. Where an efficient local insurance market is missing public-private partnerships are needed to provide risk solutions that benefit both governments and communities.

The Vietnam pilot agricultural insurance scheme, which is still at an early stage, will provide valuable lessons learned for innovative public-private partnerships in the agricultural risk insurance sector. Other economies will be able to draw upon these insights but every insurance scheme will have to reflect an economy’s specific risk landscape, stakeholder constellation and expectations, and insurance market

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8 Such as area planted per season for rice, number of livestock per type, the aquaculture area and volumes produced before issuing an insurance certificate to the farmer.
conditions. Every economy will have to structure its very own innovative partnership to protect itself against the financial impact of natural disasters (Swiss Re, 2011 and Nguyen, 2012).

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Conclusions

Throughout the APEC region evidence can be found for the effectiveness of cooperative approaches between government, business and the not-for-profit sector in building resilience of economies. Government, businesses and civil society organizations frequently have common disaster resilience goals that can create strong synergies when they can pool resources to monitor, assess, and address risks. When public and private stakeholders are able to achieve effective coordination, this can lead to a virtuous cycle, where improved information and communication motivates better planning and investments in building more resilient communities.

As the public increasingly expects business to play a greater role in society, corporations are more and more willing to contribute to socioeconomic needs. Particularly, businesses have proven their willingness and capability to contribute to post-disaster relief and response efforts. They understand that such involvement does not only help meet public needs but also enables them to reap business benefits. Few businesses, however, understand the broader concept of disaster management and the role they can play in building resilience. Building this understanding is essential in order to leverage business engagement and move away from short-term post-disaster contributions to long-term engagement in resilience efforts.

The public sector increasingly acknowledges the benefits of business engagement in disaster management. To encourage greater private sector engagement there is a need for the public sector to:

• play an active role in building business understanding of a resilience-based approach to disaster management and advocating collaborative endeavours,
• better understand and communicate business opportunities of collaborative efforts for disaster resilience,
• organize multi-sector fora that enable regular dialogue, sharing of best practices and lessons learned, and to
• establish strategic approaches, mechanisms and frameworks for public-private collaboration, that encourage the creation of new and innovative ways for business engagement.

Case studies identified through this study report represent singular examples of successful partnerships between government, business and the not-for-profit sector. They demonstrate the increasing interest throughout the APEC region of both, the public and private sector, in collaborative endeavors. However, greater effort is needed to increase understanding of and capabilities for a resilience-based approach to disaster management and multi-sector partnerships. Understanding and capabilities of both, the public and private sector, need to be built in order to move from singular success stories to cooperative, mutually beneficial efforts at larger scale.