

# Private Sector Strengths Applied

Good practices in disaster risk reduction from Japan

2013



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# Foreword

The case studies presented here focus on good practices and lessons learned by the private sector in relation to the Great East Japan Earthquake of 11 March 2011. The selection of fourteen case studies was compiled by the United Nations Office for Disaster Risk Reduction (UNISDR) in cooperation with Kokusai Kogyo, a member of the UNISDR Private Sector Advisory Group – one of several Japanese companies that rushed to the scene of the earthquake to provide immediate, post-disaster assistance to the government.

In the face of immense destruction, private companies such as Kokusai Kogyo and others featured in this collection showed a remarkable ability to support resilience-building, recovery and reconstruction in the Tohoku region. The enormous tsunami triggered by the M9.0 Great East Japan Earthquake destroyed the prefectures of Miyagi, Iwate and Fukushima in Japan's Tohoku region, with far-reaching impacts all over Japan, both economic and social. But in the midst of devastation, collaboration between the public and private sectors enabled the two to complement each other to create a conducive environment for disaster risk reduction.

Because of their direct relationship with customers and suppliers – and all other individuals in between – the private sector proved able to influence communities to adopt more resilient thinking. In addition, when private companies invest in disaster risk reduction to preserve their own business continuity, it has the effect of protecting communities where their workforce and customers reside, thus help communities advance their disaster prevention, mitigation and preparedness.

Ultimately the best use of disaster experience is to learn from them and subsequently apply this knowledge in order to better cope in the face of future disasters. The case studies presented in this publication are examples of this. Disaster risk reduction will be most successful if we are able to accelerate learning from disasters by consciously applying the lessons to our own situations.



**Margareta Wahlström**  
Special Representative of the Secretary-General  
for Disaster Risk Reduction



## Photos (from top)

Minami Sanriku Town in front of collected debris,  
September 2011

With children from Tohoku, July 2012

With Fukushima business women, February 2013

In a temporary shopping mall in Minami Sanriku Town,  
February 2013

Minami-Sanriku Town in front of Shizugawa Junior High  
School, overlooking the devastated coastal area of the  
town, February 2013

Photos by UNISDR unless otherwise stated.

Photo by Save the Children Japan



# Introduction

This publication highlights the role the private sector can play in disaster risk reduction (DRR), with a focus on the strong contributions made by private businesses across sectors, utilizing their core business strength(s). An earlier UNISDR publication about the private sector, *Private Sector Activities in Disaster Risk Reduction: Good practices and lessons learned* (2008), explored three categories of private sector contribution: 1) advocacy and awareness raising partnerships, 2) social investment and philanthropic partnerships, and 3) core business partnerships. This publication now explores the third, core business partnerships, as the partnership with the most potential for a sustainable and wide-reaching effect in society.

The common theme tying this collection of good practices together is the Great East Japan Earthquake, a M9.0 earthquake that occurred off the coast of northeastern Japan at 14:46 on 11 March 2011. The earthquake triggered a massive tsunami that devastated the coastline, caused widespread disruption in utilities, communication, and transportation, not only in the northeastern prefectures but also in the metropolitan Tokyo area. This disaster was an unforeseen event in terms of its size and complexity with 15,883 confirmed deaths, 6,143 injured, and 2,681 people missing as of 10 April 2013<sup>1</sup>; more than 500 square kilometres inundated, a nuclear power plant accident, and economic damage estimated at 16.9 trillion yen.<sup>2</sup>

The private sector can put many elements found among their business practices to use towards DRR. The private sector can make communities safer and more resilient by setting standards and quality assurance criteria for safer structures in urban areas, invest in programmes or individual projects towards risk reduction efforts in their country and community, provide expertise to help with administration, internal business processes, and external disaster risk assessments, and act as a wellspring for socially responsible volunteers and funding.

In this publication, fourteen examples from diverse industries in Japan illustrate how the private sector can contribute to disaster resilience, recovery, and reconstruction through the application of their core business strength(s), beyond the forms of contribution typically made under the name of corporate social responsibility.

The narratives of how businesses in various sectors responded to the Great East Japan Earthquake are a window into *what existed before the disaster*, in other words, the risk reduction, preventive and preparatory measures taken by these companies. Private businesses across Japan, despite the disruptions – physical and economical – suffered, were able to shoulder their responsibility as stakeholders in society, *precisely* because they had already invested in risk reduction and business continuity measures, and had actively incorporated DRR into their business models and products. Additionally, the narratives also address the question of *what didn't exist*, i.e., what was spontaneously adapted and created in reaction to unforeseen needs and how these new lessons learned will be incorporated by these businesses into their risk reduction process in the future. Last but not least, the narratives provide a window into how businesses, local governments, and local communities could, and did, work together.

The private sector has the potential to contribute to all the three strategic goals and five priorities of the *Hyogo Framework for Action*. It is therefore essential that their involvement in DRR be encouraged. A private sector committed to DRR can steer public demand towards materials, systems, and technological solutions to build and run resilient communities.

In this publication, the fourteen good practice examples are grouped under the three strategic goals specified in the Hyogo Framework for Action. Each example concludes with a summary of: 1) what worked as good practices, 2) what lessons were learned, 3) practical tips for replication, and 4) how the case is connected to HFA. A brief introduction to the HFA as well as an overview of the links between this publication and the five priorities of HFA can also be found in the concluding section.

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<sup>1</sup> Damage Situation and Police Countermeasures associated with 2011 Tohoku district - off the Pacific Ocean Earthquake, *Japanese National Police Agency (as of 10 April 2013)*

<sup>2</sup> Learning from Megadisasters: Knowledge Notes Executive Summary, 2012, *International Bank for Reconstruction and Development, The World Bank*



The *Global Assessment Report on Disaster Risk Reduction 2013* (GAR13) 'From Shared Risk to Shared Value: the Business Case for Disaster Risk Reduction'<sup>3</sup>, explores the interactions between business investments and disaster risk. It highlights how disasters are a growing global challenge to business and country competitiveness, sustainability and resilience - and why business will have to play a central role in the effort to reduce disaster risk. Damage to public infrastructure, transport and energy networks, as well as workforce losses that result from disasters interrupts business, creates additional costs, and threatens the sustainability of all businesses. GAR13 demonstrates that investors have paid insufficient attention to DRR, resilience, and sustainability of a business; the simple focus has been on business continuity planning. Thus, businesses have not fully recognised the shared risks, or the potential for shared value. Investment in risk reduction is gradually being seen as an opportunity, further cementing the argument for risk reduction in the private sector. As awareness of shared risk grows, so will investment in risk reduction by the private sector, creating more shared value for both the public and private sectors.

The concluding section of this publication ties the fourteen cases to five important take-home messages, and also links the points highlighted in the *Global Assessment Report on Disaster Risk Reduction 2013* to specific cases that serve as illustration.

This publication is jointly presented by UNISDR Hyogo Office and Kokusai Kogyo, a Japanese geospatial information consulting firm, whose Chairperson and CEO is one of the 17 members of the UNISDR Private Sector Advisory Group for Disaster Risk Reduction (PSAG). The PSAG brings together leading global private sector actors who are aware of the benefits that DRR actions have on their businesses, and calls on the wider private sector community to increase engagement in DRR through a call to action. The call to action, the *Five Essentials for Business in Disaster Risk Reduction*, is presented at the end of this publication.

The specified ten-year period of the HFA (2005-2015) will conclude in 2015. Building on the HFA, the consultation process to develop a post-2015 framework for DRR will culminate at the World Conference on DRR in 2015 in Japan. It is our hope that this publication serves as a practical guide and a source of concrete ideas, not only to private sector companies looking towards further engagement in DRR, but also to public sector actors wishing to engage and/or partner with the private sector towards 2015 and beyond.

**Yuki Matsuoka**

Head  
UNISDR Hyogo Office

**Sandra Wu**

Member of UNISDR Private Sector Advisory Group  
Chairperson and CEO  
Kokusai Kogyo Co., Ltd.

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<sup>3</sup> <http://www.preventionweb.net/english/hyogo/gar/>

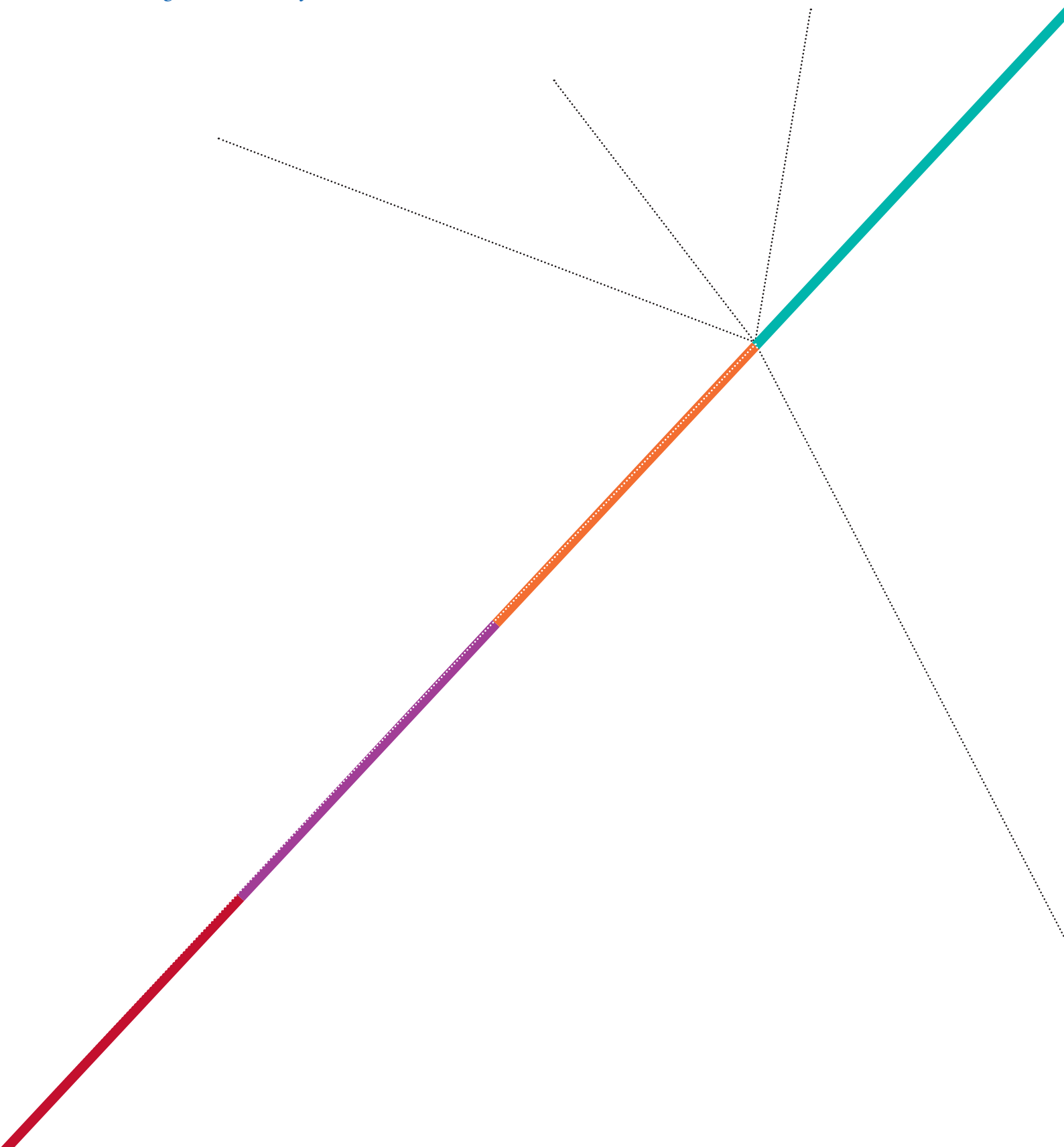


# HFA Strategic Goal (a)

The more effective integration of disaster risk considerations into sustainable development policies, planning and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction.

— Hyogo Framework for Action 2005-2015:

*Building the Resilience of Nations and Communities to Disasters*





# 1 Community Development

## Building resilient towns

*Kokusai Kogyo Co., Ltd.*

In 2009, Kokusai Kogyo Co., Ltd. launched an environmentally friendly property (real estate) development project in the Tagonishi area of Sendai City. The project originally intended to build an innovative low-carbon-footprint neighbourhood using the mixed-use rezoning method of property development. Kokusai Kogyo obtained the consent of approximately 70 landowners for development, drew up the plans, applied for and received the necessary permits, finalised the architectural design for necessary buildings and facilities, and had just started construction and actual development, when the Great East Japan (GEJ) Earthquake occurred on 11 March 2011.

The tsunami damaged Sendai City extensively. Post-disaster, the city began an urgent search for inland locations suitable for the mass relocation of their coastal residents, whose old neighbourhoods were now designated as Disaster Hazard Areas and thus off-limits for reconstructing homes. Securing land and homes for relocation proved extremely difficult for Sendai City, especially as the coastal residents expressed a wish to stay near their old neighbourhoods. As the Tagonishi area was close enough to pre-relocation neighbourhoods and at the same time safe from potential tsunamis, it was named by Sendai City as one of the city's mass relocation areas.

Knowing that disaster-affected communities suffered extensive disruption to their livelihoods after the GEJ Earthquake through the lack of electricity, Kokusai Kogyo decided to change their project design to achieve energy self-sufficiency. Kokusai Kogyo identified and assembled partners in academic, public, and private sectors, negotiated for government subsidies, and built a solid technological, organizational, and financial foundation on which the newly named Green Community Tagonishi could now be built as a disaster-resilient town.

The disaster resilient, low-carbon-footprint, nature-embracing Green Community Tagonishi, designed with the comfort of its residents in mind, has garnered attention as the embodiment of a new and positive direction in the reconstruction of disaster-affected areas and urban renewal.



*Aerial photo of Green Community Tagonishi under construction, March 2013*

Photo by Kokusai Kogyo

## The case study

### Background

The east coast of Sendai City in Miyagi Prefecture was extensively damaged by the Great East Japan (GEJ) Earthquake and tsunami. Sendai City had to promote the relocation of residents whose homes fall within the newly designated Disaster Hazard Area. Kokusai Kogyo Co., Ltd. is in charge of a property (real estate) development project that has become one of Sendai City's mass relocation destinations.

Kokusai Kogyo is a civil engineering consulting firm that offers technical services based on geospatial information expertise, such as disaster management, environmental conservation, and local government administration support services. Recently the company, with 1,200 employees, set the creation of green communities as its new corporate focus, and expanded its business line-up to include solar energy consulting and environmentally friendly urban planning and property development.

When the Tagonishi area was named a relocation area, Kokusai Kogyo decided to add disaster resilience to their basic project concept. This decision was made in consideration of the future residents of Tagonishi, who had survived the GEJ Earthquake and tsunami, as well as a long period of inconvenience afterwards, when access to everyday necessities and basic utilities such as electricity was nonexistent or difficult. It is not actually easy for private companies to invest in measures against disaster risk, because their stakeholders demand economically clear and short-term benefits in return for their investments. This case study describes how Kokusai Kogyo was able to make its concept of disaster resilient towns a reality, namely how the company identified and obtained funding for the application of cutting-edge disaster risk management technology towards the development of Green Community Tagonishi.

### An environmentally-friendly development project

Kokusai Kogyo's property development project in the Tagonishi area began in 2009. Originally, the project aimed to build and develop a low-carbon-footprint neighbourhood through mixed-use rezoning. In a mixed-use rezoning project, multiple landowners organize themselves into a committee, and each agrees to contribute a part of their land for the building of new roads and parks, as well as public and/or commercial facilities. The property values of the remaining adjacent residential lands increase when the additions of these new elements improve living conditions and traffic convenience. This makes the whole suburb healthier, property market-wise. About a quarter of Sendai City's urban

area has been developed using this method.

Kokusai Kogyo has a track record in managing mixed-use rezoning projects in Sendai City, and was trusted in this regard by both local residents and relevant local government departments alike. In order to develop the Tagonishi area, Kokusai Kogyo employees and landowners together went to Sendai City for advice, held study sessions and seminars on rezoning, and through such activities formed the Tagonishi Land Rezoning Committee with the cooperation of 70 landowners. Kokusai Kogyo was entrusted as the Committee's agent and put in charge of preliminary surveys, detailed design, the application for necessary permits and approval from local governments including Sendai City, identifying sources of funding, as well as eventual property sales. Kokusai Kogyo's Tagonishi property development project at this point of time was characterised by:

- A private-public-academic-civil society partnership element. Kokusai Kogyo provided technological and financial input in coordination with Miyagi Prefecture, Sendai City, and Tohoku University, while civil society, in the form of landowners, provided their land and acted as implementing body through the Committee.
- A large commercial development zone to increase property values and return profits to landowners.
- Three basic project concepts for the new community, namely 1) energy efficiency, 2) resident comfort, safety, and security, and 3) oneness with nature.
- Legally required disaster risk reduction (DRR) features. Japanese regulatory and public approval processes include many DRR-related standards and requirements accumulated through lessons learned from Japan's frequent encounters with disasters. In the project area, a storm water reservoir was built for flood control purposes, and soil stabilisation undertaken to prevent land subsidence.

### Selected as a mass relocation site

Kokusai Kogyo had finished the public approval process and detailed architectural design, and was about to start construction when the GEJ Earthquake occurred. Sendai City was heavily damaged, with 904 deaths, 30 missing and 2,271 injuries known to have occurred within city limits (as of February 2013). Following the disaster, Sendai City declared a part of its coastal residential area a Disaster Hazard Area, as tsunami risk in that area could not be sufficiently reduced by hard-infrastructure-based improvements such as tsunami walls. Sendai City decided to support the group relocation of residents living in the Disaster

Hazard Area through the national government's Special Financial Support for Promoting Group Relocation for Disaster Mitigation. Approximately 1,700 households were eligible for relocation under this programme, and Sendai City was faced with an urgent need to find suitable relocation candidate locations for all of these households.

None of the residents wished to move far away from home, greatly complicating the search by Sendai City. The Tagonishi area was found to satisfy the needs for closeness as well as safety, as it was located only two kilometres away from the Disaster Hazard Areas, but inland, and had low tsunami risk.

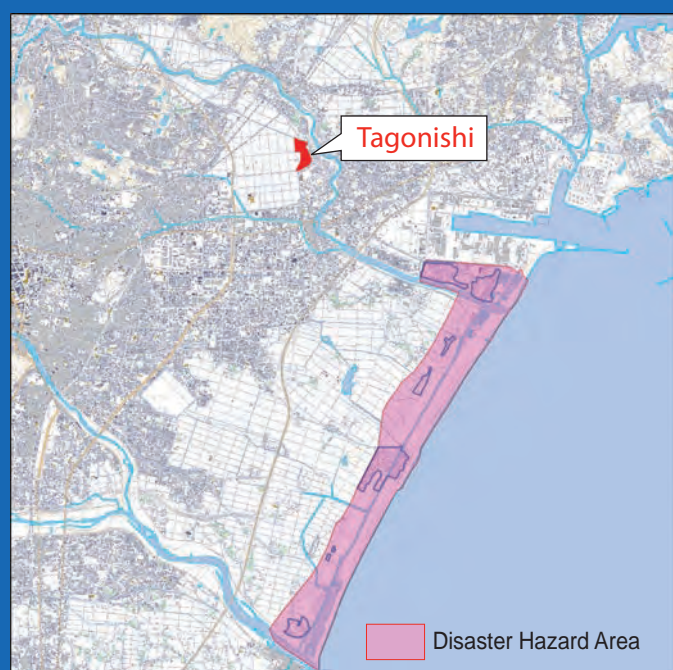


Figure by Kokusai Kogyo

Location of Green Community Tagonishi

## Becoming a disaster-resilient town

As a result of these developments, Kokusai Kogyo made two major changes to their project plan. The first was to increase the land available for residential housing to accommodate as many residents as possible, although this meant the planned commercial development zone had to be reduced in size. Of the overall development, 16.32 hectares in total, the commercial and residential zones initially occupied 51% and 15% respectively, but this was adjusted to 35% and 33% respectively. Sendai City purchased 1.6 hectares of residential land for the purpose of building Public Reconstruction Housing apartment buildings (4 blocks, 176 households), and the expected number of residents increased from 180 to around 1,800 persons.

Secondly, knowing that the GEJ Earthquake had severely dis-

rupted the livelihoods of their future residents, Kokusai Kogyo decided to add disaster-resilient urban infrastructure to their basic project concept.

Japan is a disaster-prone country, relative to the rest of the world. A history of disasters – caused by earthquakes, typhoons, heavy snowfalls, etc. – has taught Japan to respect nature; at the same time, it has worked on developing both its countermeasures to disaster risk, and its regulatory system that ensures countermeasures are properly taken. In an urban property development project, Japanese regulations first of all require developers to take area-wide DRR measures, such as soil stabilisation and flood control. It also specifies a range of DRR measures that need to be built into residential homes, from structural reinforcement to intelligent gas meters that automatically shut off the supply of gas in the event of an earthquake. Basically, Japanese regulations already require DRR technology to be deployed in every way possible to improve resilience of infrastructure and facilities, and yet, the GEJ Earthquake still caused massive damage.

Kokusai Kogyo thought hard about additional elements that would make their community more disaster resilient. While tsunami risk was already addressed by the inland location, Kokusai Kogyo decided that the risk for fuel shortages and stoppages to utility services, which had disrupted the livelihoods of many disaster victims over a long period in the GEJ Earthquake, needed to be addressed.

Among utilities-related risk, the most conspicuous was the risk of depending too much on the conveniences brought by electricity. In the aftermath of the GEJ Earthquake, nearly five million homes experienced blackouts in the six prefectures of Tohoku, and rolling blackouts were imposed on a wide area in East Japan as a pre-emptive measure against potential shortages in electrical power that summer. The disaster-affected areas, known for their cold weather, experienced extensive blackouts in the season when snow still occasionally fell, and residents were not only unable to light their homes, they were also unable to use their electrical heating equipment. Residents of high-rises with rooftop water tanks lost their water supply. Others lost the use of their home medical equipment, including respirators. Kokusai Kogyo decided it would address such impacts of electricity shortages on residents' livelihoods. The new DRR measure that Kokusai Kogyo would introduce to their project would be energy independence, or energy self-sufficiency. The company believed that maintaining electrical power, even during an emergency, was key.

The original project design set low-carbon footprints and high energy efficiency as goals. Measures already built into the project design to achieve these goals were upgraded to a self-sufficient



energy supply system to power the community even in times of emergency.

### ***Identifying appropriate subsidies***

Putting innovative DRR measures in place requires substantial initial investment as well as a high technological input. The difficulty lay in finding both funding and appropriate technical expertise.

Kokusai Kogyo found out that Sendai City was looking for end-user project applicants of a subsidy by the Ministry of Internal Affairs and Communications (MIC) for projects that utilize information and communication technologies (ICT), established in response to the government's Basic Guidelines for Reconstruction in Response to the Great East Japan Earthquake. Sendai City had applied for, and won, the right to allocate and use part of this national subsidy, one of the eligible applications of which was the development of 'smart grid' communication interfaces. A system that would ensure an emergency energy supply could be secured using ICT-based energy management systems and storage fuel cells in addition to solar photovoltaic and other low-carbon energy systems already in Kokusai Kogyo's project plans.

To join the selection process for the MIC subsidy, an application had to be submitted through Sendai City, and the applicant had to be a special purpose organization with members coming from more than one organization. To clear such prerequisites, Kokusai Kogyo and NTT Facilities Inc., a forerunner in the 'smart grid' field, formed the Sendai Green Community Association, a general incorporated association. The association also included one supporting member company, Nippon Telegraph and Telephone East Corporation. By showcasing the combined expertise that association member companies brought to the development of ICT-based energy management systems and independent energy supply systems, Kokusai Kogyo secured both funds and technological expertise for the project.

### ***Independent energy systems for DRR***

As a result of the MIC subsidy, Kokusai Kogyo added a new energy independence component to Sendai City's four Public Reconstruction Housing apartment blocks. They are designed to receive energy from the city grid in the form of high voltage electricity at a single incoming point, which is more cost-effective than having low-voltage power delivered to individual homes. An intelligent electricity meter (smart meter) with communication functions will be installed at each apartment, so that the balance of electricity supply and demand can be controlled through a demand-response system. Residents will receive discounts on their

electricity bill depending on the extent of their energy savings. To diversify energy sources and reduce risk, solar power generation and gas cogeneration systems (combined heat and power) will be used to efficiently utilise waste energy for heating water. A 'smart grid' energy management system will automatically send extra electricity generated by solar panels to storage fuel cells, visualise energy consumption to encourage energy conservation by residents, and send enough electricity to operate the community centre, which doubles as an evacuation centre, during blackouts.

The first 16 houses going on sale to the general public will also showcase the latest energy saving and generation technologies, including solar panels and storage fuel cells, in addition to being connected to the city's electricity supply. Two of these houses are also equipped to receive power from electric vehicles. Residential energy management systems will control the flow of electricity from these multiple sources for the most energy- and cost-efficient mix, and work to maintain electricity supply during blackouts.

The Sendai Green Community Association's initial role was to develop such energy management systems and install the required hardware. The association is also expected to continue to play a role after the community goes into operation, by providing electricity management services to residents, for example, by providing overall monitoring of energy supply and demand, achieving the most efficient mix of energy sources during times of normalcy, and making sure that there is sufficient supply during times of emergency.

The 16 houses, described above, are called 'smart houses' and are located in the Smart Village zone within Green Community Tagonishi. In this showcase neighbourhood, Kokusai Kogyo has worked in additional features to increase residents' comfort and



*Homes on sale at Green Community Tagonishi, April 2013*

Photo by Kokusai Kogyo

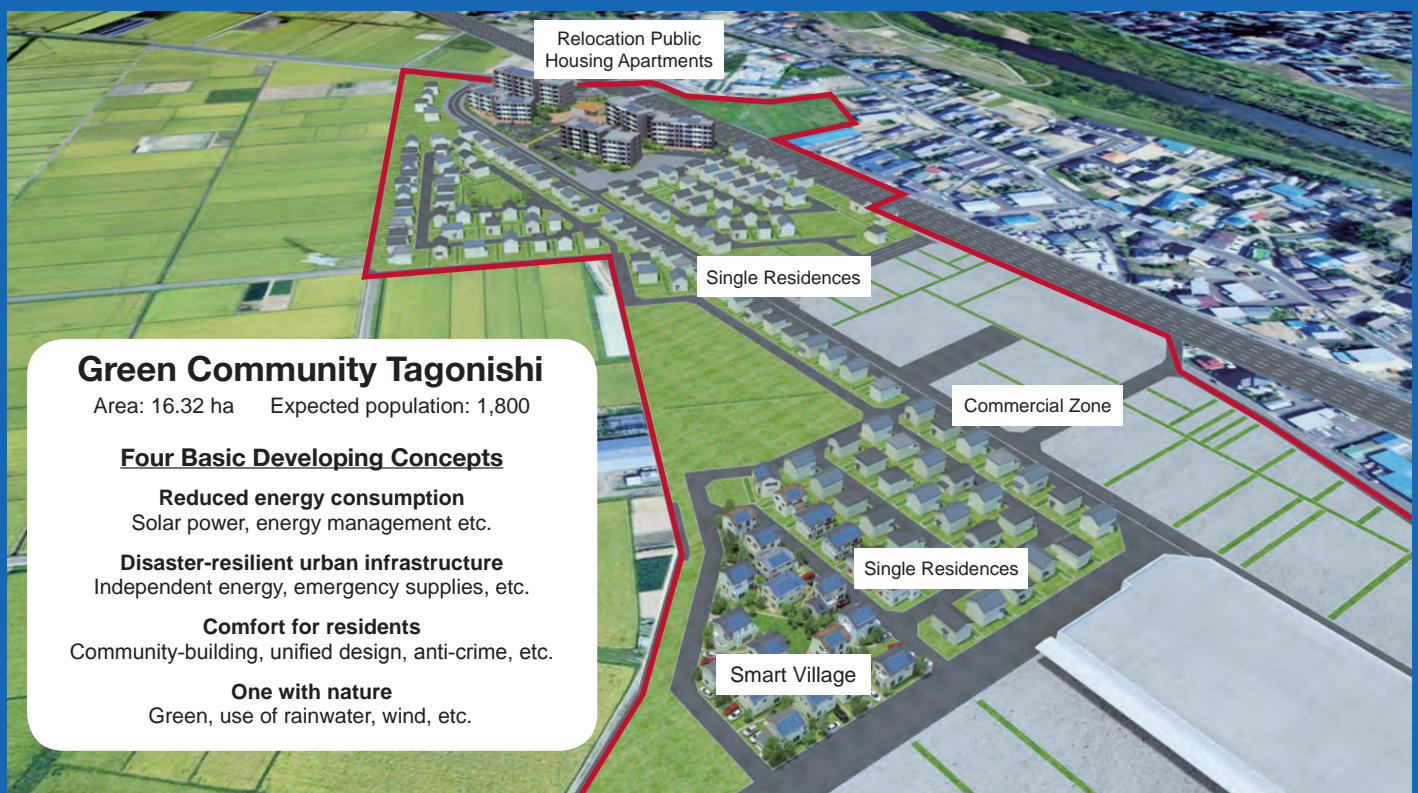
the feel of oneness with nature. Drawing on the expertise of multiple housing manufacturers and Tohoku University, the Smart Village will have, in addition to energy efficiency features:

- A communal area to increase the sense of community amongst residents.
- Homes arranged to take advantage of natural wind flow.
- Strategically placed paths to and from the communal area.
- Unfenced garden plots to enhance visibility and hence serve as a crime deterrent.

### *The future of Green Community Tagonishi*

Kokusai Kogyo plans to further develop their town energy management model, by introducing energy management systems, like those used in the abovementioned apartments and 'smart houses', to homes and buildings in other zones within the development, both residential and commercial. In addition, Kokusai Kogyo is preferentially selling the commercial properties to supermarkets and other retail stores, so that these stores could serve as a local source of supplies when disasters occur. The company plans to encourage the stores to enter into emergency agreements to secure a reliable supply of food and other necessities to the community when a disaster strikes.

As the world focuses on the recovery and reconstruction of the Tohoku region, this project in Tagonishi has garnered attention as the embodiment of a new and positive direction in the reconstruction of disaster-affected areas and urban renewal. Kokusai Kogyo will continue to apply cutting-edge technology towards building homes and communities that are environmentally friendly and disaster resilient.



Overview of Green Community Tagonishi



## The good practice

- Through lessons learned in the GEJ Earthquake, Kokusai Kogyo realised that one of the key features of a disaster resilient community was a secure energy supply in times of emergency. The company quickly moved to identify and add an energy management component that merged well with existing plans.
- The importance of investing in measures that reduce disaster risk is often not well understood by stakeholders, who demand clear and immediate results from investments. If DRR measures require application of cutting-edge technology, they could become even more costly. Kokusai

Kogyo solved the twin problems of technology and funds by forming a partnership with other private companies, demonstrating collective technological prowess, and successfully applying for subsidies through the partnership.

- Both national and local governments in Japan hope that Tohoku will build back better and stronger from the GEJ Earthquake, and not simply return to status quo. Such an outlook is conducive to the positive evaluation, and funding of, projects such as the one in this case study.

## Lesson(s) learned and scope for improvement

Japan has traditionally been diligent in applying its lessons learned from disasters and introducing countermeasures through urban planning, but the energy problems observed in the aftermath of the GEJ Earthquake have not been clearly

identified among its development goals so far. With public interest in alternative energy sources and energy efficiency still high, it is a good opportunity to systematically address how energy supplies should be secured in times of emergency.

## Practical tips for replication

- Engineering consulting companies can potentially become the driver behind projects by coordinating and building cooperation among various players, including landowners, tenants, governments, academia, and other private sector companies. Projects can be run this way in any country.
- Japan already has a regulatory system in place that re-

quires DRR measures as a precondition for development, but other countries, especially developing countries, lack this important regulatory mechanism. Weaknesses in the regulatory systems of cities and countries must be identified, and fixed step by step, so that DRR measures become mandatory in property and real estate development.

For further information:

**Kokusai Kogyo Co., Ltd.**

<http://www.kk-grp.jp/english/index.html>

### *How is this case connected to HFA?*

The Section 'General considerations to be taken into consideration for implementing the HFA priorities for action' (HFA, General considerations, paragraph 13, section 'j') highlights the need for proactive measures, and the importance of the reconstruction period as an opportunity to build resilience and reduce vulnerability to future disasters. The risk-conscious countermeasures being built into homes in Tagonishi is an example of such a proactive measure. Tagonishi's planners provided information to the public on disaster reduction options prior to construction. Such steps are especially highlighted in

HFA3 (HFA3, paragraph 18, Information management and exchange, section 'f'), as HFA3 emphasised the use of knowledge and information to build a culture of safety and resilience. Similarly the reconstruction efforts at Tagonishi are an example of HFA4 (HFA4, paragraph 19, Land-use planning, sections 'o' and 'r') which aims to reduce underlying risk factors to disasters through the mainstreaming of DRR into infrastructure planning, and development of building and reconstruction codes which foster the construction of disaster-resistant infrastructure at the national and local level.

## 2 Manufacturing

### Glass Power Campaign: providing safety and ease of mind through glass

*AGC Glass Japan/Asia Pacific, Asahi Glass Co., Ltd.*

The Glass Power Campaign by Asahi Glass Co., Ltd. (AGC), introduced in the 2008 UNISDR publication *Private Sector Activities in Disaster Risk Reduction*<sup>1</sup>, consists of a suite of activities aimed at promoting awareness of how glass can make an impact against disasters and various environmental problems on a global basis. Of these, AGC's disaster-resistant glass donation programme is a public private partnership (PPP) programme to replace windowpanes installed at designated evacuation centres throughout Japan with laminated and disaster-resistant glass. Thirty-three donations have been made since the inception of the programme in 2005.

In response to the Great East Japan Earthquake in 2011, AGC has donated disaster-resistant glass to nine evacuation centres (mainly school gyms) in three prefectures. Disaster-resistant glass ensures these centres will keep functioning as shelters during an emergency, and prevent further injuries while in use. Each donation has been accompanied by lessons about glass at primary schools.

<sup>1</sup> Part of this case study is reprinted from the 2008 publication.



*'Travelling Glass Safety Class' at Moka Elementary School*

Photo by AGC

## The case study

### Background

Of the various kinds of glass products, windowpanes might be one of the most familiar in our daily lives. Windowpanes protect people from wind and rain and keep out the heat and cold. Windowpanes are thus very useful, but in past disasters such as earthquakes, windowpanes have sometimes caused serious damage: broken glass and windowpanes have injured people and rendered evacuation centres unusable.

When Niigata Prefecture, located in northwestern Japan, was hit by a devastating earthquake in October 2004, a large number of people were evacuated to shelters (mainly school gyms) and remained there for several days due to large aftershocks. The evacuees were afraid that the windowpanes might shatter into small pieces and cause injuries. They therefore stayed uncomfortably squeezed into the centre of the building to avoid potential injuries. Asahi Glass Co., Ltd. (AGC), a world-leading glass manufacturer, was shocked when hearing about this incident and launched the Glass Power Campaign as a direct result.

The Glass Power Campaign serves as a means of addressing global environmental problems, including disasters, and of raising public awareness on the disaster-resistant properties of laminated glass. Laminated glass will not shatter into small pieces, but instead stay in place in the windowpanes when it breaks or cracks. Its use could help make evacuees more safe and comfortable.

Originally started as a two-year project in 2005, AGC's Glass Power Campaign will continue as a long-term corporate social responsibility (CSR) project. The ultimate goal of the campaign

is to amend the country's building code and make the use of laminated glass mandatory in all emergency shelters. While the campaign is a corporate social responsibility (CSR) activity, it improves the visibility of one of AGC's products and has potential to contribute towards the improvement of AGC's business performance.

### The Glass Power Campaign

The Glass Power Campaign is structured around a dedicated website. The website introduces laminated glass to visitors through educational materials, such as online videos of experiments where laminated glass withstands direct hits by flying objects, and articles about specific disasters and damages caused. The site offers in-depth information for those who wish to learn more about glass. Participants of AGC's 'Travelling Glass Safety



The Glass Power Campaign website

Class' typically visit the website for more information.

When the Campaign was first launched, AGC used the popular vote among registered website users to select donation sites from a list of designated evacuation centres. While the donation site selection process has changed slightly since 2011, AGC has made a total of 33 donations to designated evacuation centres, of which 30 are to school buildings, as part of the Glass Power Campaign as of January 2013.

Donations have served as a catalyst to change. In 2008, the Ministry of Education, Culture, Sports, Science, and Technology of Japan (MEXT) advised that window safety should be taken into consideration when performing seismic retrofitting on schools. MEXT also announced that special funding will be provided for glass replacement when school buildings are reinforced for earthquakes.

Several local governments have mandated the use of laminated



Shattered laminated glass

glass when renovating public buildings, or strategic buildings such as shelters and lifeline operation centres. For example, in 2012, an elementary school in Moka City, Tochigi Prefecture, which suffered from tornadoes that year, was the recipient of a complete glass replacement job by AGC on its school gym which also served as the city's designated emergency shelter. The mayor of Moka City has since publicly stated his intention to introduce the measure to all elementary and middle schools in the city.

The Glass Power Campaign has been mentioned in many newspapers, TV and other media, and the message has also spread among local governments. The campaign enjoys increasing support from national and local government bodies and business partners. It was introduced at an international conference on disaster reduction held jointly by the World Bank, the United Nations, and the World Economic Forum in 2007, as well as the Third Asian Ministerial Conference on Disaster Risk Reduction in 2008. The campaign has been described on the website of the Cabinet Office of Japan since 2007, and again in 2012.

who had evacuated there had to sleep in their cars and on school buses. It was a cold night with snow and wind, and evacuees had to start and stop their engines throughout the night to run the heat, even though fuel was running low.

After the earthquake, donations of laminated glass were made to nine facilities in the prefectures of Iwate, Miyagi, and Fukushima – including the school gym of Matsuiwa Junior High School mentioned above – as part of the Glass Power Campaign. Nine local governments were asked to select a designated emergency shelter (for example, school gyms) as recipient. The construction was performed in stages beginning in September, and donations to all the facilities had been completed as of February 2012.

Under the Glass Power Campaign, the ceremony to hand over and complete the donation is accompanied by a lesson by AGC's 'Travelling Glass Safety Class.' In the classes, students and teachers participate in glass shattering demonstrations and other activities to get a feeling of how safe the laminated glass is, and by extension, how safe their evacuation centres are (see chapter cover photo). Experiencing how strong the safety glass can be leads to an even stronger sense of security.

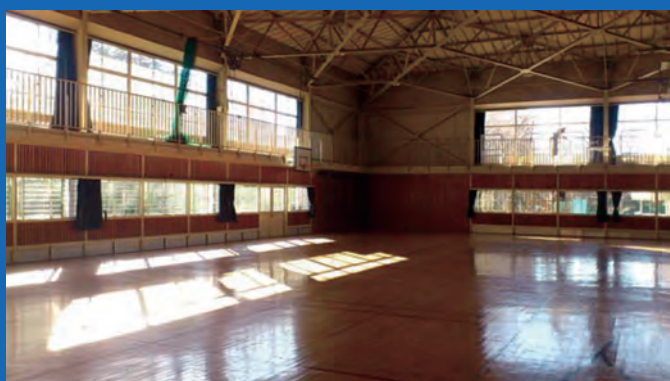


Photo by AGC

*School gym with laminated glass, Moka Elementary School*

### ***Glass safety: lessons from the Great East Japan Earthquake***

Testimonies from the Great East Japan Earthquake reiterate the necessity of laminated glass in schools and evacuation shelters.

At Matsuiwa Junior High School in Miyagi Prefecture, most of the pupils were in the school gym on the day of the earthquake, rehearsing for the graduation ceremony that was to be held the next day. All of the windows started breaking when the unusually severe shaking began. With shattered glass raining down, the students inside the gym started panicking, and several students and teachers were injured from the glass while evacuating outside. At night, the school gym could not be used as an evacuation centre as planned, meaning the students and local residents



## The good practice

- Through the campaign, AGC fulfils its social responsibility, as a world-leading glass manufacturer, to use glass to protect people. It also takes advantage of its long-standing expertise to provide the best solutions for glass-related problems.
- AGC was able to generate interest among local governments and mass media in glass safety issues by providing laminated glass window donations for evacuation shelters through the campaign.
- The campaign uses the internet to communicate the advantages of laminated glass for disaster resistance in a way

that is direct, quick, easy, and economical. An added effect is that as the number of registered website users increase, the public authorities are likely to pay more attention to the company's disaster risk reduction activities and will listen more carefully to the company's message.

- The Glass Power Campaign has achieved tangible results in promoting disaster risk reduction, and in raising public awareness about the importance of disaster risk reduction.

## Lesson(s) learned and scope for improvement

- As a world-leading glass company, AGC has the responsibility to reduce glass-related disaster risks and to provide the best solutions available. However, some public agencies may be hesitant to meet with company representatives because of the assumption that they will be trying to promote their company's products. A donation component and a significant number of registered website users serve as a way for private sector companies to promote a cause.
- The public generally does not know much about glass and

may initially be somewhat afraid of it. An informational website facilitates the dissemination of information and knowledge about a risk-reducing product, as well the need for disaster risk reduction.

- Creating and maintaining a website that would be attractive enough to ensure high traffic are major challenges, as even websites with a serious message and accurate information do not tend to attract high traffic volumes.

## Practical tips for replication

The project methodology is very simple and would not be difficult to replicate by manufacturers in different industries, such as furniture manufacturers, ceiling material manufacturers, and those who make other products relevant to disaster risk reduction. More laminated glass means greater numbers of people protected and higher returns for the glass industry. Glass manufacturers in other countries could easily replicate the project.

Manufacturers of products for disaster risk reduction need to un-

derstand the following:

- Their products protect people and are conducive to environmental preservation.
- Higher visibility could result in the increase in sales of their products.
- Their products improve both employee and customer satisfaction.

### *How is this case connected to HFA?*

Captured under HFA3 is the potential for substantially reducing disaster risk through education and dissemination of information relating to disaster risk. AGC's 'Travelling Glass Safety Class', in combination with their website, provide easily understandable information and education on how laminated glass can reduce disaster risks while taking into account the needs of the audience, particularly school children (HFA3, paragraph 18, Information management and exchange, sections 'a' and 'h'). The website also serves as a user-friendly information-sharing system for exchanging information on cost-effective and easy-to-use DRR technologies (HFA3, paragraph 18, Information management and exchange, section 'e'). HFA4 specifies key activities to reduce disaster risks related to social,

economic and environmental conditions through sector development planning and programmes, including key social and economic development activities such as the strengthening of public facilities and physical infrastructure, particularly schools and disaster management centres (HFA4, paragraph 19, Social and economic development practices, section 'f'). These points directly pertain to this case study provided by the Asahi Glass Company. Their campaign also addressed the issue that programmes for displaced persons should not place them at increased risk (HFA4, paragraph 19, Social and economic development practices, section 'i') by increasing the resilience of emergency shelters to disaster risks which may cause further injury.

For further information:

**Asahi Glass Co. Ltd.**

[www.glasspower.jp](http://www.glasspower.jp)

[www.agc.com/english](http://www.agc.com/english)

### 3 Water Treatment

#### Disaster resilient lifelines: fulfilling community responsibility through resilient investment

##### *Wellthy Corporation*

Damage to lifelines (main utilities) in a disaster can mean the loss of lives of elderly and the vulnerable, even if they have survived the actual disaster. It is vital to ensure redundancy in lifelines to prevent such additional casualties. In particular, it is important to have a backup water supply as it can take time to restore this particular utility.

Wellthy Corporation provides an alternative water system that draws on groundwater supplies, which can also be used in an emergency, as well as its operation and maintenance services for the system. As a result of having such a system installed, many of Wellthy's client companies were able to continue their business operations even after the 2011 Great East Japan Earthquake occurred. Moreover, residents living in the vicinity benefitted from these backup water supplies because the companies provided water to the community as part of their social responsibility.

As a provider of a service that contributes to their clients' business continuity, Wellthy has continued to strengthen its own business continuity planning (BCP). Wellthy's BCP has been highly rated by third-party organizations such as the Development Bank of Japan (see also Case 6 in this publication), which have opted to support Wellthy with preferential interest rates as a direct result. By obtaining such high evaluations of its disaster preparedness, Wellthy signals to potential clients that its business continuity, and thus its services, are reliable, and encourages its clients' investment in disaster risk reduction, in this case, a backup lifeline system.



*Groundwater Membrane Filtration System opening ceremony, Hino Motors Hamura Plant*

Photo by Wellthy Corporation

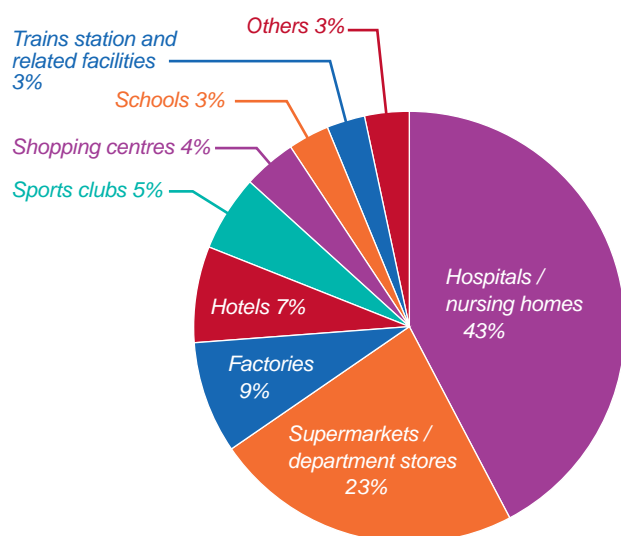
## The case study

### Background

In the 1995 Great Hanshin-Awaji Earthquake in Kobe, the public water supply facilities were damaged and service was cut off. This caused shortages in water that was essential for putting out fires, for drinking, and for other everyday activities of evacuees and residents. Water from rivers and seawater was used for fire fighting, and water from wells and swimming pools was used for drinking, washing, and so on. Approximately 1.3 million homes had their water supply cut off. Half of these homes were reconnected in about one week, while the other half were without water for between one to three and a half months.

In the 2007 Niigata Prefecture Chuetsu Earthquake, there were no severe water shortages because well water (groundwater), normally used for clearing snow, was available for use when the water supply failed. Additionally, past lessons were applied and emergency water supply trucks were deployed quickly in response to this disaster. Such experiences led to the realisation that more wells should be dug or maintained as a measure against water shortage risk.

Wellthy Corporation's Groundwater Membrane Filtration System (GMFS) purifies well water to meet Japanese drinking water standards. Since the GMFS will work in the event of a disaster as long as there is electricity, the system has been installed in a variety of facilities that are visited by a large number of people and use a lot of water, such as hospitals, nursing homes, supermarkets, department stores, factories, hotels, schools, and train stations. A total of 937 units had been installed by Wellthy throughout Japan as of January 2013.



GMFS uses hollow fibre membrane technology to produce high quality water that can be used for medical purposes as well as drinking by removing viruses, protozoa, and bacteria that cause food poisoning, etc. The plants are custom designed and constructed to meet the needs of the clients in terms of water volume and quality.

The business model is as follows: Wellthy designs, installs, operates, and maintains the plant; in return, clients agree to pay Wellthy, instead of the public water utility, a monthly fee according to the amount of water they use. While the GMFS is usually able to provide sufficient amounts of water for the client facilities' water demand, Wellthy specifically recommends its clients to continue using the public water supply in conjunction with GMFS, as far as cost considerations allow, in order to ensure a dual water supply in the event of a disaster.

By maintaining redundancy in their water supply, that is, having water supplied from two sources, facilities with GMFS will have access to water fit for drinking and medical use even if the public water supply is cut off in a disaster. They will thus be able to continue their business operations. Because the GMFS is in use on a daily basis, not just during an emergency, it is reliable and does not need to be switched over or started up in emergencies. Even if, by chance, the GMFS stops working in a disaster, it will likely recover more quickly than the public water system because the contract includes operation and maintenance services.

Moreover, safe groundwater can be supplied to local residents by operating the GMFS longer and thereby increasing the output in a post-disaster situation. Thus, the GMFS not only contributes to the client's business continuity but also its social responsibility, builds community bonds and instils a positive impression of the

Type of facility	Number	Percent
Hospital/nursing homes	396	42.3%
Supermarkets / department stores	216	23.1%
Factories	80	8.5%
Hotels	69	7.4%
Sports clubs	51	5.4%
Shopping centres	39	4.2%
Schools	29	3.1%
Train stations and related facilities	25	2.7%
Other	32	3.4%
Total	937	100.0%

*Facilities with GMFS installed as of January 2013*



facility and the organization. A formal emergency agreement to supply water might even be established with the local government, allowing Wellthy's clients to make a significant contribution to local disaster risk reduction.

### ***Business continuity founded on disaster resilient lifelines (main utilities)***

The Business Continuity Guidelines published in 2005 by Japan's Central Disaster Management Council states that it is desirable for facilities with a high likelihood of becoming evacuation centres or shelters in the event of a disaster, such as hospitals, hotels, and train stations, to be equipped with measures to cope with extensive failures to public water, gas and electric utility services. In fact, 43% of facilities that chose to install GMFS are hospitals or nursing homes that provide services which require a great deal of water, such as dialysis treatments.

Mito Medical Centre, a national hospital located to the northeast of Tokyo, in Ibaragi Prefecture, installed a GMFS in January 2011, just one and a half months before the Great East Japan (GEJ) Earthquake. As a result, even though the immediate area was without water for 14 days, Mito Medical Centre was able to stay in operation and take care of its patients. The hospital was also able to accept over 110 additional inpatients, from another hospital in Mito City that was damaged by the earthquake, and from a hospital in neighbouring Fukushima that had no water supply after being damaged by the tsunami.

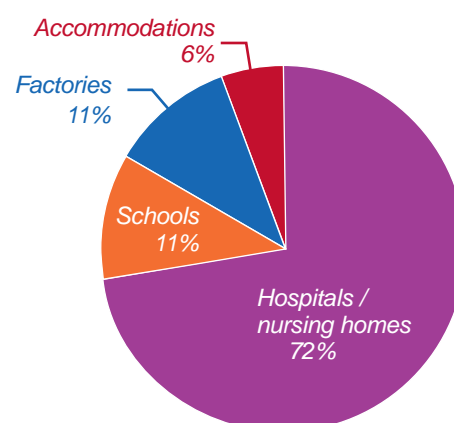
The director of the hospital, Mr. Makoto Sonobe recalled, "Another hospital in our area had a well, but we were the only one with ready access to water that could be used for medical purposes. Although hospitals are given priority by water trucks, it would have been difficult to cover our needs with just water trucks as

we use about 270 ton of water per day. Because we had been prepared with backup lifeline systems including a backup water supply, we were able to take in additional patients, contribute to the local community, and even be thanked by many people."

The Investigative Meeting on Disaster Medicine in Japan at the Ministry of Health, Labour, and Welfare (MHLW), convened after the GEJ Earthquake, has commended Mito Medical Centre's success in providing emergency medical assistance through its backup water supply and other business continuity measures. Following the findings in their Final Report, MHLW has updated their criteria for the designation of disaster base hospitals. Disaster base hospitals are now required to have enough water for medical examinations during disasters, and the criteria now specifically mention wells that can still be used in the event of a power blackout as a countermeasure that satisfies this requirement.

### ***Spreading the benefits to the community: emergency agreements through GMFS***

Among Wellthy's clients that have installed GMFS, some have gone beyond their own business continuity, and entered into formal emergency agreements with their local communities to provide their excess water, after calculating their water use, in the event of a disaster. Eighteen emergency agreements to provide drinking water via GMFS to local residents in an emergency had been made with local governments and community associations as of August 2012.



Type of facility	Number	Percent
Hospital/nursing homes	13	72.2%
Schools	2	11.1%
Factories	2	11.1%
Hotels	1	5.6%
Total	18	100.0%

*Number of GMFS clients that have concluded emergency agreements, as of August 2012*



*Emergency inpatients in Mito Medical Center*

Photo by Wellthy Corporation

It should be noted that ten of these emergency agreements were made in the five years leading up to the GEJ Earthquake, while eight more have been concluded in one and a half years since the disaster, showing an increasing trend. The inclusion of privately owned GMFS in community risk management plans through emergency agreements is a prime example of the successful utilisation of private sector strengths and investments in disaster risk reduction (DRR).

In most cases, emergency agreements about GMFS simply contain an arrangement for the supply of groundwater. Some emergency agreements, however, aim to reduce risk across even wider categories. In 2008, Chiba University of Commerce concluded a comprehensive agreement which included a DRR component with Ichikawa City in Chiba Prefecture, the city that the university is located in. The comprehensive agreement covers six areas, including DRR, in which academic-local government cooperation such as the sharing of human and physical resources, and joint projects, can be hoped to lead to local community development. As part of this agreement, the university campus has been registered as a municipal evacuation centre, and its GMFS will supply 200 tons of water per day in the event of a disaster. The university has also agreed to keep a supply of stored food and other necessities.

Another client of Wellthy, Hino Motors Hamura Plant, located in Hamura City, has concluded an emergency agreement with the city in August 2012. The agreement, called the 'Agreement for emergency response activities [by Hino Motors Hamura Plant]', promises access to a water supply (a well), use of a ten-ton water truck and heavy machinery, loan of fuel, use of their plant premises as a temporary emergency evacuation location, as well as assistance in fire fighting and first response activities. The emer-

gency agreement followed the installation of the GMFS, which made it possible for Hamura Plant to provide purified groundwater as drinking water to the community in an emergency. This has now become an integral part of the auto plant's corporate social responsibility (CSR) activities. The GMFS at Hamura Plant has a special faucet that allows the auto plant's ten-ton water truck to connect directly. Moreover, emergency water faucets are located on the side of the unit that faces the public road, so that local residents may access the water in times of need. There are two backup generators dedicated to the GMFS, as well as an emergency supply of fuel for them and the water truck.

### ***Dependable business continuity as private lifeline service provider***

When the GEJ Earthquake struck, there were a total of 501 GMFS units installed in the Tohoku and Kanto (greater Tokyo and surrounding areas) regions, which were the most affected. On that day, Wellthy promptly acted according to its BCP and within 40 minutes had confirmed the safety of all of its employees, including those in the Tohoku region. Then, again in accordance with its BCP, it confirmed the status of all of its clients' GMFS units.

While the confirmation was underway, Wellthy also instructed its local offices and contracted maintenance companies to start inspections. Due to restricted access to the disaster zone, which resulted in the Tohoku Expressway being closed to regular traffic, emergency vehicle status was applied for and received within two days from the Miyagi Prefectural Government. Accordingly, Wellthy was able to send one team from Tokyo on the third day and another two teams on the fourth day after the quake to carry out the necessary repair work. While some minor repairs were necessary, only a few out of the 501 plants in the Kanto/Tohoku region suffered damage that affected the units' operation, such as damage to the foundations or piping. Within one week, all emergency repairs had been completed. The GMFS proved to be resilient to earthquakes, continuing to operate relatively smoothly while the public water supply was either unavailable, or able to only provide turbid water.

Wellthy fulfils its corporate responsibility as a lifeline service provider by strengthening its business continuity management, and thus being able to rapidly deal with emergencies. Wellthy formed a BCP project team in 2005, and compiled a BCP manual, guidelines and checklists, as well as company action policies by 2006. The checklists cover over 30 different risk scenarios, from earthquakes to fires, floods and food poisoning, as well as the actions to be taken by each department in each scenario. The lists are designed to enable prompt decision making, so that risk iden-



Photo by Wellthy Corporation

Water tanker truck outside GMFS at Hino Motors Hamura Plant

tification leads to appropriate response. Wellthy has intentionally adopted a 'risk approach' BCP that classifies risk scenarios into detailed categories. Through its practice drills, Wellthy has confirmed that appropriate company-wide actions can be taken when the 'risk case number' is called out, using this approach. In 2009, a pandemic risk scenario was added to its BCP.

Wellthy activates its BCP procedures every time there is an earthquake of Japanese intensity scale five or greater. Thus, well prepared and practised, Wellthy employees reacted calmly even in the GEJ Earthquake.

Since the GEJ Earthquake, Wellthy has been working to instil an even greater sense of disaster preparedness in its employees. Once a month it conducts a practice drill for employee status checks, for both Wellthy and partner company employees. Wellthy has revised its BCP checklists based on the lessons learned from the GEJ Earthquake, and conducted a shakeout drill on 20 February 2013 at its headquarters and Kansai office according to an envisaged major earthquake scenario.

Such efforts by Wellthy have not gone unnoticed. In 2009, the Development Bank of Japan (DBJ) recognised Wellthy's exceptional preparedness by awarding Wellthy with its highest BCM Rating (refer to Case 6 in this publication) and preferential interest rates on loans. Additionally, in 2012, Wellthy received an-

other loan at preferential rates, this time through the Sumitomo Mitsui Banking Corporation's Business Continuity Assessment Loan Program, after it was awarded the bank's highest rating in the programme's history at that time. Currently Wellthy is in the process of obtaining ISO22301 business continuity management system (BCMS) certification. As a private lifeline service provider, such recognition and certification gives Wellthy's clients assurance that Wellthy is appropriately prepared, and that its products and services (including GMFS) will be there and ready when needed in an emergency. Thus, Wellthy's business continuity encourages their clients to invest in disaster risk reduction, and disseminates an invaluable product for disaster risk reduction that supports business continuity and provides an invaluable service to society.

## The good practice

- Wellthy develops a product that is conducive to disaster risk reduction, and focuses on its DRR strengths when marketing the product. By the act of marketing the product, Wellthy increases awareness of DRR, and if the product is installed, the number of facilities that can play an invaluable role in disasters increases.
- Wellthy encourages their GMFS clients to contribute to their community's DRR through concluding emergency agreements for the provision of drinking water to local residents in times of disaster. Wellthy also helps promote these clients' efforts by featuring case studies on their own corporate website.
- Wellthy is a small to medium enterprise (SME) with 130 employees, but it is readily and continuously investing in measures to strengthen its business continuity. Its clients are thus convinced by their sincerity in their DRR message and able to trust their DRR related products.
- Wellthy has proactively obtained third-party evaluations of its business continuity, despite it being a time-consuming

process. This also contributes to increased trust and reassurance in, as well as dissemination of, its products.

- Wellthy is spreading the DRR message via its water business and as a CSR activity outside Japan as well. For example, in 2008, Wellthy donated and installed a groundwater filtration plant that could supply a maximum of 40,000 residents daily with drinking water, in a housing area for evacuees from the Sichuan Earthquake in China. Wellthy's employees installed the system under severe conditions such as continuing aftershocks and under many restrictions; the company obtained cooperation from Japanese ministries and industry associations, as well as the Ministry of Housing and Urban-Rural Development and municipally owned water companies in China. Wellthy's contribution has been highly evaluated by both those affected by the earthquake as well as the authorities. Their efforts have helped to raise awareness of the potential for utilising groundwater for drinking and the importance of redundancy, or duplication of water supplies, in both countries.

## Lesson(s) learned and scope for improvement

- While electricity is usually restored more quickly than the water supply, there is a definite need for a backup power supply to an alternate water supply system.
- Redundancy in lifeline services at hospitals and evacuation centres needs to be further encouraged.

## Practical tips for replication

- The decision to install an additional or alternate water supply system might not seem feasible when just based on everyday cost savings or on the reduction in environmental impact. However, if the overall benefit, including business continuity (reduced risk) and contribution to society, is taken into consideration, then the decision to adopt such measures can be made.
- Ensuring that lifelines (main utilities) are resilient to disasters and ensuring redundancy in important lifelines are concepts that are relevant in any country. While it may be difficult to reduce risk in public lifelines, by utilising private lifeline services, disaster risk can be reduced independently on a case-by-case basis. Securing a safe and reliable water supply can directly increase a facility's appeal and ability to attract customers.
- A business model targeting facilities that use large volumes of water and/or attract many customers/visitors is an effective model for backup lifeline companies. Even if the water is not of a level fit for drinking, for example, redundancy in supply lines is of certain benefit to disaster risk reduction.

For further information:

**Wellthy Corporation**

<http://www.wellthy.co.jp/english/>

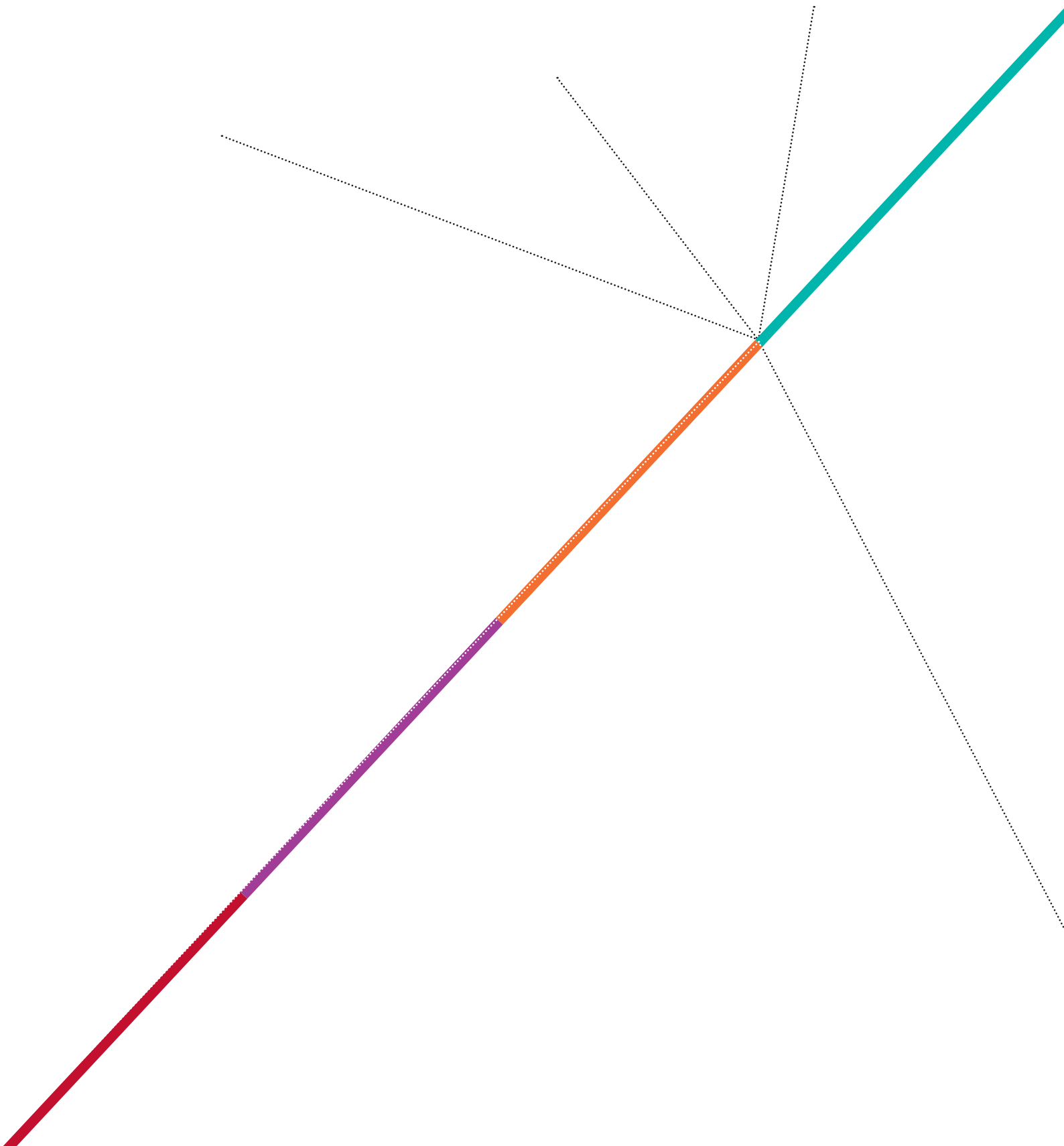
### How is this case connected to HFA?

Reducing underlying disaster risks outlined in HFA4 related to social, economic and environmental conditions should be addressed through sector development planning and programmes, including key social and economic development activities such as the strengthening of public facilities and physical infrastructure, particularly schools, water related infrastructure and disaster management centres (HFA4, paragraph 19, Social and economic development practices, section 'f'). Installation of groundwater purification systems supports resilient lifelines (utilities) and having a dual water supply encourages the presence of multiple measures for DRR in addressing the underlying risk factors to disasters, as suggested under HFA4. Wellthy's emergency agreements with their GMFS clients shows preparedness for effective response through providing access to essential relief supplies to community members, as mentioned in HFA5 (paragraph 20, key activities, section d).

# HFA Strategic Goal (b)

The development and strengthening of institutions, mechanisms and capacities at all levels, in particular at the community level, that can systematically contribute to building resilience to hazards.

— *Hyogo Framework for Action 2005-2015:*  
*Building the Resilience of Nations and Communities to Disasters*







## 4 Construction

### Business continuity is our social responsibility

#### *Kajima Corporation*

Kajima Corporation, the leading general contractor in Japan, met the Great East Japan (GEJ) Earthquake well prepared, with a business continuity plan (BCP) drawn from lessons learned from the 1995 Great Hanshin-Awaji Earthquake in Kobe, and outfitted with improved soft and hard business infrastructure based on the BCP. On the day of the GEJ Earthquake, the head office, as well as the branch office and construction sites located in the disaster area, reacted to the situation in an appropriate and speedy manner. The company was also able to secure their business continuity.

The work that had to be done before the first responders could move into the disaster area, save lives, and deliver emergency relief supplies – work such as the elimination of road obstacles and recovery of key infrastructure – relied on major construction companies like Kajima staying open for business and responding to requests for such work coming from both national and local governments. Business continuity by major construction companies thus contributes toward the curtailment of the effects of the disaster.

Early recovery of disaster-struck communities also depends on the business continuity of construction companies, because they provide damage assessment and repairs on the facilities and structures they have built. Through such activities they support the recovery of their clients, present and past, business and non-business. They also support the recovery of the communities directly when they honour emergency agreements and support the community through their industry association. This case study explores the effects and effectiveness of Kajima's BCP.



*Crisis response team meeting, Tohoku branch office, March 2011*

Photo by Kajima Corporation



## The case study

### Background

Our lives and economic activities heavily rely on infrastructure such as roads, railways, and airports. When a major disaster strikes, lives can be saved and economic losses will be kept to a minimum if such infrastructure are quickly returned to working order. Similarly, damage to homes and manufacturing facilities are best dealt with at an early stage, and reconstruction should begin as quickly as possible in order to minimise the effects of the disaster. Construction companies are expected to play a major role in all of the above activities, and thus, they must take steps to secure their business continuity even under the most adverse of conditions.

Kajima Corporation (Kajima) is a major construction company with project sites across Japan and the world. Their business continuity management (BCM) places the greatest emphasis on building an effective initial response structure.

Kajima has been careful not to let the establishment of the business continuity plan itself become the objective; they have taken care to keep incorporating new lessons learned, and to implement regular training and monitoring sessions. To give some examples, Kajima experienced much difficulty in finding out the status of their employees and offices, when all means of communication were cut off during the Great Hanshin-Awaji Earthquake of 1995. In the Great East Japan (GEJ) Earthquake, however, they were prepared with multi-channel access (MCA) radios in every major branch office, and were able to establish communication between the head office and the Tohoku branch immediately after the earthquake.

Using these MCA radios, Kajima was able to go through the initial steps of business continuity – confirming the current status of employees and facilities, identifying offices and project sites that required assistance, as well as sorting out what else was necessary for Kajima's overall business continuity – all while telephone and IT systems were struggling to recover. Simultaneously, crisis response teams (CRT) at the head office and the Tohoku branch were able to plan the reassignment of personnel, materials, equipment, and vehicles from all across Japan for the upcoming response and recovery operations; they also identified employees with experience in disaster response and recovery and arranged their deployment, all within the first few hours.

In the field, across the Tohoku region, in northeast Japan, as well as the greater Tokyo metropolitan area, Kajima employees fanned out to assess the safety levels of buildings and facilities,

including those still under construction and those constructed by Kajima in the past. As professional engineers, they gave advice to clients on the assessment of damage and safety and arranged necessary repairs. By working as quickly as possible, Kajima supported their clients' business continuity as well.

In the areas of Tohoku with the most damage, Kajima also worked on the elimination of road obstacles and recovery of key infrastructure in response to requests by national and local governments.

### How the BCP worked: the first three days

The GEJ Earthquake, which occurred on 11 March 2011, affected an unprecedentedly large area, caused unprecedentedly thorough destruction in areas inundated by the tsunami, and completely paralysed the greater Tokyo metropolitan area. Overall, Kajima had a Tokyo head office, several major branch offices in Sendai and greater Tokyo, regular branches in each prefecture, as well as several hundred construction sites located within the zone affected by the GEJ Earthquake.

The table on the next page gives a summary of the first three days, focusing on actions made possible by Kajima's business continuity management.

### BCP elements that allowed swift action

It is impossible to introduce the entirety of Kajima's BCP/BCM in this document, but some elements that made the actions in the first three days possible are described below.

#### Preparedness on the soft side (organization and procedures)

Many sections of Kajima's BCP reflect the lessons learned from the 1995 Great Hanshin-Awaji Earthquake. Companies across Japan have adopted a safety confirmation system<sup>1</sup>, but Kajima's system, unlike most, is structured so that the employees can send in their status report on their own initiative, regardless of the arrival or non-arrival of an email from the office. Kajima's drills and training sessions cover a multitude of scenarios, including emergencies during working hours, as well as on weekends or nights. If an earthquake occurs on weekends or at

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<sup>1</sup> Anpi joho kakunin system, a system commonly used in Japan for registering and checking the safety status of employees, students, family members, etc. via a semi-automated phone or texting system following a disaster.

*The first three days*

Tohoku branch office (Sendai)	Head office (Tokyo)
<b>11 March</b>	
14:46 GEJ Earthquake Office furniture broken, electricity, and communication out. Building's water tank keeps water running, despite loss of water supply across Sendai City.	14:46 GEJ Earthquake Building had quake-absorbing features and nothing fell down despite large tremor. Crisis response team (CRT) established in head office and 4 major branches in greater Tokyo. Status checks of employees, facilities, construction sites, and major clients begin. Begin inspection of IT and other infrastructure.
14:55 Contact made between Sendai and Tokyo on MCA radio.	
15:00 Crisis response team (CRT) formed, employee status checks begin.	
15:30 All employees evacuate the building, building checked for safety.	15:30-20:00 Status information reports come in from branches across Japan; project site status updated.
15:50 Food and water handed out, employees go home.	
16:20 CRT meeting.	17:25 Food and water handed out, some employees start walking home. 750 camped out in three main buildings as all commuter transportation shut down.
21:00 Management also go home. Those who cannot camp out in office.	
<b>12 March</b>	
08:00 CRT meeting.	00:30 Request for supplies (cold weather gear, food, water, etc.) come from Sendai; instructions for procurement sent to branch offices. 07:00 CRT meeting. 09:50 Supplies and trucks ready across greater Tokyo. 12:30 Two trucks depart for disaster area. 14:00 Two more trucks depart. 15:00 All employee status confirmed in greater Tokyo. 18:00 CRT meeting. 18:30 IT system back online across greater Tokyo.
18:30 First load of relief supplies arrive from Hokuriku branch. Electricity and office phones come back online.	
19:00 Servers back online. Internet, email, and corporate LAN now available.	20:30 Total of 19 trucks across Japan depart.
<b>13 March</b>	
Dawn Eight trucks arrive.	
08:00 Whole branch gears up for the task of receiving supplies. First group of re-assigned employees from outside the area arrive.	10:30 Continue the arrangement of supplies. 16:00 CRT meeting.

night, Kajima will have employees that live close enough to their offices report to work.

**Preparedness on the hard side (equipment and infrastructure)**

The MCA radio, mentioned above, is a commercial-use radio system commonly used by truck and taxi drivers. As a stand-alone communication system, it can be relied upon to work even during emergencies. With several MCA radios set up in each branch office as well as the head office, damage reports and requests for supplies were precisely communicated between offices, including the Tohoku branch office. Until the internal corporate phone system came back online on the night of 12 March, the MCA radio system functioned as the only means of communication.

***Tackling new and unforeseen obstacles***

Despite being well-prepared, Kajima faced some glitches, particularly in its emergency organizational structure when this disaster on an unprecedentedly large scale caused the complete and unexpected paralysis in Tokyo's transportation and communication infrastructure. Kajima used this experience to develop some good ideas that will prove useful in future disasters.

For example, according to Kajima's BCP, crisis response workgroups were to cut across existing organizational borders, so that workgroup members would represent multiple departments and divisions. However, in reality, tasks were carried out more efficiently when assigned to pre-existing organizational units. For example, there was confusion when relief supplies started arriving at the head office from all over the country in large amounts. The solution was to separate out all the procurement-related tasks and assign it to a certain department. Another department was put in charge of receiving what was procured and re-loading them on trucks according to destination. The clear division of labour reduced the confusion considerably.

On the other end, the Tohoku branch office also ran into problems; it had to deal with trucks arriving in the middle of the night, not enough people to help unload, and not enough space to accommodate the goods. The Tohoku branch resolved these problems by setting up a logistics hub in the suburbs of Sendai with a fully developed logistics management system. When another transfer hub was subsequently set up in Tokyo to receive loads coming in from all over Japan, things improved greatly.

It must be mentioned that all traffic into Tohoku was restricted; Kajima applied for emergency vehicle permits at police stations in order to send supplies, construction materials, and equipment for recovery. As the trains were not running, Kajima set up its

own shuttle bus system between Tokyo and Tohoku on the third day after the earthquake to send engineers from all over Japan into the disaster-struck areas. The bus system served as the only means to send in additional and replacement personnel until the bullet train resumed operations.

Kajima identified employees who had worked in disaster response and recovery situations in the past, and sent them to the disaster area under a rotational schedule. Their personal knowledge of how things were done in the Great Hanshin-Awaji Earthquake and the Niigata Prefecture Chuetsu Earthquake proved invaluable.

In some cases, employees on emergency appointments found themselves cut off from information, felt isolated, and lost motivation as well as efficiency. The solution was to have managers individually contact each person once a day, and discuss what was happening at the head office and in the company as a whole. This step improved the outcomes of emergency assignments.

### ***The acts of emergency relief and recovery made possible by business continuity***

Kajima's BCP not only protects the company itself and its employees. As a construction company, its BCP served to protect the livelihoods and business continuity of their clients and community.

Kajima handles construction projects of various sizes, from apartment buildings to large civil engineering structures. Following the GEJ Earthquake, Kajima began damage assessment as well as necessary repairs of all facilities built under the management of the Tohoku branch office. Actual assessment work began the morning after the earthquake, and the majority were assessed within two weeks.

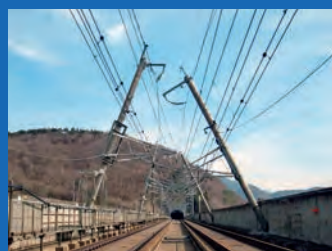


Photo by Kajima Corporation

*Recovery of the Tohoku bullet train line, March (left) and May (right), 2011*

Kajima also contributed to the elimination of road obstacles and recovery of key infrastructure, in response to a request made via an emergency agreement concerning emergency response to disasters, signed in 2007. The agreement was between the Japan Civil Engineering Contractors Association (JCE)<sup>2</sup>, a national industry association on one side, and the Tohoku Regional Bureau of the Ministry of Land, Infrastructure, and Transport (MLIT), six prefectures in the Tohoku region, as well as Sendai City on the other.

At Ishinomaki City, Miyagi Prefecture, a mountainous peninsula dotted with fishing villages was devastated by the tsunami, but the road was blocked at more than 20 locations, and relief supplies could not be delivered. The road reconstruction work began five days after the earthquake. Basic utilities were unavailable. There was no way to communicate directly with the crushed stone factory, so orders were placed by sending notes in the hands of the truck driver. Water and food was scarce, compounding the fatigue of workers who had to engage in manual

<sup>2</sup> This organization is now merged into the Japan Federation of Construction Contractors.



Photo by Kajima Corporation

*Removing debris blocking the road, March 2011*



Photo by Kajima Corporation

*Prefab toilets supplied through the emergency contract*



lifting due to the lack of heavy lifting equipment. Despite this, the road was reopened after six days of work, as scheduled. Kajima was also involved in the reconstruction of embankments of high-ways in Fukushima Prefecture.

Kajima played a part in the recovery of key infrastructure as well. The Tohoku bullet train line had 1,200 points of damage along 675 km of track. Major construction companies from around the country worked together for the recovery of this important transportation infrastructure, and despite further damage caused by strong aftershocks a month after the initial quake, service was resumed along the entire route a mere 49 days after the GEJ Earthquake. Kajima was in charge of repairing electricity poles along approximately 68 km of track, including portions that ran on overhead structures. It invested a total of 3,500 worker-days, with work continuing 24 hours a day.

The emergency agreement concerning emergency response to disasters, mentioned previously, was in fact called into action on the day after the GEJ Earthquake. Member companies of JCE from across the country contributed specialised items that only construction companies could procure quickly, such as heavy lifting equipment and materials for building job site trailers and other temporary structures. General relief items such as food were contributed in addition. Eleven personnel on loan from member companies manned JCE's Tohoku temporary disaster response headquarters to sort out requests made by local authorities.

JCE's Tohoku temporary disaster response headquarters was initially located in Kajima's Tohoku branch office building, due to a combination of Kajima's quick resumption of normalcy thanks to its BCP, and the head of Kajima's Tohoku branch being the head of JCE Tohoku that year. By 17 March, six days after the quake, JCE Tohoku was able to call all 63 member companies to meeting, and officially opened their earthquake response headquarters. JCE understood that immediate action was key to effective assistance and worked with JCE's other branches (totalling 139 member companies) towards this purpose.

#### *Materials, equipment, and everyday goods supplied through JCE*

Items	Numbers/amounts
Prefab toilets	574 units
Prefab houses	279 units
Large-size tents	6 units
Tents	517 units
Plastic tarpaulins	15,000 sheets
Sprinkler trucks	5 trucks
Water tanker	1 tanker
0.7m <sup>3</sup> excavator	6 units
Fuel tanker lorries	6 units
Diesel oil and kerosene	15,000 litres
Large sandbags	3,500 bags
Sandbags	19,800 bags
Power generators	77 units
Water pumps	5 units
Power generators, water pumps and lay flat hose	2 sets
Wood piles	1,100 piles
Traffic cones and bars	300 bars
Shovels	600 units
Wheelbarrows	300 units
Loudspeakers	44 units
Washing machines	30 units
Bicycles	12 units
Portable toilets	3,200 units
Bedding	300 sets
Food and daily necessities	17 trucks
Nappies	500 boxes
Sanitary items	unspecified quantity
Hardtacks	3,300 packs
Bottled tea	16,000 bottles
Bottled water	15,300 bottles
Raincoats	557 pieces
Waterproof sheets	2,000 m <sup>2</sup>
Oil-absorbent sheets	50 boxes
100m-long polypropylene rope	13 rolls
Brooms	75 units
Wire shackles	20 units
Hydrated lime	100 bags
Rubber gloves, raincoats, rubber boots	10 sets
Petrol pumps	5 units
Portable gas burners	500 units
Gas cartridges	1,500 units
Detergent	20 boxes
Heat insulator, carpets	unspecified quantity
Laundry poles	50 sets
Chainsaws	30 units

## The good practice

- The core business of major construction companies is the construction of social infrastructure, and they are key actors in the recovery of communities from disasters. It is a good practice for such companies to quickly put its own business continuity in order, so that they can contribute to society as quickly as possible. Kajima's actions were driven by a sense of duty and the understanding that, without the recovery of the community, their business would be in jeopardy in the long run.
- Kajima developed hard and soft measures for business continuity, on lessons learned from past disasters. Through regular drills, they had their priorities and procedures in order. They were able to support their clients and community (through damage assessment etc.) quickly, due to these efforts.
- Kajima had to deal with major logistical challenges, transportation issues, and the shifting of resources within their company to deal with a major disaster. The crisis response teams made this possible through information collecting and quick decision-making. Client needs were flexibly met through creative solutions developed in the field.
- Many construction companies, including Kajima, honoured an emergency agreement between the national industry association and multiple public sector partners and mobilised to provide disaster-affected areas with specialised items that only construction companies could procure quickly.

## Lesson(s) learned and scope for improvement

- Damage by the magnitude 9.0 GEJ Earthquake to the main structural elements of buildings and civil engineering structures was, perhaps unexpectedly, mild, and proved the validity of the structural and architectural regulations and standards. However, damage involving finishing materials and secondary materials, such as the collapse of ceilings and interior finishing walls, were more common. From the standpoint of those who live and work there, buildings need to be safe and usable overall, including secondary parts. Dialogue about new standards need to be opened on a national level, so that the situation can be improved.
- The supply of fuel was an issue. Fuel is necessary not only for everyday life, but for recovery operations. Securing fuel for use post-disaster is another topic that needs to be discussed nationally, as well as by individual companies.
- Keeping existing departments together to work on emergency tasks, developing logistics hubs on both the sending and receiving end of supplies, and follow-up procedures for the well-being of temporarily assigned employees are examples of effective measures that were not found within the BCP, which was considered quite comprehensive. The BCP will need to be revised and improved further.

## Practical tips for replication

- When roads become impassable due to a disaster, it prevents life-saving activities from being undertaken and necessary supplies from being delivered. Construction companies that make the roads passable again should be the focus of BCM awareness raising, together with utility companies, and should be made to understand that they are socially responsible for quickly recovering, and continuing, their businesses.
- It might be useful for construction companies to network with each other, and share information on materials, equipment, and personnel available in case of disasters.

For further information:

**Kajima Corporation**

<http://www.kajima.co.jp/english/welcome.html>

### How is this case connected to HFA?

The reduction of risk factors by strengthening critical public facilities and physical infrastructure, particularly transport lifelines, is highlighted in HFA4, which also encourages the development of public-private partnerships to better engage the private sector in disaster related work (HFA4, paragraph 19, Social and economic development practices, sections 'f' and 'l'). The effectiveness of Kajima Corporation in the post-disaster phase was made possible by its well planned business

continuity and management, which was a result of learning from the Great Hanshin-Awaji Earthquake in 1995 in Kobe. This case also provides an example of incorporation of DRR measures into post-disaster recovery and rehabilitation processes and use of opportunities to develop long-term capacities for DRR, including sharing of expertise, knowledge, and lessons learnt (HFA4, paragraph 19, section 'h').

# 5 Drug Manufacturing

## Out-of-stock is not an option

### *Tohoku Nipro Pharmaceutical Corporation*

Tohoku Nipro Pharmaceutical Corporation (TNPC) is a contract manufacturing organization (CMO) specialising in the manufacture of prescription drugs. In the Great East Japan Earthquake, shaken by tremors registering high 6 on the Japanese earthquake intensity scale<sup>1</sup>, TNPC's factory and manufacturing equipment received damage to the extent that they were unsalvageable, and had to be completely demolished and rebuilt. Despite this, and despite being affected by restrictions that followed the nuclear power plant accident, TNPC fully recovered operations in six months. TNPC also quickly arranged alternate production of their products, by sending 104 employees – a third of their workforce – on temporary assignments to several different factories, together with key equipment. TNPC's could not let its drugs go out of stock, as shortages would have been life threatening to patients depending on them.

TNPC has since strengthened its business continuity management (BCM) and related hard and soft measures, such as the strengthening of the structure of their buildings, and the strengthening of cooperation with local businesses. Additionally, TNPC has decided to establish complete redundancy in their production, with cooperation of their group company, in order to fulfil their responsibility as a manufacturer to their pharmaceutical clients and to the market.

<sup>1</sup> Defined by the Japan Meteorological Agency as being "impossible to keep standing and to move without crawling."  
The strongest intensity on this scale is seven.



*PTP (Push-Through-Pack) blister packaging line*

Photo by Tohoku Nipro Pharmaceutical Corporation

## The case study

### Background

Tohoku Nipro Pharmaceutical Corporation (TNPC) is a company under the umbrella of the Nipro Group, a general medical manufacturer producing medical equipment, pharmaceuticals, and glass equipment. NIPRO brand medical devices are used widely both in Japan and abroad, including dialysis-related products (artificial kidneys) that lead the world market. The NIPRO brand is highly regarded worldwide for its technological superiority and high quality.

TNPC, with 329 employees, specialises in the manufacture of oral drugs (oral solid dosage) and ointments, and provides their pharmaceutical clients with integrated solutions from material procurement to manufacture, testing, packaging, and release approval, and is the central CMO (contract manufacturing organization) factory under the Nipro group. TNPC manufactures not only NIPRO brand drugs, but also pharmaceuticals bearing most major Japanese pharmaceutical brands, and many medical patients require TNPC products to carry on with their lives.

The magnitude 9.0 Great East Japan (GEJ) Earthquake on 11 March 2011 caused extensive damage to TNPC's factory buildings, manufacturing equipment, and rack storage facilities. Luckily there was no damage by tsunami, but aftershocks, the disruption of water supply, difficulty in procuring gasoline, and the effect of the nuclear power plant accident all overshadowed the process of recovery.

TNPC had, while recovery efforts continued, quickly established alternate production of their pharmaceuticals at the pharmaceutical client's own factories and other Nipro group factories. 104 of TNPC's employees dispersed to several factories far away from their homes, sometimes bringing along key equipment. Recovery and reconstruction continued at an extremely energetic pace, and TNPC was able to re-establish full operational capacity, with even some improvements in structural earthquake-proofing, in 6 months after the earthquake: a very early recovery considering the conditions in Fukushima Prefecture at that time. TNPC has not stopped there, and is now taking additional steps for further disaster risk reduction.

TNPC's actions were made possible through the strong will, of both management and employees, to prevent shortages in the market at all costs.

### From disaster to recovery

Two hundred and forty-four out of 273 TNPC employees were on duty when the GEJ Earthquake struck. Following the extremely

intense tremors, everyone evacuated outside the building. TNPC periodically conducted evacuation drills and emergency training based on their own disaster preparedness regulations, and their evacuation drills were known to be realistic, with each production section conducting practice drills to prepare for the drill itself. All employees, thanks to this training, managed to evacuate the building safely through quick and appropriate decision-making, despite wrecked equipment being strewn all over the floors, and designated evacuation routes being blocked.



Photo by Tohoku Nipro Pharmaceutical Corporation

*Firefighter leading CPR<sup>1</sup> training session of TNPC employees (before the GEJ Earthquake)*

It was extremely difficult to grasp the extent of the damage, as blackouts and aftershocks continued. It was the third day post-disaster when the totality of the damage, with everything "looking like they had been air-bombed", according to those who saw first-hand, became clear. Carefully surveying the damage in the dark with headlights, employees and management found the wreckage of equipment that had fallen from 30 meter-high ceiling storage racks, and damage to boilers and water treatment plants caused by land subsidence. It was clear that repairs would not be enough; the factory would have to be rebuilt from ground up.

Fortunately, servers and phone exchange systems were relatively undamaged, and communication through phone and mail were possible from the day after. Two teams were formed and sent into the factory buildings to conduct damage assessment and report the findings to the pharmaceutical clients and equipment manufacturers. The management acted decisively, immediately ordering a completely new set of expensive equipment for the quality testing department when equipment in that section was discovered to be completely wrecked on the second

<sup>1</sup> Cardiopulmonary resuscitation.





Photo by Tohoku Nipro Pharmaceutical Corporation

*PTP blister packaging line (see chapter cover photo), post-disaster, photographed March 2011*

day. This expensive decision amply paid off, because TNPC was able to restart this crucial operation on their premises at an early stage in their recovery, and avoid the extremely cumbersome approval procedure that would have accompanied the relocation of their analytical services.

Representatives of equipment manufacturers started arriving around ten days post-disaster, and the transportation and off-site repairs of salvageable equipment followed in mid-April.

### ***Special circumstances of a pharmaceutical factory***

A pharmaceutical factory must protect the integrity of its products, i.e. medical drugs, through stringent quality management. A pharmaceutical factory will have specialised equipment, specially planned factory floors with environmental control, and is altogether different from the typical factory. Its workers can also be considered technical specialists.

To produce several different pharmaceuticals at the same time, the flow of material ingredients, products, and even the movement of workers working on each product line is strictly separated, to prevent cross contamination as well as contamination by foreign matter. Sealed-off cleanrooms are built into the factory, with air conditioning systems with backup generators to maintain an air pressure differential. Some manufacturing facilities are also built with further containment measures in place for the manufacture of pharmaceuticals requiring rigorous isolation.

When a new product line is assembled within a factory, the manufacturing equipment and production environment is checked by a very time-consuming quality control process called validation to ensure that all products coming out of the line will be uniform and up to standard in their active ingredients and effect. There are

testing facilities and personnel for the validation process within the factory. The products, as well as the pharmaceutical ingredients and materials, must be stored in temperature-controlled rooms, so there are refrigerated facilities with backup generators.

TNPC's Oral Solid Dosage Facility II not only contained all of the above features; it also was the most state-of-the-art facility within Nipro group and had automated and IT-enabled equipment offering economic benefits to clients, and high-tech equipment that made variable volume manufacturing and various packaging options available. The manufacturing employees and production technicians working at TNPC had intimate knowledge about their product, and highly developed skills.

Finally, the strict pharmaceutical manufacturing approval process must be briefly explained, to fully understand the problems faced by TNPC. In Japan, the Ministry of Health, Labour, and Welfare (MHLW) approves the manufacture of medical drugs separately for each factory. The manufacturing permit specifically mentions the manufacturing location and method, together with the pharmaceutical characteristics and quality, so that the manufacturer cannot independently change the manufacturing process or venue.

It was only through extraordinary effort that TNPC managed, under these conditions, to quickly shift production to alternate factories, and get their reconstructed factory in working order, so that they could prevent shortages on the market.

### ***Making improvements while achieving fast recovery***

The reconstruction of the production facility began when representatives of pharmaceutical facility manufacturers and construction companies, under the architectural design office's supervision, began the process of assessment, rebuilding, and validation. New earthquake mitigation features were built in when and where possible, within the constraints imposed by the ultimate purpose of quickly re-starting normal operations. When damage was assessed in detail, it became apparent that the degree of damage varied greatly, even within the same machine room. Such differences were drawn upon to strengthen the building against future disasters in a practical manner.

In the height of the reconstruction, around May to June, there were on average 430 workers on-site, with a total of 35,000 workers from all around Japan contributing to the effort by the end of August. Due to such intensive efforts, TNPC was able to resume ointment production in approximately three months post-disaster, production in their first oral solid dosage facility within

five months. Finally, on 1 September, nearly six months after the earthquake, TNPC resumed production in their state-of-the-art second solid dosage facility and thus reached full operation status.

### ***Out of stock is not an option – continuing production on temporary assignment***

Something had to be done to keep the pharmaceuticals on the market while the above activities were going on. TNPC arranged for alternate production sites for all of their products, in either the pharmaceutical client's own factories or in other factories belonging to Nipro group, as shown in the table below. A full third of TNPC's employees, 104 in total, accepted temporary transfers to factories outside the prefecture.

The strict approval process required for pharmaceutical manufacturers makes it difficult to move production of pharmaceuticals to another location. Successful alternative production was the result of all parties working towards preventing the shortage of these pharmaceuticals on the market: pharmaceutical clients, Nipro group, and the Ministry, MHLW, in charge of approval. The pharmaceuticals manufactured by TNPC were specialised prescription drugs for inpatient use in hospitals, and a large warehouse stock did not exist; without continued production, it was clear that they would run out. TNPC quickly inventoried what was available, prioritised the products, and looked for alternate production sites.

Each site was painstakingly identified through discussion, by searching out available production locations, for example where the same drugs used to be manufactured by their pharmaceutical clients prior to outsourcing or facilities similar in equipment and production processes within the Nipro group. TNPC lent out crucial equipment, continued to purchase and supply ingredients and materials, and provided employees. It should be noted that loaning out equipment was also not as easy as it sounds. For example, the PTP blister package line shown in photographs above had to be carefully dismantled and transported in three to four 10-ton trucks.

MHLW assisted by expediting the lengthy approval process that would normally need to be followed when registering changes in manufacturing locations. Companies were first requested to submit lists of pharmaceuticals and medical equipment under their production that would likely face shortage. Items on the lists that met the emergency criteria could be applied for alternate production using the abbreviated application form. The Ministry's clear written instructions, sent not only to national-level industry associations but also to related government agencies on the same

### ***Alternate production of contract manufactured products***

Client	Product	Alternate production	TNPC workers
A	a	Factory of client A	17
	b, c, d, e, f	Factories chosen by client A	-
	g, h	Nipro group factories	28
B	i, j		
C	k	Factory of client C	11
D	l	Factory of client D	5
E	10 products	Arranged for manufacture to be resumed by client E	-

### ***Other transfer assignments***

Destination	Assignment	TNPC workers
Nipro factory, Northwest Japan	Syringe and kit preparation production	20
Nipro factory, West Japan	Oral dosage production, quality control	6
Nipro factory, Greater Tokyo	Oral dosage production	17

day, proved as valuable as its quick decision-making.

A crucial decision that prevented shortage of supplies was TNPC's decision to send manufacturing employees and production technicians who knew their products well. While the destination was decided by management, all employees were given the choice to accept temporary assignment, and the 104 all went voluntarily. As nearly all of these employees had never lived outside Fukushima Prefecture, TNPC made sure to provide counselling and other support while they were at their new workplace. The longest temporary assignment was around seven months.

The strong interrelationship within Nipro Group also came into play, with five group companies and eight factories accepting TNPC employees on temporary assignment, and even providing basic training to new TNPC hires. TNPC had gone ahead with their scheduled new employee welcome ceremony in April, less than a month after the earthquake, and promised that the company will continue to exist, and resume normal operations within six months, to give their employees hope as well as purpose. TNPC managed to keep its promise to its employees.

### ***A new direction in BCM***

As a result of the GEJ Earthquake, TNPC has since strength-

ened its business continuity management (BCM) and related hard and soft measures. The new hard measures included strengthening of the structure of their buildings, where possible, during the reconstruction of the factory, improvements in their emergency facilities such as backup generators, and a week's stock of food and water.

The soft measures for better risk management include a new business continuity basic policy and business continuity plan (BCP). When formulating the BCP, TNPC identified 334 issues, categorised into human resources, infrastructure, equipment, facilities, system data, and supply flow issues, and has to date identified countermeasures to 304 of them.

To establish complete redundancy in production lines is the ultimate objective of TNPC's new BCP, drawn from lessons learned in the GEJ Earthquake. TNPC is working towards using the same pharmaceutical manufacturing equipment, processes, and know-how at their own north-eastern Fukushima facility and a group company's factory in western Japan (Osaka) so that production could be shifted quickly in either direction. Within the group, the same pharmaceuticals will be contracted for manufacture in at least two factories in differing regions, so that production capacity is assured.

TNPC has also set their target recovery period from future disasters at three months, and will strengthen the system of col-

laboration within Nipro Group towards this goal. TNPC has also rethought and improved communication lines with outside companies necessary for their business continuity, and is working to strengthen the ties between diverse sectors involved in the entire pharmaceutical manufacturing supply chain in central and southern Fukushima Prefecture.

TNPC has spared no effort to fulfil its heavy responsibility, both as a pharmaceutical manufacturer to society and as a contract manufacturer towards its pharmaceutical clients, and TNPC's new direction promises that it will continue to earn the trust of both client and society.

## The good practice

- TNPC employees were able to evacuate calmly and efficiently as a result of periodic drills and training, despite the unusually long and heavy tremors.
- TNPC quickly assessed damage to their production facilities, and arranged for continued production by coordinating closely with their clients and group companies.
- TNPC opted to structurally improve and enforce their factory building where possible, instead of simply rebuilding to pre-disaster designs, despite the urgency of reconstruction.
- TNPC has applied its lessons learned from the disaster, identified a clear business continuity objective, and extracted specific issues and countermeasures in their BCP.
- The management of TNPC openly promised the continuity of their company, at a ceremony a month after the earthquake. This served to give employees a purpose in life, and assurance of continued employment, both of which are important for mental well-being.

## Lesson(s) learned and scope for improvement

A construction company fortunately had a team on factory premises at the time of the disaster, as the factory was undergoing expansion. The construction team provided plastic sheets during the initial evacuation to ward off the cold, and provided invaluable support in starting the process of recovery without delay. On the other hand, there was a facilities manufacturer that established a policy that would not allow their em-

ployees to enter Fukushima, on grounds of the nuclear power plant accident. It is impossible to recover from a major disaster without assistance from related companies, and, while the circumstances were exceptional this time, it is important to work towards building a good everyday relationship to assure that such assistance is given in times of emergency.

## Practical tips for replication

- Securing and drawing on the resources of group companies, clients, and related companies in the community for business continuity is a valid approach for any country and any sector.
- Industry sectors that deal with products and services that are hard to transfer to alternate locations in the event of a

disaster due to difficulties in quality control or approval processing, but at the same time are life-threatening if products and services should become unavailable, should also consider establishing complete redundancy of their products and services. This approach is valid in other countries and applicable sectors.

For further information:

**Tohoku Nipro Pharmaceutical Corporation**

<http://www.tohoku-nipro.co.jp/>

### *How is this case connected to HFA?*

HFA5 specifically addresses the importance of strengthening disaster preparedness for effective response at all levels (HFA5, paragraph 20). The multiple measures and ample resources to cope in a disaster situation relates directly to HFA5 where being well prepared and equipped with the capacity for effective disaster management is highlighted. This includes access to food and non-food relief supplies (HFA5, paragraph 20, section 'd'). HFA5 also proposes the development of specific

mechanism to engage the active participation and ownership of relevant stakeholders in DRR. Such ownership by a health sector was demonstrated by this case on Tohoku Nipro Pharmaceutical Corporation's initiatives. This case is also an example of integrating DRR planning into the health sector, including strengthening their capacity to remain functional in disaster situations in HFA4 (HFA4, paragraph 19, Social and economic development practices, section 'e').



## 6 Finance

### Market incentives to build private sector resilience

*Development Bank of Japan Inc.*

Development Bank of Japan Inc. (DBJ) was the first financial institution in the world to develop and implement a disaster risk reduction (DRR) and prevention rating system in 2006. The DBJ Disaster Prevention Rating is a progression of traditional credit ratings that are an indicator of a company's credit worthiness. The rating is designed as an objective third-party evaluation, giving recognition to the recipient company's efforts in DRR/Business Continuity Management (BCM) to external stakeholders, and as a method to initiate dialogue on the necessity for BCM and DRR measures to the company's internal audience. In 2011, the DBJ Disaster Prevention Rating evolved into the DBJ BCM Rating with stronger emphasis on business continuity, based on lessons learned from the Great East Japan Earthquake. DBJ's disaster rating-related loans have reached about 100 cases and 100 billion yen since 2006.

DBJ not only provides a rating but also works to comprehensively strengthen their client's DRR capacity by tying in financial incentives to the rating, offering an extensive line-up of financial products to support every stage pre- and post-disaster, as well as encouraging review and improvement in BCM through their monitoring services throughout the financing period. As Japan's financial institute for strategic development, DBJ is putting market incentives to work towards a realistic DRR solution.



Photo by DBJ

*Presenting the BCM Rating certificate to Nippon Soda Co. Ltd., 2012*



## The case study

### Background

When a disaster or accident puts a stop to a business' operations and its services or products are cut off, it is a loss not only for the company concerned but other businesses and society as a whole. Therefore it is of vital importance to ensure the business continuity, or, failing that, to minimise the period of disruption. A business continuity plan (BCP) stipulates specific procedures, contingencies, and timeframe objectives for achieving this.

The Great East Japan (GEJ) Earthquake and tsunami on 11 March 2011 caused widespread damage, both directly as a result of the earthquake and tsunami, and indirectly as a result of fuel shortages and rolling blackouts imposed to conserve electricity. According to Japan's 2011 Disaster Prevention White Paper, over 30% of companies reported vital business interruptions and over 50% of companies reported interruptions of over one week. Since the GEJ Earthquake, development of BCPs suddenly became more widespread.

There remain, however, many obstacles to the development of BCPs. Not only do most companies, particularly small and medium ones, have insufficient personnel for BCP development, they also lack the necessary expertise. Moreover, the cost of putting the BCP into practice can be prohibitive. This includes hard measures such as structural reinforcement of buildings and establishing alternative business hubs, and soft measures such as redundancy in resource supply lines and data backup systems. On the other hand, from the perspective of reducing the likelihood of business failure, a BCP makes a positive contribution to a company's credit assessment. Consequently, financial institutions are showing interest in companies that invest in their own DRR, and are expanding their support of such private sector DRR and disaster preparedness initiatives.

### BCM rating – a world first

The Development Bank of Japan, Inc. (DBJ) is Japan's financial institute for strategic development that provides long-term funding for companies investing in economic and social development.

In 2006, DBJ established its Disaster Prevention Rating and started supporting its clients' BCM initiatives. The system at this time evaluated a company's disaster preparedness initiative, mainly based on the amount of potential risk reduced. In 2011, based on accumulated experience as well as lessons learned from the GEJ Earthquake, DBJ re-launched the initiative under the new name of Enterprise Resilience Rated Loan Program (DBJ BCM Rating).

DBJ conducts its ratings using a proprietary evaluation system in

consideration of a self-evaluation format developed by Japan's Central Disaster Management Council, and international standards such as ISO22301. DBJ's rating system is designed to be an objective evaluation by a third party, so that the rating can serve as advertisement of the client company's interest and investment in DRR/BCM to those outside the company, as well as a means to encourage discussions about, and reduce resistance to, DRR/BCM-related investment among those within the client company, including its shareholders.

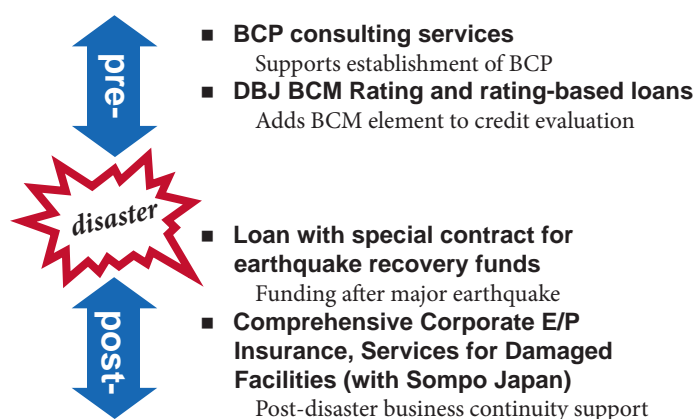
The rating is conducted alongside the regular credit check of a company when it applies for financing. It takes into account both hard and soft measures the company has in place for DRR and BCM purposes. The outcome is reflected in the loan conditions as well as the overall credit rating. Companies that qualify for the top two ratings are rewarded with special interest rates (two rates). Moreover, those that receive the highest scores within the top-tier group are additionally presented with a special certificate.

DBJ continues to regularly monitor how the BCM is being implemented, even after the rating is given and the loan has been made. When problems are discovered in the course of monitoring, DBJ asks the client to investigate the cause, implement solutions, and report to DBJ as appropriate. Through such continuous monitoring and feedback, DBJ encourages diligence in the client company's DRR/BCM efforts.

DBJ also provides various financial products for hedging risk in the event of a disaster. There is a type of loan with a special contract for the provision of funds for recovery from major earthquakes. When an earthquake that meets pre-set magnitude and area conditions occur, the borrower will receive between 100 million to one billion yen of funding within a month. This loan can be expected to have a positive impact on the borrower company and the entire supply chain that they are part of.

Additionally, DBJ also provides two services in conjunction with Sompo Japan Insurance Incorporated. One of which is the Premium Discount Plan for Comprehensive Corporate Expenses and Profits Insurance (Comprehensive E/P). Comprehensive E/P is an insurance plan that covers, among other things, the loss of profits resulting from disaster-related events, such as the loss of utilities. Insurance premiums for this plan can be reduced by up to 20% based on DBJ's rating as well as on Sompo Japan's independent evaluation. The second joint programme is Services for Damaged Corporate Facilities, which assists the recovery of businesses by providing funding for inspection and decontamination, as well as repairs to damaged buildings, for example, by smoke and soot.

To give an example, one company that received the highest DBJ



### DBJ's Corporate Risk Management-related services

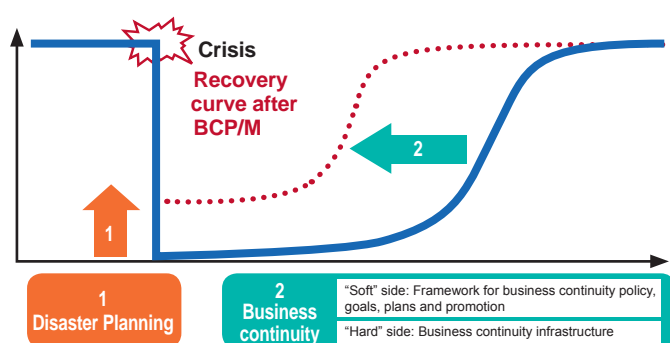
BCM Rating is a major Japanese chemical producer. Their business continuity measures contained the following elements:

- Implementation of hard measures such as structural reinforcement of its buildings.
- Continuous BCP revisions that resulted in a reduction of its target recovery time.
- Sharing of risk information with business partners on a regular basis.

The above elements, as well as the company's awareness of the impact its products, or the lack thereof, will have on society via the supply chain, were highly evaluated. DBJ provided favourable rates available under the highest rating to fund this company's pre-disaster preparedness initiatives, as well as a loan with a special contract for the provision of funds for recovery from major earthquakes, in conjunction with Sompo Japan.

## Learning from the GEJ Earthquake

The lessons learned from the GEJ Earthquake provided the impetus to redesign the evaluation parameters of the original 2006 DBJ Disaster Prevention Rating, and the redesign resulted in the DBJ BCM rating, which goes under the formal name of Enterprise Resilience Rated Loan Program.



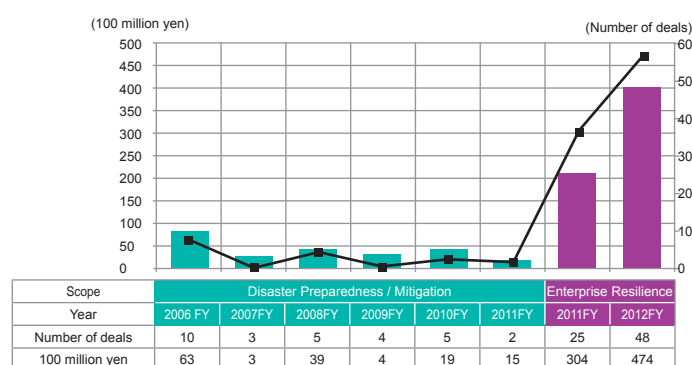
DBJ BCM Rating evaluation criteria and outcomes

While DBJ had a system to annually review and revise the questions on the screening sheets that determine ratings based on the advice of outside experts in place, the unprecedented GEJ Earthquake triggered a major review of the rating system. The revised rating system does not limit its scope to pre-disaster risk reduction measures, but also comprehensively evaluates a wider range of factors including business continuity (i.e., organizational resilience), through, for example, strategies and frameworks in place for post-disaster scenarios.

The importance of conducting actual, practical exercises in business continuity also became apparent through a special survey conducted after the GEJ Earthquake. As a result, measures such as preparing an advanced disaster simulation, then conducting real-life simulation drills or map-based drills; and identifying business continuity bottlenecks (i.e. the lack of measures to ensure emergency electricity supply), were incorporated in the BCM ratings.

The GEJ Earthquake also provided a massive boost in interest in BCM. DBJ's disaster rating-related loans have, since 2006, reached a total of 102 cases, about 92 billion yen, by the end of March 2013, but nearly 72% of the cases and nearly 85% of the loan amount have been provided in the two years following the GEJ Earthquake.

DBJ provides expertise in BCP development to client companies that have realised the necessity of developing and improving their business continuity management capacity. They give financial support for their daily disaster preparedness initiatives, both hard and soft. DBJ ensures observance through its ratings and monitoring, and works to develop a financial safety net in case of an emergency. Such are DBJ's comprehensive services related to crisis management. As Japan's financial institute for strategic development, DBJ actively promotes practical disaster risk reduction initiatives using market principles. DBJ's BCM rating financing scheme was reported in the World Economic Forum's report *Global Risks 2012* to be an innovative and effective financial product with a global impact.



Loan approvals under DBJ's Disaster Prevention and BCM Rating systems

## The good practice

- Since the GEJ Earthquake, corporate value indicators have diversified as businesses are increasingly recognised as the pillars that support the resilience of society as a whole. When business continuity is included as a condition for credit in financial markets, its value becomes more tangible, and will encourage further efforts for business continuity.
- DBJ's rating system is an effective system for encouraging companies to improve their business continuity and disaster preparedness initiatives because it evaluates comprehensively, beyond the presence/absence of a BCP, and is a rating based on its actual content and monitoring of its implementation.
- DBJ encourages companies to undertake business continuity and DRR measures, not only by giving an economic incentive in the form of financing, but also by providing a good corporate social responsibility (CSR) marketing tool through its BCM rating certification and award system.
- DBJ maintains an original, but also objective, evaluation system that it has developed, which draws on international standards such as BS 25999 and ISO 22301, on the opinions of various experts in Japan and market research following the GEJ Earthquake, but is ultimately based on the financial instincts of a banking institution.

## Lesson(s) learned and scope for improvement

- Financial institutions face potential massive losses from irretrievable debt in disasters, therefore it is beneficial for them to support the improvement of their clients' business continuity capacity.
- There is a need to expand the options open to companies when developing and implementing BCPs, because so many issues still remain in this regard. This can be done by expanding the range of technical support services and financial avenues available, both by industry bodies and the public sector, and finding the optimum combination of such initiatives.
- This was a truly groundbreaking initiative to evaluate the capacity of companies for disaster preparedness and business continuity. It is hoped that in future the evaluation methods can be further improved and used in a wider variety of applications, e.g. in financial and tax fields.

## Practical tips for replication

- It is desirable for financial institutions, which regularly evaluate companies for credit worthiness, to promote a change in thinking from disaster prevention to ensuring business continuity after a disaster, as a part of their regular work.
- There are many ways to provide incentives to encourage business continuity besides financial, such as tax incentives and technical support. The financial industry should take into account its position in each country, and promote business continuity with appropriate means.

For further information:

**Development Bank of Japan Inc.**

<http://www.dbj.jp/>

### How is this case connected to HFA?

An integral part of the HFA relates to the reduction of disaster risks by underlying risk factors is outlined in HFA4. HFA4 specifies key activities to reduce disaster risks related to social, economic and environmental conditions through sector development planning and programmes, as well as key activities in post-disaster situations. As one of the key activities under HFA4, the importance of promoting financial risk-sharing mechanisms is pointed out. Additionally, the develop-

ment of alternative and innovative financial instruments for addressing disaster risks is highlighted (HFA4, paragraph 19, Social and economic development practices, sections 'k' and 'm'). Concrete examples of these activities were demonstrated by the case of the Development Bank of Japan, which offers better interest rates and discounts for those considering disaster preparedness.

## 7 Finance

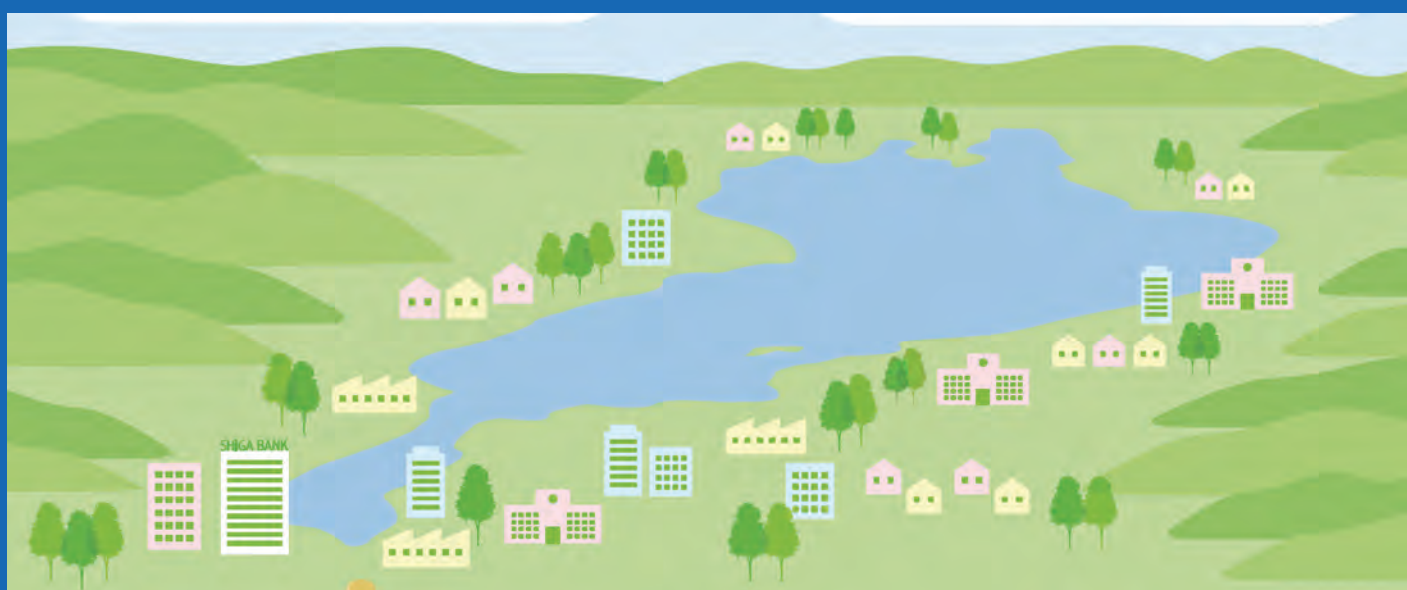
### Survive and prosper through DRR: the choice of a local bank

*The Shiga Bank, Ltd.*

As a local bank, based in the western region of Japan, most of Shiga Bank's corporate clients are small and medium enterprises, with assets such as sales and manufacturing facilities concentrated in the local Shiga area. These clients are vulnerable to catastrophic losses and potential bankruptcy if and when a major earthquake should occur, and the Shiga Bank shares their vulnerability as a lending partner.

Thus, the Shiga Bank started offering a variety of disaster risk reduction (DRR)-related services to their corporate clients, applicable to planning and preventive stages, and beyond. Through their risk consulting and starter-pack business continuity plan (BCP) formulation consulting, for example, Shiga Bank encourages and assists its clients to take the first important step towards risk mitigation.

The Shiga Bank has also implemented measures to prevent the failure of its fund transfer system during disasters, in order to fulfil its role in the community's economic infrastructure. Shiga Bank's pioneering efforts to encourage BCP through their core financial services have been recognised nationally, and have been awarded the NPO Business Continuity Advancement Organization's highest "BC Award" in 2007.



*Shiga Prefecture and its local community around Biwa Lake*



## The case study

### Background

A BCP, or business continuity plan, is a plan outlining both preventive and recovery measures and actions, so that important business does not have to be interrupted due to an unforeseen external event, or, if interrupted, can be recovered in the shortest possible time frame.

To make a BCP, a company first isolates the core business activities that would affect the survival of the company if disrupted. Then, it sets a target recovery period. A company may prevent the loss of their customers' loyalty, its corporate value, and business opportunities, and in fact may increase its corporate value and standing, by managing to continue, or at least recover quickly, their core business functions.

Since the 2011 Great East Japan (GEJ) Earthquake, the Japanese public is more aware of the importance of risk mitigation measures, and it has become increasingly common to tie such efforts made by businesses to their corporate value, but Shiga Bank actually started offering its disaster risk consulting services in August 2006. Since that date, 606 corporate clients have received pointers and advice about their disaster preparedness through this service, and 17 clients have availed themselves to financial loans through Shiga Bank's BCP Support Loan programme, started in the same year. Shiga Bank's BCP-related financial services are truly a pioneering effort.

### ***Motto: mutual prosperity together with the community***

The Shiga Bank has 112 branches within Shiga, a prefecture in western Japan with a population of approximately 1.4 million and an area of 4,017 km<sup>2</sup>, and is known as the location of Biwa Lake, the largest lake in Japan. The Shiga Bank is the leading bank in the area, holding 44% of total prefectural savings, and 43% of total prefectural loans. Shiga Bank realised the necessity of a DRR, or disaster risk reduction-related product when, in 2005, Shiga Prefecture published the predictions based on a hypothetical earthquake involving the "Biwako Seigan" active fault system, located along Lake Biwa, Japan's largest lake and a major geographical feature in Shiga Prefecture.

According to the published study, the probability of this particular 59 km-long fault system causing a M7.1 earthquake in Shiga Prefecture in the next 30-50 years was higher than predictions made for most other fault systems throughout Japan. If such an earthquake should occur, the prefectural study estimated it would cause 37,000-46,000 destroyed homes and buildings, 600-1,200

deaths, 7,000-10,000 injured, and 72,000-82,000 displaced.

The Shiga Bank had a sound understanding of the diversity of risk factors that can affect corporate management, to include disasters caused by natural hazards such as local but large earthquakes, weather-related disasters caused by typhoons, heavy rain and snowfalls, and even large fires. The publication of Shiga Prefecture's earthquake prediction, accompanied by an official comment that earthquake risks in the area were "grave, serious, and worrying", became an eye-opening moment for Shiga Bank: it started to think how it could fulfil its social responsibility as an important financial institution in the community, contribute towards the building of resilient businesses and local communities, and live up to its corporate motto of mutual prosperity.

The majority of Shiga Bank's clients are small and medium enterprises (SMEs), with their sales and manufacturing facilities concentrated in the local Shiga area. SME clients are very vulnerable to catastrophic disaster losses, and Shiga Bank knew it faced potential multiple bankruptcies among its clients should a major earthquake occur. With awareness that their role in society as a local bank included financing these local SMEs, despite the risk they carried in the form of concentrated assets, Shiga Bank decided that their social responsibility extended to the promotion of disaster preparedness among their clients, and began exploring ways to encourage their local clients to strengthen their risk mitigation measures.

2005 was the year when Japan's Central Disaster Management Council formally requested all businesses to formulate BCPs. Specifically, the Council requested businesses to formulate BCPs so that they may continue their critical operations and fulfil their responsibilities as a corporate citizen during a disaster (such as to protect lives, prevent secondary disasters, ensure business continuity, and contribute to their local community). Government agencies strove for standardisation in BCP practices, with the Cabinet Office publishing the definitive Business Continuity Guidelines, Ministry of Economy, Trade, and Industry (METI) publishing the BCP formulation guidelines, and the Small and Medium Enterprise Agency in METI releasing a special SME edition. Interest in risk management among private companies reached a new high, and the abovementioned events added incentive to Shiga Bank's efforts.

Still, levels of risk management, especially disaster risk management, were woefully inadequate within Shiga Prefecture. A 2006 opinion survey by Shiga Bank showed that only 10.8% of their corporate clients had measures in place against disaster risk, and awareness of this risk category remained low.



The Shiga Bank thus began to encourage their corporate clients' business continuity planning through a four-step programme, namely "acknowledge", "consider", "implement", and "support."

*Shigagin Keizai Bunka Centre "Prefectural Business Trends Survey", June 2006; 1,262 companies surveyed, 567 replies, 45% response rate*

Measures are already in place against:		Have intention/plans to mitigate against:	
1. Economic risk	43.4%	1. Economic risk	46.0%
2. Product risk	41.8%	2. Product risk	38.6%
3. Environmental risk	29.8%	3. Environmental risk	31.4%
4. Social risk	29.1%	4. Social risk	30.9%
5 Financial risk	23.3%	5 Financial risk	22.2%
6. Personnel/ employment risk	22.6%	6. Personnel/ employment risk	21.7%
7. Accidents	20.1%	7. Accidents	19.2%
8. Information/ credit risk	16.9%	8. Information/ credit risk	18.3%
9. Disaster risk	10.8%	9. Disaster risk	12.3%
10. Legal risk	10.8%	10. Legal risk	9.7%

The first step, "acknowledge", offers disaster risk consulting, for example comprehensive earthquake risk evaluations and corporate risk management structure evaluations, by specialists from a risk consulting firm. BCPs are drawn up in the second step, "consider", and concrete steps, such as reinforcing buildings against earthquakes, developing alternate production sites, setting up backup IT systems, or setting up a safety confirmation system are to be taken in the third step, "implement".



*Shiga Bank's BCP support system in 2006*

The fourth step, "support", is to support both the second and third steps. Shiga Bank's BCP support loan was a financial product with preferential loan rates that could be applied towards equipment costs and consulting fees. Eligible companies were those that already had a BCP in place, or had undergone Shiga Bank's disaster risk consulting process. By limiting eligibility to this financial product, Shiga Bank placed the weight on promoting awareness for the need of risk mitigation measures among their corporate clients, instead of their own profit.

The Shiga Bank's pioneering efforts to promote BCP through their core business as a financial institution has been recognised in Japan: Shiga Bank has won the NPO Business Continuity Advancement Organization's highest "BC (Business Continuity) Award" in 2007.

### **Supporting the first important step**

The Shiga Bank has further added BCP formulation consulting to their menu in 2008, to facilitate their clients' transition from the first step, "acknowledge," to the second, "consider".

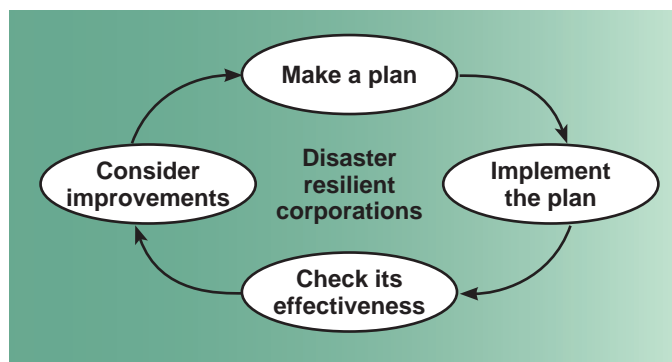
These new services support the first important step towards risk mitigation when companies have interest in preparing a BCP, but lack the personnel or knowledge, or are unsure of what needs to be done next. Shiga Bank works with their corporate clients to turn the results of the BC status quo evaluation into a 'starter BCP' using an easy-to-use template. The simplified BCP will then be evaluated, and reviewed, and advice will be given, by professionals from a risk consulting firm.

In 2006, at the time when Shiga Bank began to research business continuity, the bank joined the "society for the study of business disaster management" within the business association for Shiga Prefecture businesses, and discussed BCP in depth with assistance and advice from academics. Thus Shiga Bank was aware, from the very beginning, that the importance of a BCP lay not in its formulation but management; that a PDCA (Plan-Do-Check-Act) process must be established; and that periodic employee education and training, checking and correction of action plans, and reviews by management were very important. Shiga Bank has actively communicated this awareness to the local business community through presentations at industry study groups, and other means.

The Shiga Bank's BCP formulation-related services lowers the bar, and widens the door, on business continuity management

<sup>1</sup> Anpi joho kakunin system, a system for registering and checking the safety status of employees, students, family members, etc. via a semi-automated phone or texting system following a disaster.

using the PDCA cycle. Shiga Bank's encouragement to their clients: "Jump in. Start where you can. We can refine it later" has resulted in 22 new BCP formulations among their clients as of September 2012, four years since the additional services were introduced. The awareness of disaster risk, which was around 10% in 2006, has risen to 64.6% of prefectural businesses, according to an April 2011 survey following the GEJ Earthquake.



*Shiga Bank's model of corporate business continuity*



*Illustration by Shiga Bank*

*BCM workshop raises DRR awareness levels*

## ***Safeguarding the prefecture's financial infrastructure through BCP***

In awarding the Shiga Bank the highest "BC Award" in 2007, the Business Continuity Advancement Organization mentioned not only Shiga Bank's innovative services, but also the bank's own BCP, especially the fact that its management had consistently led the effort, and made it an institutional priority. Shiga Bank's BCP against major earthquakes has been in place since 2009, with manuals and step-by-step instructions for initial response. Shiga Bank also does what they recommend their clients, namely, periodic training and education of employees, periodic evaluation of their plan by their BCP committee, and overall PDCA manage-

ment of their business continuity practices.

The bank has diversified their communication system with satellite cell phones, assured the continued functioning of their online system by installing all of the important computer equipment in an administrative building that has a 72-hour power generator and structurally reinforced architecture, and created a system backup centre located in a different region of Japan. Their branch locations, as befits a bank's function as a semi-public building, also have backup generators, reinforced structures, and supplies of food and water. Shiga Bank reduces the risk of failure of its fund transfer system during disasters by taking such measures, to fulfil its central role in Shiga Prefecture's economic infrastructure, and to minimise the impact on their clients' economic activities.

## ***Keeping the tradition of sampo yoshi***

Shiga Prefecture has historically been a hub of transportation, trade, and commerce, with two major east-west routes passing through the area. The first mention of tradespersons originating from Shiga Prefecture, known as Omi Shonin, date back to the 12<sup>th</sup> century, or the Kamakura Period. The traditional motto passed down from these tradespersons, sampo yoshi, roughly translates to "all three parties happy" – the three parties being the sellers, buyers, and society – and show that the spirit of mutual prosperity has been passed down together with enthusiasm for commerce.

When the risks of projected southeastern and southern seaboard earthquakes are considered together with risks presented by the "Biwako Seigan" active fault system, Shiga Prefecture shows a high probability of major earthquake risk, even by Japanese standards. Shiga Bank thus considers the formulation of BCP, its continuous review and improvement, and the increase of disaster resilience among local corporate clients as important and necessary tasks for the satisfaction of the "three parties", sellers, buyers, and society.

Shiga Bank remains committed to introducing and promoting BCP-related products and services in their local community, to contribute to their corporate clients who are the engines of local economy and society, to protect environmental assets including Lake Biwa, to achieve mutual prosperity with the community, and to realise a sustainable local community.

<sup>2</sup> The percentage of prefectural businesses that indicated interest in BCP and the introduction of countermeasures to disaster risk.

## The good practice

- Shiga Bank supports risk management and business continuity seamlessly, from the very first step of acknowledging the problems, to BCP planning, to providing supporting financial products for its realisation.
- By involving itself in its corporate clients' management strategy through BCP formulation support services, Shiga Bank is able to increase the level of mutual trust, and at the same time, understand the economic reality of their area, as the local community's main financial institution.
- Shiga Bank focuses on local businesses, and crafts their message to reach their target audience by highlighting locally relevant DRR data such as local earthquake predictions.
- Shiga Bank promotes BCP with a business continuity management element, specifically the PDCA cycle.
- Shiga Bank leads by example, implementing their own BCP, and advertising the importance and necessity of BCP formulation through their actions.
- Shiga Bank researches local business trends through surveys, and responds to their client needs, for example by developing an easy-to-use 'starter BCP' product.
- All of the above practices contribute to increased risk awareness and the fostering of a DRR culture within their local business community.

## Lesson(s) learned and scope for improvement

The Shiga Bank has provided solutions for the roadblocks their corporate clients had pointed out in BCP formulation, such as the lack of personnel and knowledge, and expanded their BCP related services. However, unaddressed issues remain, such as:

- Scepticism about the efficacy of BCPs remains among prefectural businesses, which expressed, in a June 2012 prefectural business trend survey: "not sure if BCP will prove useful in an actual emergency", "so much depends on how you set up the disaster parameters", and so on.
- Difficulty in obtaining cooperation from related businesses

were among the main roadblocks to BCP planning for some businesses, e.g. "it is difficult to form a cooperative relationship with competitors", "as we belong to the secondary sector of the economy, it is difficult to formulate an independent, single-company BCP".

- While interest has risen, daily concerns such as sales and financing are ranked high among concerns, and BCP cannot be said to be a high-priority concern for the majority of corporate clients. As the local community's main financial institution, Shiga Bank intends to continue to raise awareness of the necessity of BCP among local businesses, especially among the management.

## Practical tips for replication

- Traditionally, businesses were evaluated on their technical expertise and quality of service and/or products, but the overall soundness of a corporation, and the stability that can be expected in their supply of products and services

are becoming important indicators of corporate value. Financial institutions that give credit evaluations can promote local DRR by actively sending the message that corporations will be evaluated on their business continuity.

For further information:

**The Shiga Bank, Ltd.**

<http://www.shigagin.com>

### How is this case connected to HFA?

Establishing partnerships between public and private sectors with a view to reducing underlying risk factors to disasters is mentioned in HFA4 (HFA4, paragraph 19, Social and economic development practices). The purpose of this is to engage the private sector in DRR activities, as well as encourage the development of disaster preparedness mechanisms within the private sector. The importance of public-private partnerships is highlighted by this case study on the Shiga Bank's initiatives,

where the bank promotes business continuity and financial risk-sharing mechanisms within the local community to reduce the financial burden on individuals as well as the public sector. This case is also a good example of the importance of promoting financial risk-sharing mechanisms and innovative financial instruments for addressing disaster risks (HFA4, paragraph 19, Social and economic development practices, section 'k' and 'm').

# 8 Information Technology

## Successful crisis management governed by clear global corporate policies

### *IBM Japan*

In times of emergency, including emergencies triggered by disasters, IBM Corporation puts its global crisis management policy to practice through their fully integrated Enterprise Risk Management (ERM). The ERM process serves to generate a common understanding of risk around the world, as well as ways to manage and mitigate each risk, so that this global enterprise, with 430,000 employees in 170 countries, can act together and assure the global enterprise's growth long-term.

For most risks, management and mitigation comes in the form of formulating plans and policies, and putting them into practice. IBM Japan has been constantly upgrading its disaster response policies and systems, based on past lessons learned, as well as feedback and evaluation from very frequent periodic training exercises. All those preparations paid off in the Great East Japan Earthquake, when IBM Japan's Country Crisis Management Team was up and running four minutes after the initial quake, and confirmed the status of all offices, including the Sendai office, within the hour. With their business continuity assured, IBM Japan was able to announce, two days after the quake, the outline of three kinds of core business assistance to be provided in response to this particular disaster: providing cloud computing environments, the services of IBM employees as volunteers, and the localisation of an free and open source disaster management system for disaster relief, Sahana.

Backed up by the corporate citizenship of IBM Corporation, IBM Japan and IBM employees from around the world were able to maximise IBM's contribution to the community.



*Crisis Management Team, maintenance service division, 11 March 2011*



## The case study

### Background

IBM Corporation, a company with 430,000 employees in 170 countries, is in the process of transforming itself into a Globally Integrated Enterprise to match the globalising trends in economy and community. Since around 2006, business processes that were organized by country or region has been integrated and optimised on a global scale. Business risk management has also been shifted to a global model.

In times of emergency, including disasters, IBM's crisis management policy aims to 1) secure the safety of employees and confirm the safety of employees and their families; 2) support clients through the continuation of services and minimise the effects of the emergency on their business continuity; and 3) maximise IBM's contribution to the community.

To put the crisis management policy to practice, IBM has developed a consistent, systemic, and fully integrated approach to Enterprise Risk Management (ERM). Using a clearly defined risk assessment methodology and risk management metrics, IBM identifies, defines and prioritises risks, analyses their causes, and assesses for possible enterprise-level implications.

Under ERM, senior management, whose business is closest to, and who is able to respond to, the identified risk is assigned as risk owner. As the risk owner, that manager determines how best to manage and mitigate that particular risk, and reflects that understanding on the strategies and planning for the business process. ERM is also applied on the country level, and country-level ERM policies and plans are shared among the global enterprise together with the annual business plan. At IBM Japan, a special team including director-level representatives from all major business functions and divisions identifies and prioritises risks, assess the possible implications, and assigns the risk to a risk owner.

The ERM process serves to generate a common global understanding of risk, so that both the definition and decisions about how best to manage and mitigate that particular risk remain uniform across countries at the corporate management level. Recently, when cyber-terrorism was newly defined as a risk under ERM, IBM immediately incorporated countermeasures for cyber-terrorism in its annual business plans and mid- and long-term strategies of its group companies around the world, thus assuring its long-term growth.

For most risks, management and mitigation comes in the form of formulating plans and policies, and putting them into practice.

When the bird flu pandemic scare swept the world in 2006, IBM companies in every country were encouraged to establish business continuity plans (BCP) at both country and divisional levels so that everyone was clear on what to do. The BCPs were shared worldwide via an internal database system. The key strategy in IBM Japan's BCP for pandemics was to switch their workforce over to telecommuting, on the assumption that telephone and data networks would not fail in a pandemic. Training exercises to this purpose were conducted twice a year.

IBM Japan has been upgrading its disaster response policies and systems, based on lessons learned from several disaster events starting with the 1995 Great Hanshin-Awaji Earthquake, and on feedback and evaluation from periodic training exercises. IBM Japan conducts a company-wide disaster training exercise once a year, as well as safety confirmation exercises for employees and their families four times a year.



Photo by IBM Japan

*Evacuation exercise at IBM Japan head office*

### IBM Japan and the Great East Japan Earthquake

The Great East Japan (GEJ) Earthquake occurred at 14:46 on 11 March 2011. Four minutes later, the product maintenance service division's Crisis Management Team was up and running. Using the chat and teleconferencing features on IBM Japan's internal communication software, they managed to open a connection between the Tokyo head office and all office locations across Japan, including the Sendai office. Within one hour, the team managed to collect the status information from every office.

Every year, at the company-wide disaster training exercise, IBM

Japan's employees had practiced connecting to the teleconferencing system immediately, and there had been active discussion on what information should be collected in that situation. Such practice paid off. Also, based on lessons learned in the 2004 Niigata Prefecture Chuetsu Earthquake, IBM Japan was using a database system that would allow real-time updates and access to information from multiple locations, and would be resistant to the crowding of phone frequencies. Written documents containing situational reports and discussion memos were uploaded, and information was shared accurately.

On a different floor, the Country Crisis Management Team was established. IBM Japan's Country Crisis Management Team was headed by a vice president who had been authorised to make all decisions regarding disaster response. Some Country Crisis Management Team members were from human resources and corporate communications departments, and took on the task of disseminating Country Crisis Management Team decisions within the company. Others were directors of divisions that had contact with customers and clients. The establishment of this emergency structure clarified the chain of command. Changes in the delegation of power, as well as situational updates, were shared using a real-time database sharing system. This further served to avoid confusion.

Emails requesting status updates were sent out to the employees' registered email addresses, using the safety confirmation system. The whole company had been practicing with this system several times a year since 2007, but on this occasion, with cell phone communications down, important notices were quickly collected and displayed on the company intranet's home page instead for those who had access. For those who did not, information was disseminated via a Twitter account. IBM Japan managed to communicate with their employees effectively, by taking advantage of both prearranged and newly available methods.

### **Maximising IBM's contribution to the community**

To follow through on the third part of its crisis management policy – maximising IBM's contribution to the community – IBM deployed its core business strengths in response to the GEJ Earthquake. Moreover, IBM supported such technical countermeasures with generous citizenship contributions

IBM has contributed towards the recovery and reconstruction

of communities from 32 disasters in 19 countries since 2001. In response to the GEJ Earthquake, IBM Corporation immediately announced their intention to provide over 1,500,000 USD of information systems technology and services, free of charge, to non-profit organizations and public administrations. Two days after the quake, IBM Japan's Country Crisis Management Team considered the options and announced the outlines of the form of assistance that IBM's response for this particular disaster would take. From a BCP standpoint, IBM Japan chose measures that could be implemented using overseas facilities and overseas information infrastructures.

#### **First core business contribution: cloud computing environments**

Access to cloud computing environments were provided free of charge to local authorities in the disaster area as well as non-profit organizations involved in disaster relief. Servers were located overseas, in the United States, Germany, and Canada, to avoid being affected by the shortage of power or aftershocks. IBM Japan worked out potential problems, and negotiated with IBM Corporation to realise a stable arrangement for the services.

#### **Second core business contribution: IBM employees as volunteers**

IBM tries to apply, whenever and wherever possible, their expertise in information system consulting and project management etc. towards the resolution of greater social issues. To this end, the company encourages employees to volunteer at nonprofits.

IBM Japan set out new guidelines regarding IBM volunteers following the GEJ Earthquake, in which the reconstruction of disaster-struck areas was identified as the target objective of IBM's volunteer activities. Three focus areas were suggested: working in particularly devastated areas; remote assistance for disaster area communities and evacuees; and educational activities for children in disaster areas. In the six months following the earthquake, approximately 500 IBM employees volunteered by utilising IBM's volunteer leave system and/or IBM's worldwide volunteer community called "On Demand Community." They provided their technical services directly in disaster areas, provided back office support to organizations involved in relief activities, or worked to support educational programmes for children in evacuation centres.

#### **Third core business contribution: adaptation of Sahana information sharing tool**

Sahana is an information management software that facilitates the sharing of emergency relief-related information, such as post-

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<sup>1</sup> Anpi joho kakunin system, a system commonly used in Japan for registering and checking the safety status of employees, students, family members, etc. via a semi-automated phone or texting system following a disaster.

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<sup>2</sup> This document will not go into measures taken by IBM in regards to the second part of the policy (client support).

disaster conditions and the availability of supplies, facilities, and volunteers in each evacuation centre. It is developed as an open source software following the 2004 Sumatra-Andaman earthquake and Indian Ocean tsunami. IBM employees were involved in its development as volunteers, together with software developers from around the world. Sahana has since been deployed for post-earthquake relief in Haiti, Chile, and Sichuan, China; for each of the above, IBM contributed software engineers and information system environments free of charge.

IBM chose Sahana as one of its response activities, as it had a proven track record for use in disaster relief from around the world. IBM Japan teamed up with Sahana Japan Team, a volunteer organization that had been working on the localisation of the software since 2010.

It turned out to be unexpectedly difficult to run Sahana in a Japanese environment, so in consideration of urgency, several key functions among Sahana's many options were prioritised for development and testing. While development was underway, IBM Japan sent employees to local governments along the coastal area of the Tohoku region to introduce this software and conduct a detailed needs assessment survey.

Local governments in Iwate and Yamagata prefectures decided to use Sahana for the management of their evacuation centres, specifically the personal and health records of evacuees, emergency supply needs, and information of evacuees from other prefectures.

### **Software deployment in Iwate Prefecture**

In the period immediately after the disaster, personnel from Japan's Self Defence Force made the rounds at each evacuation centre, to check the number of evacuees and what supplies were low. Lists were drawn up on paper by hand. Evacuees built up a strong trust relationship with the Self Defence Force personnel, but as such work was not among the primary mission objectives of the Self Defence Force, local governments were asked to take over. Local governments, while willing, lacked the manpower, and were looking for tool-based solutions, when IBM employees introduced Sahana.

It took over 50 IBM employees a week to set up the computer environment of 300 tablet PCs for Sahana, to be distributed to approximately 200 evacuation centres across Iwate Prefecture.

IBM Japan ran some training sessions, and tablets were distributed to evacuation centres at the end of May 2011. Sahana came online on 1 June, and by the time the Self Defence Force

withdrew from this task on 20 July, information was successfully switched over to Sahana for centralised information management.

Emergency supply procurement with Sahana was managed as follows:

1. Using the tablet at the evacuation centre, the representative of each evacuation centre enters the number of evacuees and the list of everyday goods that need to be delivered.
2. The information is uploaded to Sahana running in IBM's cloud computer environment.
3. The local government personnel in charge accesses Sahana at a certain time each day, and downloads the status reports and needs lists of all evacuation centres in data format.
4. Using a spreadsheet programme, a procurement list is drawn up every day for each delivery destination. The list is then sent to the logistics hub in data format, via email or USB memory stick.
5. The logistics hub puts together the emergency relief supplies according to the needs list, and sends back an updated list, showing what was available and packed for delivery.
6. Supplies are delivered to evacuation centres the next morning. (Initially the Self Defence Forces, then local government workers, and later, private logistics companies handled the deliveries).
7. The local government personnel in charge deletes the delivered items from the needs list on Sahana.

As information was in electronic format from the point of entry onwards, local governments were able to streamline their information management tasks. Deliveries reached evacuees faster, and local governments were able to grasp an overall picture re-



*Tablet training with Japan's Self Defence Force personnel in Iwate Prefecture*

Photo by IBM Japan



garding evacuee numbers and supplies. To illustrate the benefits with a single example, Sahana was able to clarify the number of infants needing formula at each evacuation centre.

Evacuees were able to update their requests at all times of the day using the tablets, with the added benefit of being able to privately request items that were embarrassing to have to mention in public. Evacuees were also able to make an informed selection from a list of available supplies, where previously, they requested everything that came to mind. Sahana was successfully deployed in 124 evacuation centres in the coastal areas of Iwate Prefecture, and was particularly actively utilised in Rikuzentakata City, Otsuchi Town, Yamada Town, and Ofunato City.

## Applying lessons learned

In the aftermath of the GEJ Earthquake, IBM Japan's Country Crisis Management Team has identified 39 new issues. These issues have triggered a round of systematic reviews and improvements by divisions concerned, as well as additional procurement of necessary supplies and equipment. Most of the issues were resolved by the end of year 2011. The Country Crisis Management Team also conducted six company-wide training exercises and two evacuation drills at the larger offices.

One of the issues identified was the concentration of emergency headquarter functions in the greater Tokyo area. As a counter-measure, all necessary functions were fully duplicated in the Osaka office to serve as a backup. In addition, preconditions for switching over to the backup system were defined, and the process was practiced several times through drills.

IBM Japan's activities in response to the GEJ Earthquake were made possible through the efforts of many employee volunteers, affiliated companies, and organizations. IBM Japan does not intend to waste their efforts, and will look into putting the vast hoard of information to use for future disasters, in collaboration with all stakeholders.

## The good practice

- IBM had a clearly outlined global crisis management policy, with clearly outlined roles for various organizational levels, which resulted in very quick and successful mobilisation.
- Leadership and ownership were both clearly defined, with Country Crisis Management Team taking leadership, and divisions given ownership and responsibility for certain tasks. This made it possible for different divisions and departments to work together effectively.
- IBM was able to apply lessons learned from the Great Hanshin-Awaji Earthquake (in emergency customer support procedures and selection of supplies to send disaster-affected offices and areas), and preparedness for pandemic threat (in organizational procedures and processes) to overall earthquake emergency planning.
- Information technology tools within the corporate information system, such as databases and chat functions, were used effectively for both responding to the emergency and for communicating with employees.
- IBM Corporation's concept of responsible corporate citizenship requires IBM to work towards the resolution of greater social issues using IBM's technology expertise and employee skills in an innovative manner. This idea, when applied to disaster response, resulted in contributions which took advantage of IBM's core strengths. As the IT and online worlds become more open, it is getting easier to utilise good practices developed in other countries and receive assistance from overseas experts, and such an international solution was found and applied in the recent disaster.
- As an open platform solution was chosen, IBM's contribution can be expected to be applied in the future worldwide. IBM employees worked on strengthening Sahana's adaptability to cloud computing environments and added functions useful for organizations assisting disaster victims, in addition to functions to be used by disaster victims themselves. All of the improvements and know-how accumulated in the process of development has been handed over to Sahana Software Foundation, so that it can become a part of Japan's international contribution in future disaster events.



## Lesson(s) learned and scope for improvement

- IBM Japan has applied lessons learned from the GEJ Earthquake by identifying 39 new issues, in areas such as the organization of the Country Crisis Management Team confirming the status of employees, sending supplies, confirming the status of various offices and relaying the order for evacuation, PR, and business continuity. The issues have been tackled and mostly resolved. Annual business plans as well as the mid- and long-term strategies of IBMs across the world now also incorporate countermeasures against earthquakes occurring directly beneath large metropolitan areas, such as the Tokyo Metropolitan Area.
- Open source software was considered easy to adopt and hence able to be deployed swiftly, but it was found that adapting open source software to a Japanese environment could be resource intensive in terms of technology and labour, as it required the swift translation of everything into Japanese.
- It was not easy to get information entered at evacuation centres without PC and internet connections, or from elderly users who were not familiar with the use of PCs and the internet. Having evacuees enter information directly onto the donated tablets with mobile connections entailed developing new software had in a short period of time, and testing touch screen functions for operability, accuracy and speed in reaction, and ease of use.

## Practical tips for replication

- An organization can react quicker if risk scenarios are considered in advance, roles assigned to different actors, and procedures prepared. Such preparation will allow the organization to have a greater impact on communities.
- Prioritising actions to take when a disaster happens is the most important step in preparation.
- Have an industry-wide, regional, or national vision instead of a corporate-centric vision, in order to make greater impact.
- Effective use of information found on the internet, especially the large amounts of data generated by social media, is a promising area of inquiry for those interested in helping to reduce disaster risk.

### For further information:

#### IBM Japan

<http://www.ibm.com/jp/>

[www.ibm.com/](http://www.ibm.com/)

### How is this case connected to HFA?

Identifying, assessing, and monitoring disaster risks are highlighted in HFA2. Dissemination of risk related information with an aim to promoting a culture of disaster resilience is a key component of this priority (HFA2, paragraph 17, National and local risk assessments section 'a'). The activities of IBM Japan also relate to the development of scientific and institutional capacity to map hazards, vulnerabilities and disaster impacts (HFA2, paragraph 17, Capacity, section 'i'). Additionally, the case study relates to the establishment of public-private partnerships is highlighted in HFA4 (HFA4, paragraph 19, section 'i'). This is important because such partnerships facilitate access to the expertise of the private sector which is essential in

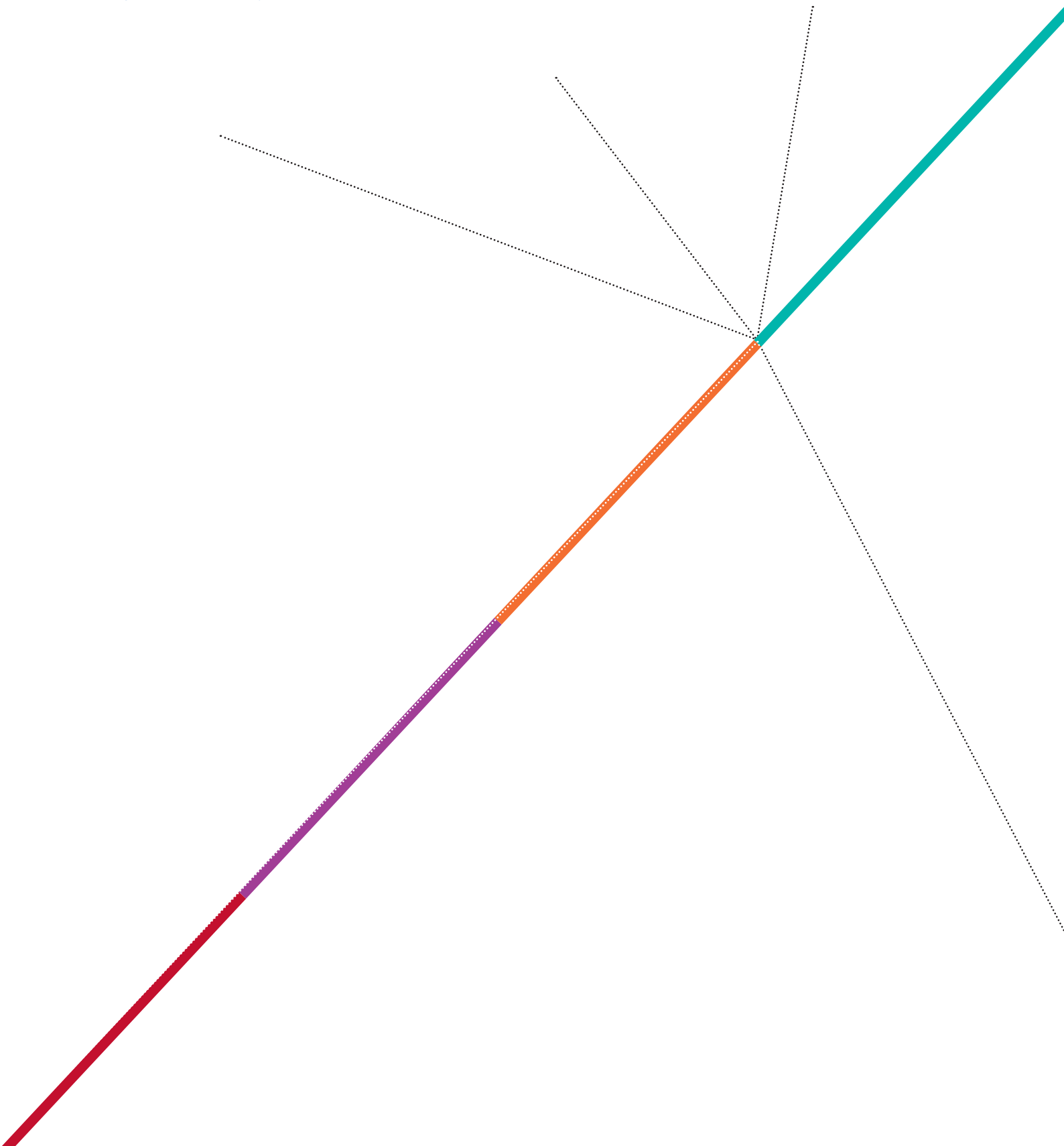
the event of a disaster. This case is also an example of how volunteers contribute to disaster recovery and preparation. The importance of managing and encouraging volunteerism is emphasized in HFA. Volunteers and the private sector are noted as essential for the multi-sectoral integration of DRR into development policy (HFA, General considerations, paragraph 21). The strategic management of volunteers and encouragement of active participation in DRR through building on the spirit of volunteerism are highlighted in HFA (HFA1, paragraph 16, section 'h', and HFA5, paragraph 20, section 'f').



# HFA Strategic Goal (c)

The systematic incorporation of risk reduction approaches into the design and implementation of emergency preparedness, response and recovery programmes in the reconstruction of affected communities.

— *Hyogo Framework for Action 2005-2015:*  
*Building the Resilience of Nations and Communities to Disasters*







## 9 Aerial Survey

### Staying prepared: emergency agreements for fast-track private-sector involvement

*Kokusai Kogyo Co., Ltd.*

Kokusai Kogyo was one of seven survey companies to mobilise its survey airplanes after the Great East Japan (GEJ) Earthquake when GSI (Geospatial Information Authority of Japan) activated its emergency aerial photography survey agreement with the national association of private survey companies (APA: Association of Precise Survey and Applied Technology). By agreeing on quality standards, work processes, contact persons, and other details in advance, as well as constantly updating and improving procedures as part of the emergency agreement, GSI and APA were able to organize the emergency survey on the day of the earthquake. Kokusai Kogyo and other APA member companies produced images of uniform quality, together covering the entirety of the disaster-affected area in pre-assigned segments.

The images were of high quality and remained useful throughout the recovery phase. Kokusai Kogyo released the images as well as image-derived analysis products for free public use. They were also used in an expedited disaster damage certification process by local governments, so that residents who needed to prove eligibility for insurance and tax relief claims, or obtain funds through the Act on Support for Livelihood Recovery of Disaster Victims, could access these forms of assistance as soon as possible.



Photo by Kokusai Kogyo

*Oblique aerial photograph of Shizugawa area, Miyagi Prefecture, on 12 March 2011*

## The case study

### Background

Kokusai Kogyo is one of the Japanese surveying companies with particular strengths in geospatial information consulting. Aerial photography is the fundamental core of its technical field and the expertise that was instantly called up right after the Great East Japan (GEJ) Earthquake.

Kokusai Kogyo – the company that surveyed the largest area – and other six surveying companies successfully completed the aerial photography of the entire affected area, an area of 4,400 km<sup>2</sup>, within two days after the earthquake. This case study gives a clue to the reasons behind the promptness and orderliness exercised in the midst of emergency.

Building on these aerial photo images, Kokusai Kogyo was able to further apply its core business strengths in geospatial information engineering and local government administration support, and provide the public as well as disaster-affected communities further assistance in a timely manner.

### The emergency agreement between GSI and APA

After an earthquake or a tsunami, an area's map information becomes outdated, although maps are an underlying infrastructure necessary for many other services. Aerial photography is the preferred solution to update the map information as quickly

as possible following a disaster, as it provides intuitively understandable, higher resolution images compared to satellite imagery. Moreover, the set timing of satellite flyover means imagery can be compromised by a lack of light or cloud cover. This is why the emergency agreement for disaster-related emergency survey work has been put into effect in 2006.

Experience from past disasters showed that remote areas could be left uncharted, and conversely, airplane accidents and duplicate coverage are likely in high-profile areas. Differing quality standards and specifications also made it hard for available information to be used effectively. The emergency agreement is designed to reduce such potential problems, and coordinate in advance so that multiple companies could be mobilised as quickly as possible, follow the same standards, and not be in competition to produce the most popular imagery by agreeing on fair method of remuneration.

The two parties in the emergency agreement are the Geospatial Information Authority of Japan (GSI), an agency under Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT), and the Association of Precise Survey and Applied Technology (APA), an association for standardising, quality control, and innovation and use of geospatial information, with 94 member companies. The emergency agreement, which is a short, bare-bones document, states that the APA, when requested by the GSI in an

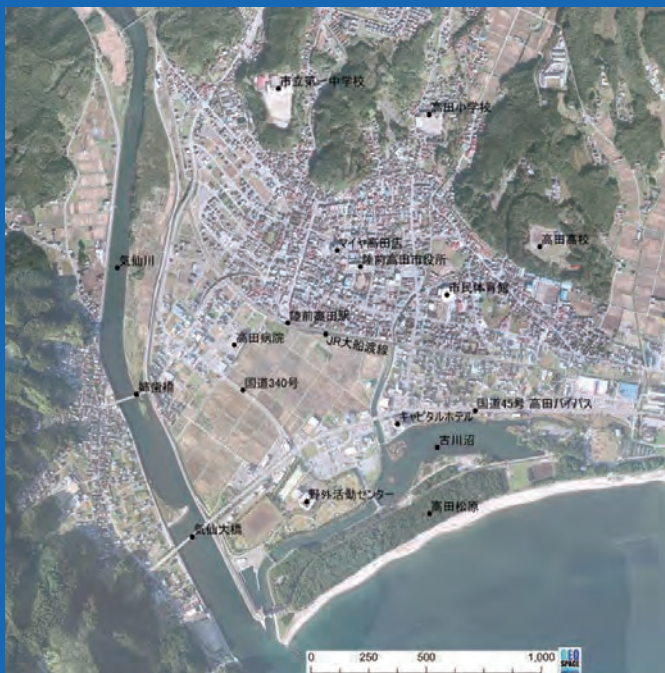


Photo by Kokusai Kogyo



Photo by Kokusai Kogyo

Aerial photography of Rikuzentakata City  
(Left) October 2010 (Right) 13 March 2011  
Blue line on 2011 image denotes tsunami extent



event of a disaster, will identify and recommend from among its member companies the ones suitable for the job. The GSI agrees to purchase the survey products from the recommended companies on a fast-track sole-source contract basis, and companies agree to be ready and willing to immediately mobilise.

Based on the agreement, the GSI and APA have worked out many more details in advance, such as emergency contact information, the necessary technical specifications for the product, and shorthand methods to both communicate and record instructions given and received. The GSI and APA keeps both details and procedures regularly updated and revised. The current working manual for emergency aerial surveys, for example, runs to 36 pages and includes 20 checklists and forms.

APA member companies are annually called to register their interest to join the emergency contact list, by submitting an updated list of resources, including the location of airplanes, survey equipment, and key personnel. Companies will be remunerated at fair rates for their products, and thus have an incentive to join the list. The emergency agreement has so far been activated in several major earthquakes to date.

### The emergency agreement in action

Staff at APA headquarters, located in Tokyo, felt a large tremor on 11 March despite being 400 kilometres away from the epicentre, and realised that in all probability, an emergency aerial

survey will soon be requested. The request arrived from GSI 45 minutes after the initial quake, despite the continuing after-shocks, and APA initiated their procedure. APA had to contact member companies on their list of emergency contacts of that year, check their availability, and then rank the available companies according to pre-arranged criteria (such as the ability to complete the flight mission without additional fuelling) so that a short list of recommended companies could be sent back to GSI.

It is noteworthy that in this unprecedentedly large earthquake, GSI sent out their first request without being able to give precise details as to area and the required quality standard, which are usually included to assure a standardised product. Member companies had a difficult decision process, in whether to respond without these details, but APA was able to send its recommendation list back to GSI, three hours after the earthquake. GSI made their selection, and opened dialogue directly with the companies.

Although electricity was out and transport and communications in the Tokyo metropolitan area remained mostly paralysed, seven companies mobilised the next morning, thanks to the preparations set in advance. The bulk of the digital aerial photography survey commenced on 12 March and finished on 13 March. Detailed aerial photographs of the disaster were made available on GSI and company websites from 13 March onwards.

(This section courtesy APA, from their internal report dated December 2011)

#### Emergency agreement activation timeline

##### 11 March, Friday

- 14:46 Great East Japan Earthquake
- 15:30 GSI sends standby notice
- 15:45 GSI requests APA for list of companies
- 15:54 APA begins contacting member companies
- 17:59 APA tells GSI: 7 companies ready to respond
- 22:37 APA tells GSI: 9 companies ready to respond

##### 12 March, Saturday

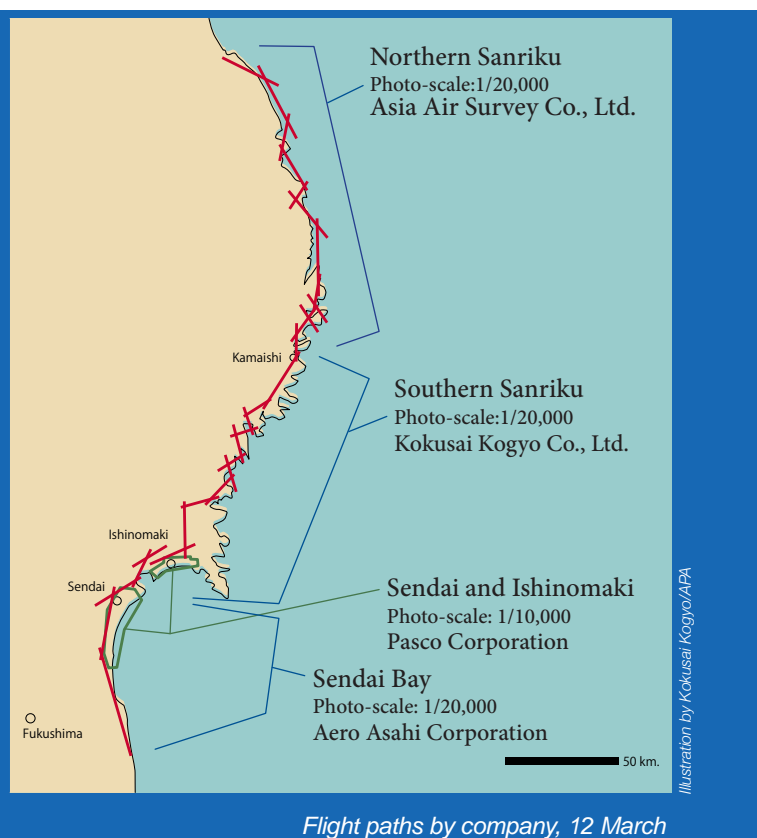
- 12:07 GSI informs APA that emergency survey job had been successfully contracted out to six companies

#### Summary of APA member company response \*

Location	Area (km <sup>2</sup> )	Time of mobilisation	Name of company
N. Sanriku	818	11:00 am	Asia Air Survey
S. Sanriku	1,044	9:10 am	Kokusai Kogyo
Sendai-Ishinomaki	529	10:00 am	PASCO Corporation
Sendai Harbor	663	11:00 am	Aero Asahi Corporation
Kurikoma Mtn. (E)	673	**	A-TEC
Kurikoma Mtn. (W)	673	9:23 am	Hasshu

\* A seventh company, Nakanihon, subsequently joined on the second round of calls.

\*\* The inland survey was cancelled due to bad weather.



## *Fulfilling the emergency agreement, and beyond*

Right after the GEJ Earthquake hit, the main technical office of Kokusai Kogyo, located in the west of Tokyo, understood that the epicentre was off Japan's east coast and that a huge tsunami was anticipated. As always, the company immediately took action, getting ready to fulfil the social responsibility of a surveying company which is to record what happened.

Kokusai Kogyo received a phone call from APA when it was about to establish its disaster response team. What was needed first was to confirm the safety of its employees and the status of its facility and equipment, which were located all over the country including the affected areas. Soon it was reported that three Cessna airplanes, with expensive digital survey cameras on board, were irretrievably damaged when the tsunami ravaged Sendai Airport in Miyagi Prefecture, one of the most devastated prefectures.

Nevertheless, Kokusai Kogyo finally found a way to commission an airplane from a small Tokyo area airport and sent a positive response to APA within two hours after the initial request.

Next morning, Kokusai Kogyo's airplane mobilised the earliest among the six companies to fly out, and covered the widest coastal area, south of Route 45, as instructed by GSI in their hand-annotated six-page fax received during the night.

The emergency agreement permitted Kokusai Kogyo to give out these aerial photos through its website. Kokusai Kogyo went a step further, and added high-resolution satellite and radar satellite images (IKONOS, GeoEye, Cosmo-Skymed, RapidEye, RADARSAT, and TerraSAR-X) and their derivative analysis products, including computer modelled tsunami simulations, on their corporate website.

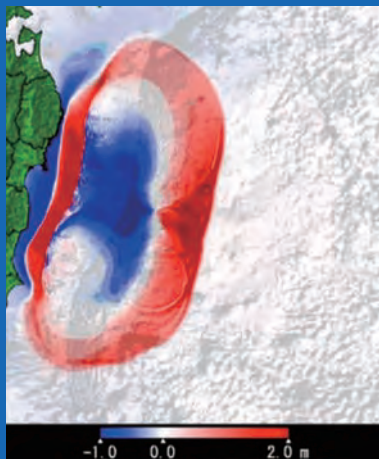
As a geospatial-information-based consulting company, Kokusai Kogyo had pre-disaster images in stock, and provided hard as well as digital copies of pre- and post-disaster paired aerial photo sets and maps to local governments and emergency response workers, and

helped locals and visitors alike to orient themselves on the changed landscape. These free data products, available from 13 March, formed the core of Kokusai Kogyo's CSR following this unprecedented disaster.

Kokusai Kogyo also responded to a separate GSI-APA emergency agreement for airborne laser surveys with six other companies in April, when the need for a new elevation map of the area, due to shifts resulting from seismic activities became apparent. Through the emergency agreement and beyond, the actions of Kokusai Kogyo and fellow member companies of the APA show that the private sector can be counted on, when their professional services and technical expertise are needed by their public sector partners and the community.

Kokusai Kogyo's contribution to disaster-affected communities through aerial photography was not only limited to the production and supply of data. Kokusai Kogyo had made some of the GIS-based administration information systems for local governments in the Tohoku area. When these local governments' offices were damaged by the tsunami, Kokusai Kogyo sent not only their backup data, but computers and employees to man their offices.

Using reliable high-resolution aerial imagery taken in the emergency agreement survey, together with property and taxation databases, Kokusai Kogyo employees assisted local governments in issuing expedited disaster property damage certificates to residents who needed to prove eligibility when applying for insurance and tax relief claims, for support from the Act on Support for Livelihood Recovery of Disaster Victims, or for home loan financing for disaster victims through the Japan Housing Financing Agency. By expediting normal certification procedures, which would require on-site visits by government workers, residents could access such forms of assistance much sooner. The emergency aerial photography was put to practical use in assisting residents well into the recovery phase.



*Computer modeled tsunami CG from website*



*Kokusai Kogyo employees working in local government offices*



## The good practice

Emergency agreements support enhanced resilience by preparing for actions during and post-disaster in advance. They facilitate effective response and thus potentially reduce the impact of the disaster. Emergency agreements are common practice across sectors in Japan and are a way for national and local governments to enter into relationships with private sector partners. The key elements in a successful emergency agreement are:

- Agreement at the appropriate level, in this case a national agency with a national-level industry association.
- Developing a clear and detailed manual, and revising and/or updating the details of the agreement regularly. The first version of the manual was created as a paid research pro-

ject, assuring its professional quality. The manuals are reviewed every year by APA.

- Allowing companies to register interest for a limited period (in this case, a year). This assures a pool of committed responders each year, and allows companies to drop out on certain years without fear of being permanently removed from the agreement.
- Firm leadership by the public body during execution of the agreement.
- The utilisation of a specific technical expertise of the target private companies and/or industry.
- Assurance of fair remuneration by the national agency for output produced to specifications is also a good practice.

## Lesson(s) learned and scope for improvement

- The rapid spread of social media and the increased availability of video, satellite, and other remote sensing images from other sources were notable in this disaster. The agreement must adapt to the times and stay relevant.
- The tsunami damage to Sendai Airport was an unforeseen problem which could have potentially derailed the whole response process. The concentrated use of certain airports by survey companies is a potential risk, and risk dispersal measures should be considered.

ures should be considered.

- All parties of the agreement had to adjust to additional unforeseen problems in this disaster, from seismic activities large enough to shift permanent survey control points, to surveying in areas close to the nuclear power plant accident in Fukushima. Better training, for example yearly role-playing training with 'surprise' scenarios, is required, especially as transfer of personnel constantly bring new people to key roles.

## Practical tips for replication

- Consider and address how the remuneration for emergency services can be provided within government procurement regulations, in the basic emergency agreement. Avoiding this issue can undermine the success of the emergency agreement.
- Consider industry associations as potential partners for

emergency agreements. By dealing with an umbrella association on the private sector side, instead of top companies, smaller companies are also given a stake. The agreement is also more stable, being shielded from the ups and downs of specific companies

For further information:

**Kokusai Kogyo Co., Ltd.**

<http://www.kk-grp.jp/english/index.html>

### How is this case connected to HFA?

The development, updating and dissemination of risk maps and their related information is highlighted as important in HFA2 (HFA2, paragraph 17, National and local risk assessments, section 'a'). Similarly, the development of scientific and institutional capacity to map hazards, vulnerabilities and disaster impacts (HFA2, paragraph 17, Capacity, section 'i'). Both of these sections demonstrate the necessity of the work conducted by Kokusai Kogyo. Additionally, this information from aerial surveys by Kokusai Kogyo was made publically available on its corporate website, which contributes to key activities under HFA2 suggesting the public dissemination of risk information

with an aim to promoting a culture of disaster resilience (HFA2, paragraph 17, National and local risk assessments, Section 'a'). HFA1 is related to governance issues to ensure that DRR is a national and a local priority with a strong institutional basis for implementation. Kokusai Kogyo had an agreement with national or local authorities in advance, which led to ensure smooth professional support when the disaster happened. This is an example of institutionalisation of DRR under HFA1 (HFA1, paragraph 16, National institutional and legislative frameworks) through the involvement of multiple sectors.

# 10 Aviation

## Pouring company-wide resources into the Tohoku region

*Japan Airlines Co., Ltd.*

The 2011 Great East Japan (GEJ) Earthquake struck roughly one year after Japan Airlines Co., Ltd. (JAL Group) filed for bankruptcy and was in the process of restructuring towards recovery. With land transportation links – road, bridges, rail, etc. – cut off over an extensive area, transportation of medical and relief teams and evacuees, as well as the delivery of emergency relief supplies, were being seriously impeded. JAL stepped up to the challenge, and using its regularly revised proprietary earthquake contingency manual, it quickly re-opened air routes by pouring company-wide resources into the Tohoku region.

Demand for flights was thrown into a state of disarray by the earthquake. While on the one hand many tourists were cancelling their travel plans as people throughout Japan exercised *jishuku*<sup>1</sup>, on the other hand, every extra flight possible to the Tohoku region was desperately needed. By cancelling and adjusting the aircraft size of regular flights, large aircraft were freed for use in the Tohoku region, although this involved re-coordinating plane assignments on a daily basis. Moreover, cabin attendants and ground staff, airport equipment and machinery were sent to airports all over Tohoku to make sure they could handle the additional flights.

The underlying principle of the aviation industry is to connect far removed locations by transporting people and cargo. JAL contributed its industry expertise to ensure the safety and peace of mind of disaster victims by flying them to safety and making sure relief supplies and personnel reached the disaster-affected areas.

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<sup>1</sup> To act with self-restraint out of respect for those affected by the disaster.



Photo by JAL

Aircraft landing at Sendai Airport, April 2011

## The case study

### Background

The JAL Group, after going bankrupt in January 2010, went through a major restructuring. As part of this restructuring, a new flight planning department was formed by combining the flight route planning (scheduling) section, previously a separate organization, and the section managing aircraft. The new department could now flexibly assign larger aircraft to routes with higher demand and smaller aircraft to routes with lower demand; a major step towards improving JAL's overall balance sheet. This newly structured organization had only been in place for three months when, on 11 March 2011 the Great East Japan (GEJ) Earthquake occurred.



Photo by JAL

*Sendai Airport being engulfed by tsunami waves, 11 March 2011*

### Putting years of preparation to use

Within ten minutes of the earthquake, with reports of runway closures coming in from affected airports, JAL's operations control centre (OCC) cancelled all flights bound for Sendai and Haneda (Tokyo International) airports. Meanwhile, reports had come in from Sendai Airport stating that passengers and airport workers were evacuating into the airport building. As warnings of the impending tsunami were confirmed, OCC sent Sendai Airport an order to immediately direct everyone to safer areas within the building. Around the same time, dispatchers began to divert the many aircraft that were running out of fuel circling Haneda and Narita airports, to various other airports as appropriate.

JAL had first established its disaster contingency manual in 1996, after the 1995 Great Hanshin-Awaji Earthquake in Kobe. The emergency procedures were regularly updated to make

them more practical, such as by including a brief code of conduct for staff in earthquake emergencies, and introducing the use of a safety confirmation system<sup>2</sup>. When the GEJ Earthquake occurred, JAL, envisaging the enormity of the catastrophe, activated the carefully prepared procedures and in addition set up a disaster response headquarters with the CEO at its head.

Airports in the Tohoku region were contacted and degrees of damage were ascertained. It became known that all land-based transportation links were in a state of paralysis, with roads and railways cut off. The demand for flights became extremely high, with evacuees trying to leave the area, and with technicians from water and electric utilities, emergency medical teams and so on trying to get into the disaster-hit areas as quickly as possible.

### Scheduling extra flights to meet demand

JAL sent its first extra flight into the disaster-hit area on the day after the GEJ Earthquake. Every day, JAL's new flight planning department matched flight routes to passenger status and determined exactly how many extra flights each route required, and took steps to make this possible. In the first 20 days alone, from 12 to 31 March, JAL flew 561 extra flights to the disaster affected areas, with a seat occupancy rate (load factor) of 84.4%.

While the disaster caused a rise in demand for air travel to the Tohoku region, the opposite was true in other areas with tourism



Photo by JAL

*First plane taking off from re-opened Sendai Airport, 13 April 2011*

<sup>2</sup> Anpi joho kakunin system, a system commonly used in Japan for registering and checking the safety status of employees, students, family members, etc. via a semi-automated phone or texting system following a disaster.



demand dropping significantly as a result of the general mood of self restraint, or *jishuku* (see abstract). The Civil Aviation Bureau of the Ministry of Land, Transport, Infrastructure, and Tourism (MLIT) does not normally allow reduction in flights in consideration of passenger inconvenience, but the Bureau made a special dispensation on this occasion. JAL reduced flights on routes with low passenger demand and diverted the newly surplus aircraft to disaster-affected areas.

In addition, larger aircraft were assigned to regular flight routes with newly increased demand. For example, a 300-seater aircraft was found for the Tokyo-Aomori flight route which usually takes 150 passengers per flight. All measures were considered to secure enough large aircraft; the retirement and resale of several A300-600R (300-seater) aircraft, initially planned for March, was delayed until the end of May.

Unexpectedly tested by the GEJ Earthquake, JAL's newly restructured organization, designed for flexible corporate management, proved useful for rapid and flexible disaster management as well.

### ***Sending in more staff and resources***

Of course, in addition to actual aircraft, pilots, cabin attendants, ground staff, and airport facilities and equipment are all necessary to get a special flight in the air. The flight planning department and departments in charge somehow found and sent necessary resources to airports in the Tohoku region. Each department took the initiative in finding out exactly what was needed at each airport in the disaster-affected area, and made every effort to support the air relief effort, namely by sending ground staff from western Japan and ground support machinery from Tokyo.

Each airport in the region had activated its emergency operational framework. Tohoku's largest air hub, Sendai Airport, was devastated by the tsunami on the day of the earthquake. About 2,000 people, including residents of a nearby elderly home, fled to the passenger terminal. They watched the tsunami sweep around and past the entire building, which luckily remained intact. With all lifelines, including power, now cut off, they were left isolated. JAL Group staff at Sendai Airport, despite being disaster victims themselves, immediately began helping passengers and evacuees alike to safety. They stayed true to their mission until three days after the tsunami, when the evacuees were rescued from the airport.

The nearby Yamagata Airport, which normally only has four 50-seater flights a day, became the backup to Sendai Airport,



Photo by JAL

*Evacuees inside Sendai Airport*



Photo by JAL

*Staff resting inside cardboard boxes for warmth*



Photo by JAL

*Relief supplies being loaded onto a JAL flight*

taking on up to 17 flights per day. JAL's various departments worked together and quickly sent additional staff, airport machinery, and equipment.

The entire JAL group was able to pool its resources to have the best possible framework in place to support the disaster-struck area. This was a result of each and everyone at JAL Group having a strong sense of their responsibility as a provider of air transport, a vital infrastructure for society, and utilising their capacity to the fullest.

JAL Group flew a total of 2,674 extra flights, carrying over 200,000 passengers, to and from the Tohoku region from 12 to 24 March. In addition, JAL Group upgraded a total of 556 flights to larger aircraft. These extra flights and larger aircraft, with their extra cargo room, were also extremely effective for transporting relief supplies.



Aircraft with "GANBARO NIPPON" (Don't give up, Japan) painted on its fuselage

Photo by JAL

## The good practice

- Quick decision making, flexible organization.  
Establishing a disaster response HQ, led by the president, immediately after the GEJ Earthquake enabled rapid decision making and facilitated the swift and accurate enactment of these decisions. Additionally, the amalgamation of the departments in charge of flight route scheduling and equipment management meant that decisions about reduction and redirection of flights could be made based on demand assessments and put into action rapidly. JAL showed a willingness to consider solutions that were more than inconvenient, such as extending the planned retirement of aircraft to meet expected increases in demand.
- Strong awareness regarding risk management.  
Envisaging and navigating potential risks is a necessary part of the aviation business. JAL, as a company, was able

to remain calm in its judgement and readily tackle difficult issues in part due to the nature of their business. JAL was prepared on an organizational scale against disaster risk, and also mentally armed with the pride in which JAL employees take in providing a public transport service as a private sector business. JAL inculcates its employees to always aim for the highest standards in business management as an aviation transport specialist. Such a corporate attitude enabled JAL to fully utilise its strengths in a crisis situation.

- Staff identity.  
One of JAL's corporate philosophies is "each of us makes JAL what it is." This philosophy is deeply rooted in all JAL Group staff and was the driving force behind their decisive actions and decision making in the field.



## Lesson(s) learned and scope for improvement

- In this disaster, the Tokyo region only suffered lightly. However, JAL realised that, in the event of a major earthquake in the Tokyo area, the Operations Control Centre (OCC), which controls all flights, might not be able to stay functional. JAL has since established the procedure for such a possibility: JAL's Osaka Airport branch will be responsible for the initial response functions of OCC, and then, in the next step, a temporary OCC will be established elsewhere. In addition to preparing manuals, JAL now conducts simulation exercises twice yearly to practice this procedure, so that it can be learned thoroughly.
- JAL's safety confirmation system for their staff, while proving to be reliable as a communications network during disasters, had flaws in its personal information registration system and maintenance procedures. Because the system was used only twice yearly, during disaster simulation drills, staff were unfamiliar with its use and in some cases could not respond in a timely manner.
- When deciding on special flights, it is vital to quickly obtain up-to-date and highly accurate information on whether other methods of transportation are back in service or not.
- While most communications were down following the earthquake, public telephones (with emergency batteries) and telephones with backup power sources were still operational after the tsunami. There is a need to establish reliable means of communication.
- JAL's regulations on earthquake countermeasures, established in 1996, had been revised as necessary. Following the GEJ Earthquake, it was further revised based on the lessons learned, such as relaxing the rules regarding transfer of authority, allowing flexible staff re-allocation, and centralisation of information within the disaster response headquarters.

## Practical tips for replication

Flights are a vital means of transport in any disaster in any country. However, as seen in this case study, aviation companies rescheduling flights alone is not enough to meet the rapidly increasing demand in disaster-hit areas. Measures such as temporarily relaxing regulatory controls by aviation authorities

with regards to changing flights, increasing the number of staff, aircraft and equipment, and securing land-based means of transport from airports will all be necessary. To achieve this, cooperation and coordination amongst all relevant parties will be indispensable.

For further information:

Japan Airlines Co., Ltd.  
<http://www.jal.com/en/>

### How is this case connected to HFA?

HFA5 highlights the importance of strengthening disaster preparedness for effective response at all levels and being ready to act when a disaster happens, in order to reduce disaster losses and impacts. The actions by JAL are an example of strengthening and developing a system to ensure rapid and effective disaster response as mentioned in HFA5 (HFA5, paragraph 20, section 'c'). HFA5 also proposes the development of

specific mechanisms to engage the active participation and ownership of relevant stakeholders in DRR. Such ownership was demonstrated by the sense of mission displayed by JAL. The case of JAL also relates to the suggested activities under HFA4 including strengthening critical public facilities including transport lifelines (HFA4, paragraph 19, Social and economic development practices, section 'f').

# 11 Food Retail

## Keeping up the supply of food in disaster-hit areas

*Maiya Co., Ltd.*

Maiya, a local supermarket chain in Iwate Prefecture, had been established during the region's reconstruction from tsunami damage caused by the Chile Earthquake in 1960. As a result, they had inculcated disaster awareness into their corporate culture, and were serious about emergency response drills. The tsunami caused by the 2011 Great East Japan (GEJ) Earthquake destroyed six of their stores, but thanks to the skilful and speedy guidance provided by store employees, all shoppers and employees evacuated to safety and survived. Many passers-by realized their danger when they witnessed the evacuations and were also able to reach safety.

Maiya's economic disaster losses were great, but they continued to provide their community with food and other supplies by re-opening the single store that was spared from tsunami damage on the very day of the disaster. As a locally based supermarket chain, Maiya believed in their social responsibility to make sure those in their community had food on their tables throughout the ordeal. Maiya secured supplies through local and national networks, opened new satellite stores, and deployed truck stalls in order to reach out and continue catering to the survivors, emergency response teams, and emergency shelter residents in their community.



Photo by Maiya

*Maiya's Rikuzentakata store, April 2011*

## The case study

### Background

Maiya, a local supermarket chain with 16 stores in Iwate Prefecture, has 1,100 employees, annual sales of 20 billion yen, and is a familiar community pit-stop that provides the daily needs to the Sanriku Coast area in north-east Japan. In the 2011 GEJ Earthquake, however, Maiya lost its head office building, warehouses, and three stores in Ofunato City, two stores in Rikuzentakata City and one store in Otsuchi Town, which together brought in a third of their annual revenue. All of Maiya's employees who were working that day survived, but among those who had the day off, 16 lost their lives.

While other local stores and national convenience store chains folded due to supply chain failure, Maiya stubbornly remained open for business, because – they felt – a community-based supermarket needed to stay open when the community was in dire need. Maiya continued to sell their products outside the storefront of their one surviving store in the tsunami-disaster area, deployed truck stalls (shops on the beds of trucks), and opened satellite stores in temporary housing units, so that they could fulfil their *raison d'être*: to deliver the necessities of life to their fellow local citizens.

### The training that saved lives: the day of the earthquake

The earthquake was clearly not normal. Maiya employees, convinced that a tsunami was coming, herded their shoppers out and ran towards high ground. Many passers-by in the area, realising their own danger when they witnessed the seriousness of their demeanour, followed them and also reached safety.

Such actions by Maiya employees are a result of Maiya's preparedness for disasters. Maiya was established in 1961, the year following the devastation of the Tohoku region by the tsunami from the Chile Earthquake, and the company was initially partially funded by reconstruction subsidies. From the beginning, Maiya appointed an Earthquake Project Team within their company, took tsunami risk into full consideration, repeated their disaster preparedness and evacuation drills every year for 50 years, and put many counter-measures in place.

The objective of Maiya's disaster preparedness is the continuation of storefront sales. In addition to a supply of food, water, and face masks for its employees, Maiya also kept a supply of backup generators, fuel, floodlights, and plastic tarp so that an outdoor shop space could be set up in the event of blackouts and damage to their store buildings. Such supplies were periodically checked and replaced. Their safety confirmation system<sup>1</sup> was set up to check the availability, and arrange efficient deployment, of their management-level employees during an emergency.

Maiya also had earthquake insurance, satellite phones for communication, and manuals instructing what to do in an earthquake. Since 2005, all employees are required to carry a small card-sized instruction booklet in their wallets which lists the key emergency instructions.

Additionally, Maiya has conducted their emergency evacuation drills every half year since their establishment. Maiya's drills were realistic to the point that participants faced real smoke, fire, fire trucks, and ran to find 'survivors.' Employees, therefore, had a very high awareness of disaster risk.

An earthquake and tsunami of such an enormous scale, however, was unforeseen, and employees could not simply follow the manual that day. In fact, the manual, made with an intensity level 5 earthquake in mind, was useless, and the safety confirmation system did not work because all communications were immediately down. The employees instead used their training to analyse the situation, make decisions, and take action.



*Evacuation drills using a real ladder truck*

The Ofunato-Inter[change] store, situated inland near a highway interchange, was the only Maiya store in the heavily devastated area that did not receive direct tsunami damage, but it was still in bad shape, with ceilings caving in and electricity supply gone. The Ofunato-Inter store nevertheless opened an outdoor shop space an hour and a half after the quake struck. The sea is not visible from the Ofunato-Inter store, but store employees heard about the total

<sup>1</sup>Anpi joho kakunin system, a system commonly used in Japan for registering and checking the safety status of employees, students, family members, etc. via a semi-automated phone or texting system following a disaster.



devastation of their community from other Maiya employees who had managed to escape the tsunami and reach this store from the head office and other stores. "We're a local company, and we've always depended on this community. We simply felt it necessary to keep the Ofunato-Inter store open at that time." The store manager and employees made the decision to fulfil their responsibility as a local supermarket, as a provider of daily needs in the community.

The parking lot of Ofunato-Inter store started to fill up with cars of those who managed to drive away from the tsunami. Maiya employees brought out rolling display units from the damaged store and sold bottled water and instant food outside, in the parking lot. Cash registers could not be used because of the power outage, so prices were slashed to round numbers, 50 yen, 100 yen. The outdoor sale area remained open until 10 pm that day, illuminated by headlights of cars.

### *Keeping the supply of daily goods flowing*

Outdoor sales at the Ofunato-Inter store continued for four days, while temporary repairs were underway in the store building. All

the backup generators and other emergency supplies, as well as immediate stock, had been washed away with their warehouses by the unprecedentedly far-reaching tsunami. Fuel immediately became scarce throughout the region, and it became impossible for the usual suppliers to deliver all the way to Ofunato, which was located on the coast. Understanding this, Maiya newly designated the surviving Ofunato-Inter store as a relay station between their surviving supply depot located further inland and Ofunato City, secured transportation between the supply depot and the Ofunato-Inter store, and managed to supply the community without apparent discontinuity.

Maiya opened new satellite stores in prefabricated housing units at the end of March, one in Otsuchi Town, and two in Rikuzentakata City. Residents were at that time completely dependent on official emergency supplies, as local stores, other larger supermarket chains, and convenience stores were all wiped out by the tsunami. Maiya supplied its satellite stores with basic necessities for the surviving residents.

The communities served by Maiya were, even before the disaster, becoming increasingly aged and depopulated, and residents relied on personal vehicles and buses to get around. With cars washed away, and public transportation halted, Maiya decided to reach the residents using truck stalls. Special supermarket truck stalls loaded with a display of 300 items including fresh vegetables, meat, fish, and condiments arrived in temporary housing areas and isolated communities playing the Maiya theme song. As Maiya did not own vehicles for mobile food retail, they joined hands with a local mobile sales vendor with a fleet of such vehicles, and even rounded up some retired Maiya employees as drivers. Maiya was not only able to satisfy their customers, but also to form a partnership that had merit to both Maiya and the vendor, who was unable to otherwise secure supplies.

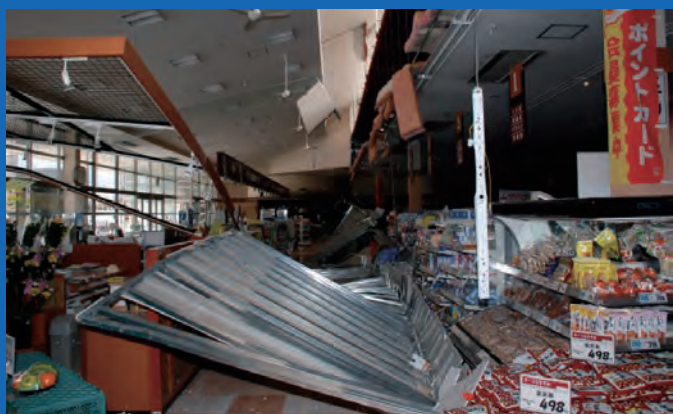


Photo by Maiya

*The wreckage inside the Ofunato-Inter store, 11 March 2011*



Photo by Maiya

*Outdoor sales outside the Ofunato-Inter store*



Photo by Maiya

*Satellite stores opened in temporary housing units, Naruishi area, Rikuzentakata City*



## ***The two networks that supplied Maiya***

How was Maiya able to keep their supply coming? Maiya had two safety nets in place: a local network developed through years of being active in the local business community, and membership in a nationwide supply network.

The local network proved itself useful immediately after the disaster. The day following the disaster, there was a crowd forming outside the Ofunato-Inter store, looking for their immediate needs, and the store needed fresh supplies, but Maiya's head office was incapacitated by the tsunami. It was decided that one of the Ofunato-Inter store employees would drive his own car to Maiya's supply depot located far inland in Iwate Prefecture, where the phone was still working, to try to contact Shiraishi Baking Company Ltd., a bakery in Morioka City. Once there, although the Maiya employee tried many times, with blackouts in Morioka City, the calls did not go through.

The Maiya employee managed, however, to call another company in Morioka, a supplier for Maiya. That supplier, despite not having any relationship to Shiraishi Baking Company, sent one of their own employees to bear the message. And Shiraishi Baking Company, despite having only received a simple plea for help second-hand from a stranger, nevertheless sent a 10-ton truck bearing 6,000 freshly baked loaves of bread to Ofunato-Inter store.

The trust-based relationship built by Maiya with two local companies, Shiraishi Baking Company, with whom Maiya had discussed mutual aid in case of emergencies, and with the supplier who sent their employee with Maiya's message was integral to their successful role in the recovery effort.

Speaking of trust-based relationships, Maiya's relationship with its customer base should also be mentioned. Ofunato-Inter store's outdoor sales area was patronised by local volunteer fire brigade members, members of Japan's Self Defence Force, and other emergency relief workers from outside the Prefecture, buying in bulk for their teams. Maiya also delivered foodstuffs such as rice to emergency shelters, according to the agreement they had with several local governments. Bulk purchases at the storefront were commonly handled by simply noting down the name, address, and purchase details in a notebook, and deliveries to shelters were made directly to shelters without paperwork, but Maiya received the correct payment from all parties when things settled down.

At the storefront, fire brigade and outside relief workers were shown to a special entrance to make their purchases, and walked away with bulk items without waiting in line, but none of the local customers complained. In addition to community fellowship and respect for those working to find the missing, the customers must have trusted Maiya and their ability to supply all those waiting in line.

Maiya did not neglect to secure a membership in a nationwide supply network as well. Maiya's post-disaster supply flow was strongly backed up by CGC Group (operated by CGC Japan Co. Ltd.), an association of over 200 small to medium local supermarkets across Japan. CGC Japan supplied member companies during normal times, and immediately began preparations to send necessities to the Tohoku region when the disaster struck. From lessons learned in the 2004 Niigata Prefecture Chuetsu Earthquake, CGC Group had put into place a policy to send supplies even when contact is not made from members in the disaster area. They had also studied the changing customer needs in the first, second, and third days after the disaster and beyond.

CGC Group thus sent Maiya a daily delivery of an appropriate range of products, despite the lack of communication. With regular suppliers and manufacturers unable to deliver to Ofunato City due to the shortage of fuel, CGC Group's delivery was what supported Ofunato-Inter store. Maiya had emergency agreements in place with Rikuzentakata City, Ofunato City, and Otsuchi Town, and the continuation of supplies through these two networks allowed Maiya to fulfil its obligations to the community.

## ***The birth of a second Maiya***

As the only surviving retailer in the area, and with the post-disaster tendency of residents to stock up, Maiya's sales volume post-disaster was equivalent to the previous year with 16 stores, despite having only 10 surviving stores. In August 2011, Maiya opened the first temporarily built, but major new retail space in Rikuzentakata City. The retail space has been occupied by a cell phone carrier, dry cleaners, and a local traditional sweets store in addition to Maiya, and business is roaring despite the temporary settings. With most buildings burnt down within the city, residents have no place else to go for shopping or leisure, and this temporary retail space has become a destination for residents. Maiya was able to open four additional stores by the summer of the year following the disaster.

Maiya, established the year after the Chile earthquake on reconstruction subsidies, has met with the GEJ Earthquake on its fiftieth anniversary. The trials have been great, but each and every employee of Maiya now believes that supermarkets are providing services that are a necessity to life. Maiya has now embarked on its second life, as a bountiful provider of food supplies to the local community.

## The good practice

- Maiya maintained a high level of risk awareness and conducted realistic practice drills, based on the understanding that the Sanriku area was prone to major earthquakes. While the earthquake and tsunami of 2011 exceeded all expectations, their constant effort to stay vigilant honed their employees' decision-making as well as the ability to take action in the face of an emergency.
- Employees in different stores independently took stock of the situation and led their customers to safety; employees at the store that remained relatively undamaged made the decision to reopen. Such accurate on-the-spot decisions by employees were due to the pride and sense of duty each of them felt as a provider of daily needs in the community.
- The web of local connections and mutual trust, built up over many years, benefitted the company at the time of emergency.
- Maiya's supply was backed up powerfully by a national association that it had joined. The association encouraged close contact between member companies during normal times, and was able to put the shared knowledge of past disasters to effective use.
- Maiya placed emphasis on the convenience of customers, and deployed truck stalls and satellite stores towards this purpose.

## Lesson(s) learned and scope for improvement

- The supermarket's headquarters became unable to contact its branch stores immediately following the earthquake, as both landlines and satellite phones went offline. When the tsunami warning came, head office functions were reassigned to an inland facility, the Ofunato-Inter store, but subsequently all digital data was destroyed together with the head office building. Acting on this lesson learned, Maiya has since moved all data to a rented server located far inland.
- Both the company and local governments recognised that supermarkets were an important infrastructure that supports the community, as a result of this disaster.

## Practical tips for replication

- When both the company and community recognise that food retail stores/supermarkets are an important utility providing the daily needs of the community, instead of simply thinking of them as businesses, supermarkets will start to act more like a necessary utility, and the community will find itself with a means to obtain daily needs outside of emergency relief goods in the event of a disaster.
- It is useful to join or formulate several networks of different sizes and types, such as a local and national network, before any disaster happens. An association of small and medium enterprises of a certain industry may form a network that offers at the least equivalent support to the internal network of large companies.

For further information:

**Maiya Co., Ltd.**

<http://www.maiya.co.jp/>

### How is this case connected to HFA?

The work by Maiya Co., Ltd. in supplying food to the local community is related to HFA4, which encourages public-private partnerships to better engage the private sector in disaster related work (HFA4, paragraph 19, Social and economic development practices, sections 'i'). These activities are also contributing to HFA5, which relates to strengthening preparedness for disasters. HFA5 emphasizes the importance of promoting regular disaster preparedness measures, such as ensuring access to essential food and non-food relief supplies

according to local needs (HFA5, paragraph 20, section 'd'). This case is also an illustration of stakeholder engagement and ownership promoted by HFA5 (paragraph 20, Section 'f'). The grocer was invested in the needs of the local community and continued to provide essential goods to aid the members of the local community who were their loyal customers. Their work reduced the burden on the public sector to supply emergency relief by addressing the food related relief needs of the local community after the disaster.

# 12 Healthcare

## Pharmacists step up to protect evacuees' health

*Japan Pharmaceutical Association*

The Great East Japan (GEJ) Earthquake and tsunami forced many people from their homes. Medicine and its appropriate use are vital to protecting people's health in the harsh conditions at evacuation centres. Japan Pharmaceutical Association established a scheme to systematically support the three most affected prefectures, Iwate, Miyagi, and Fukushima, utilising its national network, and dispatched pharmacists at the request of these three prefectures. This was also the first time pharmacists had joined disaster medical teams in Japan. Approximately 2,000 pharmacists were dispatched in the four months following the earthquake.

In the disaster-affected areas, pharmacists sorted, prepared, and distributed medicines and supported doctors in prescribing medicines taking into account stock deficiencies. Without their contribution, the emergency supplies of medicine from across the country would not have been effectively delivered to those in need. The pharmacists also advised evacuees on health issues and maintained the hygiene of evacuation centres. Besides medical assistance, their pharmaceutical knowledge was put to use improving evacuees' quality of life and health: proving that pharmacists can play an important role in a post-disaster environment.



Photo by Japan Pharmaceutical Association

*Unloading medicines in the snow, six days after the earthquake, in Miyagi Prefecture*

## The case study

### Background

The Great East Japan (GEJ) Earthquake triggered an enormously destructive tsunami. Human suffering can be characterised by the following statistics:

- 92% of all deaths were by drowning, and 2,681 remain missing as of April 2013.<sup>1</sup>
- Injuries were few compared to deaths/missing persons.
- The elderly (65 and over), which make up 30% of the population of the three affected prefectures, accounted for even higher proportion of evacuees in shelters.

As a result, there was a greater need for medical treatment of patients with chronic conditions in this particular disaster, rather than emergency medical care of those with external wounds. This was the case from the immediate relief stage right through the recovery and reconstruction stages. How best to keep disaster victims healthy when forced to live away from their homes for extended periods, and there is scarcity of all kinds of necessary supplies? This is the question at the core of this case study on the role the Japan Pharmaceutical Association (JPA) played following the March 2011 earthquake and tsunami.

### The first organizational dispatch of pharmacists to disaster-affected areas

The JPA is a non-profit organisation that provides training, education, and information on the latest in pharmaceutical learning and industry trends to member pharmacists – who currently number about 100,000 from all over Japan.

In previous disasters, many pharmacists lent a helping hand, but this was always on an individual voluntary basis. Following the tsunami, however, with many hospitals and pharmacies damaged over an extremely wide area, there were, at one stage, as many as 400,000 residents forced from their homes, meaning pharmacists were vital to maintaining their health and distributing medicine.

The Ministry of Health, Labour, and Welfare (MHLW) issued an official letter to the JPA for the dispatch of the pharmacists on 25 March 2011. JPA already had an emergency agreement in place with Miyagi prefecture, and similar agreements were immediately signed between JPA and Iwate and Fukushima prefectures. These arrangements opened the way for the official dispatch of pharmacists, which would be publicly funded under the Disaster Relief Act, to the disaster-affected areas.

This set into motion the JPA's organisational role in the disaster relief effort; a role JPA filled for the first time, two weeks after the earthquake.

Initially, JPA played a coordinating role between those requesting assistance and pharmacists wanting to help in tsunami-devastated regions on a case-by-case basis. From April, however, it reorganised its dispatch efforts to the worst affected prefectures of Miyagi, Iwate, and Fukushima. All the JPA prefectural branches (excluding those from the three prefectures above) were divided into three blocks, and each block was assigned to one of the three affected prefectures. Each block was to assure a continuous and long-term presence of pharmacists in the disaster-affected area by planning and controlling the lengths of stay, number, and precise destination of pharmacists.

Moreover, for the first time ever pharmacists joined Japan Medical Association teams (JMATS, usually consisting of one doctor, two nurses and one driver/administrator), after JPA reached an agreement with the said association. A total of 157 pharmacists (679 missions) were active in JMATS in the disaster-affected area, with the two associations cooperating on a regional level.

### What the pharmacists did

The pharmacists' assignment types were pre-determined according to a prior agreement between the Japan Society of Hospital Pharmacists and JPA. Those of the former were sent to medical institutions, while the latter covered all other areas of need; namely, medicine distribution centres, first-aid centres and evacuation centres. Further details of their activities are as follows.

#### 1. Sorting medicines at distribution centres

Medicines arrived at the distribution centres in each prefecture from all over the country. There remained, however, the most difficult task; delivering the right medicines to the right persons who needed them. The last one mile in a delivery system is the hardest. JPA pharmacists were responsible for that last one mile, sorting the medicines according to type, managing incoming and outgoing supplies, quality control and responding to requests from evacuation and first-aid centres.

#### 2. Medication/dosage advice, prescription assistance

Pharmacists provided patients with medicines prescribed by doctors in temporary medical facilities and first-aid centres. They also recommended alternatives with the same efficacy to doctors when the prescribed medicines were not available.

Moreover, they helped evacuees with chronic conditions prepare

<sup>1</sup> Damage Situation and Police Countermeasures associated with 2011 Tohoku district - off the Pacific Ocean Earthquake, Japanese National Police Agency (as of 10 April 2013).





Photo by Japan Pharmaceutical Association

*Well sorted medicines at a distribution centre*



Photo by Japan Pharmaceutical Association

*Preparing prescriptions at Ishinomaki Junior High School*

for their medical examinations by checking their regular medication in their medication booklet, and, if they did not have a medication booklet, checking what type of medicine they had been taking and recording it in a new booklet. This greatly assisted doctors who had no access to patient medication records.

Medication booklets are used at pharmacies all over Japan to keep track of a patient's history of medicine usage, to ensure they are not taking two medicines with the same ingredients under different names, to prevent the taking of medicines that do not go well together, and to identify any allergies or side effects of medicines. Handed out for free and taken home by each patient, these booklets were more likely to accompany the patient during evacuation than institutional records. Medication booklets were found to be extremely effective in the aftermath of the 1995 Great Hanshin-Awaji Earthquake in Kobe, and since then their use in Japan grew rapidly.

### **3. Health advice, provision of non-prescription medicines at evacuation centres**

While serious cases were referred to doctors, evacuees with symptoms considered treatable with over-the-counter medicines were

given advice and medicines by pharmacists as appropriate. Besides medicines, the pharmacists also dispensed vitamins, health foods, hand creams and so on to counter the effects of the unbalanced diet in the evacuation centres and hand rashes from overuse of hand sterilizers during long periods of water shortage.

The pharmacists' personalised approach, spending the time and getting acquainted with evacuees, provided them with insight on how the hardships of living in evacuation centres were affecting evacuees' health. Pharmacists realised that, for example, the high salt content of instant foods was causing high blood pressure in some evacuees, and trying to avoid using the unhygienic prefab toilets by not drinking too much was causing dehydration and constipation among others.

### **4. Maintaining hygiene of evacuation centres**

JPA pharmacists disinfected prefab toilets and evacuation centre doors to prevent the spread of infectious diseases such as O157, salmonella, norovirus in the rainy season and summer, and influenza in winter. They also sprayed insecticide at rubbish collection points and toilets, and taught evacuees how, in order to prevent outbreaks of flies and mosquitoes in summer.

### ***Pharmacists, doing what they know best***

Winters are long in the tsunami-devastated northeast Japan. The evacuation centres were extremely cold for some time after the earthquake. The extreme living conditions in the centres, as well as the lack of exercise and mental stress it entailed, took its toll on the health of the evacuees. In particular, many elderly persons with chronic conditions suffered poor health, which at times was life threatening. Medicine played a vital role in keeping evacuees alive and healthy.

For each evacuee to have access to the medicines they needed, several obstacles had to be overcome:



Photo by Japan Pharmaceutical Association

*Pharmacists from around Japan preparing prescriptions (Ishinomaki Red Cross Hospital)*



Photo by Japan Pharmaceutical Association

*Dispensing medicine at an evacuation centre*

Photo by Japan Pharmaceutical Association

*Disinfecting prefab toilets at an evacuation centre*

- Prescriptions were given only for very short periods, due to shortages in medicinal supplies and types, and thus needed to be

constantly renewed.

- The types of available medicines, and thus the types and specific combinations of active ingredients, changed often.
- International disaster medical assistance teams (DMATs) left various kinds of medicine from various countries when they ended their emergency operations and the medicinal effect of each needed to be researched.
- Evacuees had no clinical or prescription records, the only available medical information being the medication handbooks, which had to be read, interpreted and updated.

Such conditions meant that pharmacists' knowledge of medicines was in high demand in the disaster-affected area and set the stage for them to play a vital role in the relief and recovery efforts.

Some patients with chronic conditions became hesitant about taking their medicine when prescriptions were changed and the colour and shape of medicines were different, because they had a strong dependency on, and trust in, their usual medicine. JPA pharmacists encouraged such patients to take their medication by carefully and patiently explaining that the active ingredients were the same, and why the shapes were different. Others were able to receive the same medication at their new evacuation centre, to which they had to transfer when some centres merged or closed, because the pharmacists appropriately recorded the prescription details and health condition of evacuees in their medication booklets. Being able to confirm the medical history of patients enabled pharmacists to greatly increase the efficiency of medical examinations at a time when a limited number of doctors had many patients to see.

Proof that pharmacists were making an invaluable contribution was the fact that the on 5 April 2011, MHLW requested the JPA, shortly after their first dispatch, to continue sending pharmacists to the disaster-affected area.

## The good practice

The key elements in this successful initiative are:

- All efforts were taken to supply medicines to the disaster-affected area in the face of logistical problems such as blocked roads and a lack of fuel. However, once delivered, the medicines could not be dispensed by just anyone; dispensation required specialised pharmaceutical expertise. Central and prefectural governments were quick to realise, and act on, the need for pharmacists to cover that last one mile of delivery, so that the medicine could be efficiently and effectively distributed to the hands of those in need.
- The fact that an official request was made based on the emergency agreements meant that pharmacists could

contribute their expertise as necessary in the disaster-affected area with the financial backing of the government, instead of as volunteers as in the past.

- Pharmacists had for a long time been vocal proponents of medication booklets, and this disaster clearly showed the invaluable role such booklets can play in supporting disaster victims, in terms of information sharing.
- Inclusion of pharmacists in JMATS also proved to be a good practice as the pharmacists' expertise greatly improved the efficiency of medical care by doctors. This first-time collaboration has opened the door to their participation in such teams in future.



## Lesson(s) learned and scope for improvement

- After the GEJ Earthquake, a special research team, with financial support of MHLW, produced the Manual on Disaster Risk Reduction for Pharmacists in March 2012. The manual strongly reflects the success factors identified through the GEJ Earthquake and, for example, recommends emergency agreements with local governments to be signed in advance, and how to prepare before disasters happen.
- This was the first case of disaster relief work by pharmacists on an organisational level based on an official request. Because this kind of organisational response was not envisaged beforehand, JPA was not fully prepared with an efficient framework for this kind of situation. Various measures still need to be considered, such as establishing and training a first-response team to assess the situation in the affected area immediately following a disaster, training pharmacists to join emergency medical teams (DMATs and JMATs), training an emergency response manager to coordinate the dispatching of pharmacists to the disaster-affected area and to facilitate communication in the area, designating support staff, and securing backup means of communication to coordinate these activities.
- It took two to three weeks for relief medical supplies sent by pharmaceutical industries to reach the disaster-affected area because of fuel shortages and disrupted transportation networks. However, regular distribution networks to hospitals, clinics and pharmacies, except those in the worst affected areas, were reportedly mostly back to normal within about a week. Therefore, it is assumed that there was an oversupply of certain medical relief supplies. There needs to be discussion among all relevant organisations to apply this lesson learned to future disasters, and develop systematic methods of information sharing. Methods to accurately quantify both the types and amounts of medical relief supplies in demand, and to accurately predict the same for disasters of various scales and characteristics, need to be developed through such discussion.

## Practical tips for replication

- Many people, especially in developing countries, are likely to be displaced for long periods in the event of a disaster, as in general their houses might be more susceptible to damage, and their social infrastructure might take longer to recover. Under such circumstances, the appropriate use of medicines and hygienic products become invaluable in preventing outbreaks of communicable diseases and maintaining the health of evacuees, and pharmacists can play an extremely important role. For pharmacists to play an active role in other countries, associations of pharmacists similar to JPA, as well as a system for communication with organisations in the disaster field, should be developed.
- Sending pharmacists together with Japanese medical teams to assist in other countries, especially to situations where pharmacists can be expected make a positive contribution, is an effective way of highlighting the role pharmacists can play post-disaster as well as highlighting the benefit of replicating this initiative in other countries.

For further information:

Japan Pharmaceutical Association

<http://www.nichiyaku.or.jp/e/default.html>

### How is this case connected to HFA?

HFA1 promotes the strategic management of volunteers (HFA1, paragraph 16, Community participation, section 'h'). Similarly, HFA5 suggests the development of specific mechanisms to engage the active participation and ownership of relevant stakeholders in DRR, in particular building on the spirit of volunteerism through the attribution of roles and responsibilities, as well as necessary authority and resources (HFA5, paragraph 20, section 'f'). The importance of managing and encouraging volunteerism is further emphasised in section IV Implementation and follow-up of HFA, where volunteers and the private sector are noted as essential for the multi-sectoral integration of DRR into development policy, as well as all levels of planning and programming (HFA, General considerations,

paragraph 21). This case study on JPA's initiatives is also an example of integrating DRR planning into the health sector, including strengthening their capacity to remain functional in disaster situations in HFA4 (HFA4, paragraph 19, Social and economic development practices, section 'e'). HFA4 also highlights the importance of reducing disaster risks through the establishment of public-private partnerships (HFA4, paragraph 19, Social and economic development practices, section 'i'). The expertise of the private sector can be essential in addressing various needs in reducing risks and in the event of a disaster. Such necessary expertise can often only be accessed through partnerships with the private sector.

# 13 Logistics Services

## Driver power – sense of mission and pride in delivery supports recovery

*Yamato Holdings Co., Ltd.*

Delivery services had become a vital part of daily life in Japan, but in the aftermath of the Great East Japan Earthquake, with communications down, roads blocked and fuel in short supply, deliveries temporarily stopped in disaster-affected areas. Deliveries elsewhere in Japan were also in danger of discontinuation, due to power outages and lack of fuel, particularly in the Tokyo area. At the same time, distribution centres in disaster-affected areas were inundated and overwhelmed with relief supplies from around the country; supplies desperately needed were not reaching those stranded in their homes and evacuation centres.

Yamato Transport, Japan's largest delivery firm, was able to keep its business running and to rapidly re-start delivery to the tsunami-affected area, thanks largely to forward planning – an earthquake contingency manual for its headquarters and a business continuity plan – as well the strong sense of duty held by all its staff with regard to delivering goods to the people waiting for them.

In this time of need, some Yamato drivers, who themselves were affected by the disaster, re-started delivery in disaster-affected areas on their own initiative. Other Yamato workers soon followed, using their expertise to manage, sort, and distribute supplies at the distribution centres. Yamato HQ, in support of such ground-up efforts, set up a Relief Supplies Logistics Support Team. As the human element at the end of a chain of emergency supplies, Yamato provided logistics support to 350 evacuation centres in the three worst affected prefectures, in a manner that met the specific needs of evacuees.



*Delivery in the disaster-affected area, 4 April 2011*

Photo by Yamato



## The case study

### Background

Door-to-door delivery services have become a vital lifeline in both commercial activities and daily life in Japan. Yamato Transport, one of Japan's oldest and largest logistics companies, leads the industry with over 1.4 billion annual deliveries.

Yamato's operations were severely affected by the Great East Japan (GEJ) Earthquake and tsunami on 11 March 2011, by cutting off roads and washing away and damaging trucks and distribution centres. The Fukushima nuclear power plant accident sparked massive power shortages and the damage to oil refineries all over eastern Japan caused dire fuel shortages. Such were the severe conditions under which Yamato followed through with its mission to make sure relief supplies reached those who needed them most.

This case study details Yamato's business continuity initiatives, both in and out of the disaster area, and efforts to restart its operations, as well as the enormous contribution their delivery experts made to the relief and recovery.

### The quake and business continuity

Yamato's effective disaster preparedness – its Headquarters (HQ) Earthquake Contingency Manual, developed in 2007, and its Business Continuity Plan, revised in 2009 – were integral to its successful and rapid response to the GEJ Earthquake.

Immediately after the earthquake, Yamato's HQ established an Earthquake Task Force and checked on the safety of its employees, in accordance with this manual. With lines of communication to the six prefectures in north-eastern Japan down and as the extent of damage came to light, Yamato HQ quickly decided

to halt all receipt and delivery of packages to and from disaster-affected areas. The same day, HQ was able to issue detailed instructions for how to deal with returning customers' packages.

While thus establishing a clear and orderly customer service policy to their clients all over Japan, Yamato also took immediate additional steps toward disaster response: Yamato HQ proceeded to set rules for communicating with disaster-affected areas that were in a state of disorder; to send a first-response team to assess the situation; to obtain certification necessary for vehicles to deliver relief supplies. Additionally, immediately following the earthquake, Yamato also joined the delivery operation of emergency relief supplies as a member of the national trucking association, at the request of Japan's Ministry of Land, Infrastructure, Transport, and Tourism (MLIT).

The company determined that the continuity of their business was in serious jeopardy due to the growing severity and widespread indirect impacts of the earthquake, such as fuel and power shortages, planned power outages, and the setting of an evacuation zone due to the nuclear power plant accident. A decision was made to set up a Business Continuity Task Force in addition to the Earthquake Task Force, to deal specifically with these threats generated by the unprecedentedly major disaster. In the months following the disaster, the Business Continuity Task Force dealt with issues such as:

- Allotment of delivery items to various transfer stations during power blackouts.
- Handling incoming/outgoing calls at a call centre during power blackouts.
- Responding to summer electricity restrictions by turning off 50% of lights, restricting elevator use, and increasing air conditioner temperature settings etc.
- Responding to the reduced number of trains, which was the most popular means of commuting, by encouraging bicycle use and changing the assignment of work places to those closest to workers' homes etc.
- Taking every measure available to acquire fuel.

### A project to reinstate business as usual

It became glaringly apparent, after Yamato stopped accepting deliveries to and from the disaster area, just how deeply rooted in Japanese society delivery services had become. People's reliance on such deliveries of everyday commodities – water, food, lights, batteries, and heating goods – had increased to such an extent that it had become a lifeline on par with electricity, gas, and water supplies. On 17 March, only six days after the GEJ



Photo by Yamato

Delivery truck completely destroyed by tsunami, 15 March 2011

Earthquake, a project got underway to restart operations in the disaster-affected area, with workers coming from all over the country to lend a helping hand.

The project took the following stepwise approach aiming to expand its operations:

- Services were initially restarted with drop-off and delivery limited to Yamato's branches, then progressed to fully-fledged door-to-door delivery and collection, and
- Services to the Tohoku area (north-eastern Japan) were first resumed on the Japan Sea-side prefectures – Aomori, Akita, Yamagata – where damage was more limited; then expanded to the hardest hit prefectures on the Pacific coast – Miyagi, Iwate, and Fukushima.

After confirming its fuel supply situation and staff arrangements, Yamato resumed its delivery services on 25 March, only two weeks after the earthquake, in almost every area within the six Tohoku prefectures. Individual Yamato drivers overcame numerous difficulties, such as having to walk on roads blocked to traffic by debris and searching for recipient names on evacuee lists. In some cases, drivers repeatedly visited tsunami-devastated lots where houses once stood, hoping to catch residents when they returned to their former homes to look for mementos. Their efforts were more than rewarded by the smiles and thanks when the deliveries were made.

## Yamato's reconstruction support projects

In addition to resuming services as quickly as possible, Yamato's recovery support project involved:

- Establishing a Relief Supplies Logistics Support Team.
- Donating ¥10 for every package delivered. Donations reached ¥14.2 billion by end of the project in March 2012.
- Group-wide support projects (volunteering, saving electricity etc.)

Of these, the Relief Supplies Logistics Support Team was born out of the spontaneous actions of workers who were themselves victims of the disaster.

Kesennuma City in Miyagi Prefecture was catastrophically devastated by the tsunami. Several Yamato drivers living in evacuation shelters decided to visit the local government's aid distribution centre to see why aid wasn't getting through to shelters, including theirs. They found the distribution centre in disarray. Aid was arriving from all over the country; the problem was getting them through the last one mile and into the hands of those in need. The solution – logistics professionals.

The Yamato drivers offered to help the local government staff who were struggling to handle the unfamiliar logistics. First, they organized the layout of the supplies, setting drop-off and outbound loading zones. They also relocated high-demand items near the outbound zone and organized items for maximum efficiency of worker movements so that they wouldn't cross paths. This invaluable effort by Yamato drivers ensured the relief supplies pouring in from around the country were able to be rapidly and efficiently delivered to disaster victims, according to their specific needs.

For example, the efficient layout of the distribution centre floor made it possible for aid workers to increase deliveries from once to several times a day. With multiple deliveries, recipients were able to communicate their more specific needs during delivery of the first load of essential daily food supplies, and get them delivered later that day. Additionally, the efficient sorting of goods made finding and responding to the most detailed of requests possible, such as for one bar of soap or a hard-bristled toothbrush.

As other Yamato drivers began to help with relief efforts, at their own initiative, in evacuation centres outside Kesennuma, Yamato HQ responded by setting up the Relief Supplies Logistics Support Team. Under the direction of a team leader from HQ, and in cooperation with Japan's Self Defence Force and local authorities of the three worst affected prefectures, the team helped with sorting supplies at distribution centres, then delivering it to evacuation centres, temporary shelters and severely affected communities.

Because the local Yamato drivers were so familiar with their de-



Package with words of encouragement, 4 April 2011  
Message of encouragement (from package in photo):

May spring come soon  
May the flowers bloom soon  
In your home town  
May your hearts too  
Feel the coming of spring  
For of you always  
Will we be thinking



Photo by Yamato

*Supplies at Kesennuma Wholesale Vegetable Market, April 2011*



Photo by Yamato

*Residents wave and thank passing delivery vans, 4 April 2011*

livery areas, they were also able to meet the specific needs of those trying to survive in their own houses within the severely affected areas. The drivers knew where and how many people were stranded in their homes, as well as their needs, and were able to deliver the necessary supplies to their nearest evacuation centre, together with the centre's regular deliveries. In total, 500 staff using 200 trucks delivered aid supplies to 350 evacuation centres.

Towards the end of April, when the Self Defence Force scaled back their operations, Yamato also ceased its voluntary logistics assistance. However, it continued its work in the area, employing local tsunami evacuees through a staffing agency under its

corporate umbrella, and gave them thorough training in logistics management. This staffing agency was contracted by several local governments including some of the worst hit, like Kesennuma and Ishinomaki, to deliver relief supplies, and, as a local company, continues to actively employ locals adversely affected by the disaster.

Yamato's logistics support team continued work up until 15 January 2012, with a total of 14,286 workers and 4,187 trucks mobilised for this mammoth task.

## The good practice

While the fact that a logistics company assisted in the delivery of aid supplies is by no means new, this case study does, rather, give a graphic account of how a company can fully utilise its core competencies in the event of a disaster. It is important to note that this did not just happen by chance. Several important factors made Yamato's overall response possible, including the following:

- Top management were quick to decide on a course of action and quick to put it in motion on a company-wide level. Not only did the manuals they had prepared in advance enable them to take the necessary actions, they came up with appropriate solutions to the various situations as they arose, and then rapidly formulated action plans to be carried out by staff. This quick-fire decision making and action meant that no time was wasted.
- The decision to restart operations was first disseminated within the company, so that necessary preparations could be taken. That information was press released the following day, to avoid confusion at customer service points.
- Workers showed exceptional teamwork and shared a sense of mission and a sense of responsibility, developed

through Yamato's strong corporate culture and identity-building. This is most clearly expressed by the drivers themselves: "it's not just about delivering goods, but delivering peoples best wishes and sympathies", "these are not just packages, but are an expression of the feelings from the sender to the receiver," and "these packages mean so much to those in need right now." Such a sense of mission, as well as the drivers' intimate knowledge of their delivery areas, made them the ideal human element at the last mile of the delivery chain.

- One of Yamato's corporate philosophies is "through pride in our work, we represent Yamato." It is ingrained in each and every employee that they should always act and treat customers as if they were the sole representative of Yamato Transport. This philosophy enabled workers to spontaneously make decisions, without waiting for instructions from management, when confronted with tasks of such enormity, and to follow through with them. Moreover, the company consistently showed understanding of these workers' actions and gave them full backup.



## Lesson(s) learned and scope for improvement

- Ensuring relief supplies reach those in most need is a task of enormous difficulty in any disaster. In the case of the GEJ Earthquake, the unprecedented scale of the disaster meant massive amounts of supplies were pouring in, but because the local governments had sustained serious damage and were constrained both physically and by a lack of personnel, extreme confusion reigned. This, however, was why there was such a need for the most efficient logistics. Valuable lessons can be taken from this experience in relief logistics such as how supplies should be sorted, how needs change with time after a disaster, and how to adapt the sorting response to meet these changing needs.
- Lack of planning before delivery and not labelling the contents of supplies seriously impeded work at the distribution centres. This is a recurrent issue with every disaster, resulting in inefficient logistics, even when support is provided by the likes of Yamato. Therefore it is necessary to have in place alternative communication links to maintain lines of contact between senders of relief supplies and those on the receiving end.

## Practical tips for replication

- There is wide scope for replication around the world, because, disaster relief aid logistics is inherently compatible with logistics companies' core competencies. It is important, however, to train staff and instil a culture of independent decision making in the field, because when transport and communication links are disrupted they will need to flexibly deal with unexpected situations as they arise.
- In the case of the GEJ Earthquake, the enormous scale of the disaster meant the national government arranged the necessary relief supplies, which were then sent first to prefectural primary distribution centres, then on to secondary distribution centres at the municipal level, before being delivered to evacuation centres. Delivery as far as the se-

condary distribution centres was undertaken by the Japan Trucking Association, according to the terms of a pre-existing 'emergency agreement.' Delivery from the secondary centres to final destinations was where Yamato played a vital role. In order to decide what kind of private sector logistics support is possible and at what stage, it is necessary to consider the scale and type of the logistics industry of each country, as well as considering envisaged distribution flow patterns depending on the scale of disaster and on the country's administrative structure.

For further information:

**Yamato Holdings Co., Ltd.**

<http://www.yamato-hd.co.jp/english/index.html>

### How is this case connected to HFA?

HFA4 highlights the importance of reducing disaster risks through the establishment of public-private partnerships (HFA4, paragraph 19, Social and Economic Development, section 'I'). The expertise of the private sector can be essential in addressing various needs in reducing risks and in the event of a disaster, as shown by this case study on Yamato Holdings' initiatives. Yamato's actions and use of delivery expertise are related to the suggested activities under HFA4 including

strengthening critical public facilities including transport lifelines (HFA4, paragraph 19, Social and economic development practices, section 'f'). HFA5 specifies the importance of strengthening disaster preparedness for effective response at all levels (HFA5, paragraph 20). Building on the spirit of volunteerism (HFA5, paragraph 20, section 'f'), Yamato drivers offered their expert support to contribute to effective delivery of relief goods accumulated in evacuation centres.



# 14 Wholesale (Soft Drink)

## Keeping communities supplied with the water of life

*SENDAI Coca-Cola Bottling Co., Ltd.*

Drinks are necessary to sustain life. After the Great East Japan Earthquake in 2011, many were affected by the lack of this vital commodity for survival, among other things.

Japan's Coca-Cola System, which includes Sendai Coca-Cola Bottling, addressed the urgent need for beverages by providing both drinking water and bottled drinks for the use of the local community through pre-arranged emergency agreements with various local governments; and by dispensing free drinks, also as part of the emergency agreement, from vending machines with a built-in disaster mode setting. Sendai Coca-Cola's ability to make a substantial contribution to the community can be credited to the company's wholehearted participation in Japan's emergency agreement system, as well the company's strict adherence to Coca-Cola's worldwide Incident Management & Crisis Resolution plans and procedures.



*Signing of new emergency agreement between Sendai Coca-Cola Bottling and Zao Town, Miyagi Prefecture, February 2013*

Photo by Sendai Coca-Cola Bottling

## The case study

### Background

Drinks and drinking water are among the most important elements that sustain our lives, and this fact does not change even in emergencies. Coca-Cola (Japan) Co., Ltd. is the Japanese subsidiary of the largest soft drink company in the world, The Coca-Cola Company, and is the head of Japan's Coca-Cola System comprising 12 bottling companies and other affiliates. The group is a major supplier in the Japanese soft drinks market. Sendai Coca-Cola Bottling (Sendai Coca-Cola) is a member of Japan's Coca-Cola System and is responsible for the manufacture and distribution of Coca-Cola brand drinks in Miyagi, Fukushima, and Yamagata Prefectures. The line-up of products sold by Sendai Coca-Cola includes, in addition to Coca-Cola, mineral water, un-sweetened and sweetened tea and coffee, and various carbonated and un-carbonated drinks.



*Scattered Coca-Cola products at company headquarters, 11 March 2011*

Photo by Sendai Coca-Cola Bottling



*Tsunami damage to a Coca-Cola vending machine, 11 March 2011*

Photo by Sendai Coca-Cola Bottling



*Coca-Cola products sold by Sendai Coca-Cola*

Photo by Sendai Coca-Cola Bottling

The Great East Japan (GEJ) Earthquake and tsunami of 11 March 2011 completely destroyed Sendai Coca-Cola's main office building, located in Sendai City. Water, electricity, and means of communications were cut off, delivery trucks were washed away by the tsunami, and manufacturing facilities were also damaged. Sendai Coca-Cola also lost employees to the tsunami while making deliveries. Despite such harsh circumstances, Sendai Coca-Cola quickly pulled its product delivery system together and came to the aid of disaster victims.

### Supplying bottled drinks according to emergency agreements with local governments

Emergency agreements with local governments, in this case, agreements to cooperate in the local governments' procurement of bottled drinks in times of emergency, are considered by Ja-

pan's Coca-Cola System as a way to fulfil corporate social responsibility through core business strengths, and thus, are actively embraced. As of May 2011, a total of 1,054 prefectures, cities, towns, and villages across Japan have an emergency procurement agreement in place with companies under Japan's Coca-Cola System.

Sendai Coca-Cola maintained this type of agreement with 15 local governments prior to the GEJ Earthquake (16 as of 2013), in which Sendai Coca-Cola promised the distribution of drinks to disaster areas and disaster response teams. Each emergency agreement was negotiated and concluded individually with the local government in question, and the procurement method varied, for example, from the outright donation of bottled drinks, to preferential reservation of stock for the use of that local government, to the promise of purchase.

After the GEJ Earthquake struck, in accordance with the emergency agreements, Sendai Coca-Cola quickly and immediately

Year	Prefectures	Cities	Towns
2007		4	
2008	1	5	
2009		1	
2010		2	2
2013			1

*Number of local governments with emergency bottled drink procurement agreements with Sendai Coca-Cola*

began distribution of bottled drinks in the disaster area, drawing from both their own stocks and additional supplies from Coca-Cola bottling companies across Japan. They estimate that an equivalent of 460,000 bottles (500ml/16oz) were ultimately distributed in response to emergency agreements.

### **Supplying drinkable well-water through an emergency agreement**

An affiliate of Sendai Coca-Cola, Sendai Coca-Cola Products, located in Zao Town, Miyagi Prefecture, had a separate emergency agreement in place, with their local town, to be activated during major disaster events. In accordance with that agreement, from 18 to 23 March, the Zao Factory provided a total of 74 tonnes of well water of drinking quality to the water trucks run by Zao Town, its fire brigade, and Japan's Self Defence Forces.

Despite making such contribution through their affiliate, Sendai Coca-Cola was mortified by the lack of locally manufactured bottled water in their product line-up; Zao Factory did not previously produce bottled water, and Sendai Coca-Cola sold Coca-Cola brand bottled water manufactured by bottling companies in other regions. Post-disaster, the demand for bottled water soared to a new high, so it was frustrating for Sendai Coca-Cola to be unable to meet the demand with their own product.

Sendai Coca-Cola has since followed up on this lesson learned, and made a decision to manufacture their own bottled water. The new product, sold only in northeastern Japan, was launched in February 2013. By manufacturing bottled drinking water locally, Sendai Coca-Cola has assured a stable supply of this product category for its own Sendai area, and at the same time, made sure that it has the ability to send bottled water to other regions when future disasters occur. Sendai Coca-Cola has, through its experiences in the GEJ Earthquake, realised anew that soft drink manufacturers have a responsibility to maintain the flow of the water of life at times of emergency. By making the above decision, the company has strengthened the production redundancy in this key product category.

Sendai Coca-Cola has since concluded an additional emergency agreement with Zao Town, where the Zao Factory is located, to



Photo by Sendai Coca-Cola Bottling

*Self-Defence Forces filling up their water truck at Zao Factory*

provide bottled water free of charge in case of emergencies.

### **Promoting the use of vending machines with built-in disaster mode settings**

As part of the emergency drink procurement agreements with local governments, Japan's Coca-Cola System is also encouraging its vendors to adopt disaster-ready vending machines, which dispense emergency information as well as free drinks in the event of a disaster. As of September 2012, approximately 7,200 of these units have been placed all around Japan. Investing in additional disaster risk reduction (DRR) equipment and facilities could become very costly, but upgrading to multifunctional vending machines is within the means of many, and thus installing this type of vending machine has become a popular DRR measure in Japan.

The disaster-ready vending machines have a built-in backup generator that comes on line when power fails. The backup power is used to maintain the quality of the drinks, and can also be used to show disaster-related information on the rolling LED text display. With a power source, the buttons on the machine continue to work, and some models can be remotely switched over to disaster mode, in which the vending machines dispense all beverages inside the unit for free. Around 400 of these units dispensed over 88,000 bottles in the GEJ Earthquake.

### **Coca-Cola's crisis management system and the GEJ Earthquake**

The Coca-Cola Company has implemented its Incident Management & Crisis Resolution (ICMR) plans and procedures worldwide, and this system proved effective even in this major disaster. In addition, each Coca-Cola System around the world uses a common Business Continuity Management (BCM) system, with





Photo by Sendai Coca-Cola Bottling

*Disaster-ready vending machine, displaying the message "dispensing free of charge" on LED panel*

procedures at the ready to deal with disruptive events and incidents that incur loss of profit, so that the recovery of business is certain.

Such crisis management systems cannot be effectively implemented without experience. The worldwide Coca-Cola System not only consists of manuals, it involves the establishment of a common multi-tiered training programme, conducting regular training exercises, and sharing lessons learned; each bottling company additionally conducts their own training sessions. Together, the companies in the Coca-Cola System have built up a risk-aware and resilient-oriented corporate culture.

Sendai Coca-Cola is not an exception; the company leads serious training sessions involving all Sendai area affiliated companies, and joins the national-level training exercise led by Coca-Cola (Japan) several times a year.

Immediately after the GEJ Earthquake, Coca-Cola (Japan) called its crisis management committee together, and began taking countermeasures. First, the safety of employees and the damage to factories and offices were checked in collaboration with the various bottling companies including Sendai Coca-Cola. Damage repairs and business recovery for Japan's Coca-Cola System were conducted in tandem. Industry associations as well as public administration bodies from ministries, agencies, to local government were contacted. Measures to assure distribution of beverages to the disaster area, and to save electricity, were decided upon. Vari-

ous countermeasures were quickly put into place.

The business continuity of Japan's Coca-Cola System was assured, because Coca-Cola (Japan)'s management, the crisis management committee, and the CEOs of the bottling companies were able to make important decisions together through this process.

### ***Securing supplies: the project to resume business in the disaster-affected areas***

Japan's Coca-Cola System put all its resources to work, utilising all systems and networks it had access to, to get its business in the disaster-affected area – both manufacturing and distribution – back on its feet.

First, as a result of around-the-clock recovery work, all factories in the Tohoku and Kanto<sup>1</sup> regions that had been damaged by the disaster resumed production, earlier than scheduled, on 22 April; this was an important step towards business recovery. The resumption of production in these factories went far in assuring the stable supply of beverages, and allowed Japan's Coca-Cola System to be ready to supply extra bottled drinks for the disaster-affected areas, and also meet the demands of the market in the summer high season. When the demand for water reached critical levels in May, Hokuriku Coca-Cola Products' Toba Factory in north-western Japan was able to open its additional aseptic bottle filling line earlier than scheduled, and strengthen the supply of bottled water products.

In addition to stabilising the supply within Japan, Japan's Coca-Cola System worked with the global network of Coca-Cola Systems as well as with industry associations and public bodies. During the peak demand for drinking water that resulted from GEJ Earthquake-related incidents, bottled water was imported from Coca-Cola Korea (Seoul, South Korea) as well as The Coca-Cola Company itself, for free-of-charge distribution in the disaster area and for sale on the Japanese market.

Japan's Coca-Cola System has consistently worked towards securing the stable supply of its products to the market. When there was a potential shortage of PET bottle caps on the horizon, due to a key bottle cap factory being closed down by the disaster while there was also a massive demand for bottled drinks, Japan's Coca-Cola System endorsed the Japan Soft Drink Association's policy of temporarily using white, unprinted bottle caps, putting the stability of supply over the considerations of brand imaging.

<sup>1</sup> Tokyo and surrounding areas.



## The good practice

- Having emergency agreements in place prior to the disaster: prior agreements with local governments expedited the provision of beverages.
- The establishment and effective utilisation of a worldwide crisis management system: the Coca-Cola System's crisis management system was effectively applied to this disaster. By having a single central point of communication, Japan's Coca-Cola System was able to demonstrate close cooperation.
- Utilising its local and global corporate networks: there are many Coca-Cola bottling companies around the world, and collaboration was achieved in times of need.
- DRR through vending machines: installing additional DRR equipment and facilities could become very costly, but upgrading to multifunctional vending machines is within the means of many.

## Lesson(s) learned and scope for improvement

- Securing redundancy in key product production: Sendai Coca-Cola, the bottling company in charge of the area severely damaged by the 2011 tsunami, began producing bottled water locally after the disaster. The bottled water that Sendai Coca-Cola provided to local governments etc. in the post-tsunami relief stages came from their stock or was sent by bottling companies from out of the region, and the company felt that it was unable to supply this product in high demand as well as it wished.

By locally producing bottled water, Sendai Coca-Cola is now able to quickly set up a supply system during local emergencies, and also has the ability to supply other regions in Japan in times of need.

## Practical tips for replication

- It is likely that beverage manufacturers and wholesalers will be asked to provide drinks as well as drinking water after a disaster. By making efforts to reach an understanding with local authorities prior to the occurrence of a disaster, for example through emergency agreements, the supplies can reach the communities faster.
- If a company is not affiliated with a corporate network outside the country, it should consider safety nets and backups, for example, in the form of business partners in suitable locations.

### For further information:

**Sendai Coca-Cola Bottling Co., Ltd.**

<http://www.sendai.ccbc.co.jp>

### *How is this case connected to HFA?*

HFA4 specifies key activities to reduce disaster risks related to social, economic and environmental conditions through strengthening public facilities and physical infrastructure, particularly water related infrastructure (HFA4, paragraph 19, Social and economic development practices, section 'f'). Sendai Coca-Cola case is a good example of this activity through investing in a disaster conscious design of equipment, where the vending machines are designed to dispense information and free drinks in disaster situations. The work by Sendai Coca-Cola in maintaining the drinking water supply is also related to public-private partnerships to better engage the private sector in disaster related work highlighted in HFA4 (paragraph 19, Social and economic development practices, section 'f').

These activities also contribute to HFA5, which relates to strengthening preparedness for disasters where disaster impacts and losses can be substantially reduced if authorities, individuals and communities in hazard-prone areas are well prepared and ready to act, this includes ensuring access to essential food and non-food relief supplies (HFA5, section 'd'). The pre-existing agreement between Sendai Coca-Cola and the authorities ensured smooth professional support when the disaster happened. This is an example of ensuring that DRR is a national and a local priority with a strong institutional basis for implementation through the involvement of multiple sectors highlighted through HFA1 (paragraph 16, National institutional and legislative frameworks).

# Take-Home Messages

This section provides five “Take-Home Messages” that summarise this publication. Each message is shown with the following information:

## Examples from this publication:

- Read about case studies that relate to, and illustrate, each Take-Home Message.

## Linkage between case studies and GAR13:

- Read about how these case studies link to highlighted points from the *Global Assessment Report on DRR 2013* (GAR13). The case studies illustrate, for example, the shared risk of disasters, the shared value of public-private partnerships, and private investment in disaster risk reduction (DRR), which are all topics explored in GAR13.

## Linkage between case studies and HFA:

- To see how each case study is connected to HFA priorities, see the box *How is this case connected to HFA?* at the end of each case study.
- See the following section for a summary of HFA connections.
- HFA links to the Take-Home Message are shown under each message.

## Message #1 “Invest in DRR by upgrading your everyday equipment to a disaster resilient model”

A sensible way to invest in DRR is to invest in innovations which add value to a necessary product or system, instead of investing in an additional and often underutilised ‘emergency’ system. Such products and systems, already offered by many private sector companies, are often more economical and are less prone to failure in an actual disaster as a result of frequent use and maintenance. Investment in DRR presents multiple opportunities for strengthening the resilience, competitiveness and sustainability of a business, they are no longer just seen as a cost to a business, as GAR13 points out.

### Examples from this publication:

- ✓ **Community development/ Building resilient towns (case 1):**  
Disaster risk reduction and sustainability measures are integrated into urban development at the planning stage.
- ✓ **Manufacturing/ Glass Power Campaign (case 2):**  
Shatter-resistant laminated glass is installed in school buildings which serve as emergency shelters, and promotes the safety of children and evacuees.
- ✓ **Water treatment/ Resilient water supply (case 3):**  
An economical groundwater purification system also provides the surrounding community with clean water, including in times of emergency.
- ✓ **Finance/ Banks and local business continuity; Banks and BCM-based credit ratings (case 6 and 7):**  
Preferential rates are given to businesses that consider, or have put in place, disaster mitigation in terms of equipment and planning.
- ✓ **Wholesale/ Providing bottled drinks and water (case 14):**  
Vending machines dispense information and free drinks during emergencies.

### Linkage between case studies and GAR13:

GAR13 points out the importance of integrating disaster risk information into investment decisions. Prospective risk management that factors risk reduction into investment planning is more cost-effective than retrospective risk management. Simultaneously, land-use planning is a challenging area, as few disaster risk management systems have been able to effectively employ land-use planning and management, or influence investment policies. GAR13 also draws attention to the fact that investment in climate change mitigation, sustainable water management and green cities directly addresses the underlying risks related to disasters and as such, these considerations are becoming increasingly important for businesses. The case study on **Community development/ Building resilient towns** gives a good example of this.

It is highlighted in GAR13 that small and medium size enterprises (SMEs) often directly absorb the costs of large scale disasters, it is thus important to support these SMEs to be resilient. GAR13 goes on to demonstrate that innovative risk financing schemes are an important component of comprehensive disaster risk management, but at the same time, it emphasises that to be successful, they depend on complementary efforts to reduce risks. Two case studies, **Finance/ Banks and local business continuity, Banks and BCM-based credit ratings**, demonstrate concrete examples that strengthening risk management in SMEs can enable them to shift from simple business continuity to comprehensive disaster risk management. This is a key concept that GAR11 highlights.

**Linkage between case studies and HFA: HFA3, HFA4**

## Message #2 “Consider multiple measures that foster redundancy\* in the event of a disaster”

The Great East Japan (GEJ) Earthquake taught a hard lesson to those who were confident that they were well prepared. Some of them relied on only one certain measure and assumed it would work. However, the experiences from the GEJ Earthquake revealed the necessity of taking multiple layers of measures and protection.

\* Redundancy refers to the creation of multiple measures or layers that enhance safety measures and DRR, so in the event of a disaster, the disruption of one measure does not mean the ineffectiveness of the whole system.

### Examples from this publication:

- ✓ **Community development/ Building resilient towns (case 1):**  
Multiple energy sources are incorporated in a housing development to attract residents who were relocated after the tsunami.
- ✓ **Water treatment/ Resilient water supply (case 3):**  
A company providing groundwater purification plants that complements public water works encourage the maintenance of a dual water supply.
- ✓ **Drug manufacturing/ Preventing medicine shortages (case 5):**  
After the GEJ Earthquake, the production of the same kind of medicine is spread to at least two regions of Japan to prevent disruption to future supply.
- ✓ **Wholesale/ Providing bottled drinks and water (case 14):**  
Added locally produced bottled water to product line-up after the GEJ Earthquake, to ensure the company has a factory producing water in each region of Japan.

#### Linkage between case studies and GAR13:

*An important part of disaster preparedness is the presence of multiple measures for DRR. The case study on **Community development/ Building resilient towns** shows how resilient energy mechanisms are created by installing multiple alternate energy sources, and the **Water treatment/ Resilient water supply** case study is about encouraging the maintenance of a dual water supply. A characteristic of these measures is that they are*

*not purely for disaster situations, but their role in daily life ensures users are aware of their availability and how to use them, their use results in the systems being properly maintained, and all of this means they are accessible in disaster situations. Investment in sustainable development and renewable energy is highlighted in GAR13 as having shared value. It not only benefits business, but also benefits the local community as it addresses the underlying drivers of disaster risk.*

**Linkage between case studies and HFA: HFA4, HFA5**

## Message #3 “Why not secure professional support and contributions in advance?”

One of the ways to reduce the impact of disasters is to mobilise immediately and take action. All levels of government, down to cities, towns, and villages in Japan utilise the ‘emergency agreement’ mechanism to keep specific public and private sector partners on call, for specific tasks. An added benefit of forming a partnership in anticipation of the disaster is that there is time and opportunity for planning and practice.

### Examples from this publication:

- ✓ **Construction/ Construction industry’s BCM (case 4):**  
Via agreement, the company engaged in emergency railroad construction and worked to collect construction and emergency related materials, through their industry association, from all over Japan.
- ✓ **Aerial survey/ Emergency aerial surveys (case 9):**  
Via agreement, a national survey industry association assisted the national mapping agency by mobilising quickly to conduct an aerial survey of the areas affected by the disaster.
- ✓ **Food retail/ Supermarkets staying open (case 11):**  
Via agreement, a supermarket supplied food to evacuation shelters after the disaster in support of the local government.
- ✓ **Wholesale/ Providing bottled drinks and water (case 14):**  
Via agreement, a company maintained their supply of beverages for local governments, by utilising their national and global networks.

#### Linkage between case studies and GAR13:

*The case studies about **Food retail/ Supermarkets staying open**, **Wholesale/ Providing bottled drinks and water**, and **Construction/ Construction industry’s BCM** are good examples of the vested interest businesses have in effective DRR in their local community or city, as mentioned by GAR13. It is for this reason that GAR13 emphasises the importance of public-private partnerships, explaining that local governments can find strong allies among business to more effectively manage disaster risks.*

*“Communities of interest” are being formed by business and local governments, which can play an important role in disaster risk management. From this context, reaching an agreement or pre-arrangement with private sector partners to secure experts and professional support by using their core business expertise in advance before a disaster strikes is important, as some of these case studies demonstrated.*

**Linkage between case studies and HFA: HFA1, HFA2, HFA4, HFA5**

## Message #4 “Experts are invaluable in ensuring success in the last mile”

The final mile of delivery – getting something to the person who needs it – can often be the hardest. Tasks belonging to the ‘last mile’ are arguably best handled by those with the right expertise and with close relationships with communities and individuals. Private companies operating in the local community, as well as professional associations, are rich sources for such personnel, the key human element at the end of a long chain.

### Examples from this publication:

#### ✓ **Information technology/ Information sharing using IT (case 8):**

Corporate volunteers used their expertise in information technology in providing cloud computing services and an information sharing tool, Sahana, to disaster-affected areas.

#### ✓ **Healthcare/ Pharmacists working in the disaster-affected areas (case 12):**

Volunteer pharmacists used their expertise to figure out the pharmaceutical needs and fill prescriptions for evacuees, despite the lack of medical records and an inconsistent supply of medicine.

#### ✓ **Logistics services/ Delivery and logistics professionals (case 13):**

Corporate professionals used their expertise in warehouse management and delivery route optimisation. They straightened out the logistics at warehouses and continued to deliver to homes in disaster-affected areas despite the disruption to road transport.

### Linkage between case studies and GAR13:

*GAR13 promotes the development of public-private partnerships as it creates shared value for both sectors. Partnerships with businesses are important for effective management of disaster risks as often the private sector has expertise which can enhance risk reduction, response and recovery efforts. GAR 13 also emphasizes the importance of increased availability of open source and*

*open access risk information which will facilitate a healthy debate between business, governments and the public. The information sharing platform, Sahana, introduced in the case study regarding **Information technology/ Information sharing using IT** gives an example of how information and systems for sharing information are essential in times of disaster.*

**Linkage between case studies and HFA: HFA1, HFA4**

## Message #5 “Fostering partnerships with the private sector has shared value”

The good practices listed in this publication show, on one level, private companies simply doing what they must to maintain their standing and share of the market. This is a positive thing, as the private sector’s response to the Great East Japan (GEJ) Earthquake, which amply illustrates the private sector’s acute awareness of their social responsibility towards the communities which support them, and the extremes of measures that will be taken to fulfil the perceived responsibility, will likely be replicated in other disasters, large and small.

### Examples from this publication:

#### ✓ **Finance/ Banks and local business continuity (case 7):**

A bank engaged local SMEs in business continuity planning even when such services were not financially viable.

#### ✓ **Aviation/ Always being ready to provide flights (case 10):**

Special flights were scheduled for areas where ground travel was difficult after the GEJ Earthquake through a speedy and extensive reorganization and redistribution of resources, including human resources.

#### ✓ **Food retail/ Supermarkets staying open (case 11):**

A supermarket continued to provide food etc. and opened satellite stores to reach more people, out of their loyalty to community members who support their business.

### Linkage between case studies and GAR13:

*The case study on **Food retail/ Supermarkets staying open** features a good example of a business doing what was necessary to maintain their market share. As GAR13 points out, in the event of a disaster, businesses’ market share may be lost due to clients*

*turning to competitors. Loss of market share creates multiple issues with regards to long-term competitiveness and sustainability of the business.*

**Linkage between case studies and HFA: HFA1, HFA4**



# The Hyogo Framework of Action and this publication

The Second United Nations World Conference on Disaster Reduction was held in January 2005 in Kobe City, Hyogo Prefecture, Japan, where the “Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters” was adopted as the outcome document by 168 countries and endorsed unanimously by all UN Member States in the General Assembly in the same year. The HFA serves as the comprehensive disaster risk reduction (DRR) policy guidance to all stakeholders.

The expected outcome of the Hyogo Framework for Action (HFA) is “the substantial reduction of disaster losses, in lives and in the social, economic, and environmental assets of communities and countries.” HFA specifies that the realisation of this outcome will require the full commitment and involvement of all actors concerned, including governments, regional and international organizations, civil society including volunteers, the private sector, and the scientific community.

In this publication, fourteen case studies about private sector efforts in disaster risk reduction (DRR) from Japan are categorised by their contribution to the three Strategic Goals of HFA. Of course, some case studies contribute to more than one strategic goal, in which case they were categorised according to the main area of contribution. The relationship of each of the fourteen case studies to the five Priorities for Action of HFA is summarised by the table below, and described in the box *How is this case connected to HFA?* at the end of each case study.<sup>1</sup>

## Expected outcome, strategic goals, and priorities of the Hyogo Framework for Action 2005-2015

### Expected Outcome

*The substantial reduction of disaster losses, in lives and in the social, economic, and environmental assets of communities and countries.*

### Strategic Goals

*a) The integration of disaster risk reduction into sustainable development policies and planning.*

*(b) The development and strengthening of institutions, mechanisms, and capacities to build resilience to hazards.*

*(c) The systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response, and recovery programs.*

### Priorities for Action

*1. Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation.*

*2. Identify, assess, and monitor disaster risk and enhance early warning.*

*3. Use knowledge, innovation, and education to build a culture of safety and resilience at all levels*

*4. Reduce the underlying risk factors.*

*5. Strengthen disaster preparedness for effective response at all levels.*

Full text of the HFA is available at: <http://www.unisdr.org/we/inform/publications/1037>

		Expected Outcome: The substantial reduction of disaster losses, in lives and in the social, economic, and environmental assets of communities and countries.						
		#	Sector/Topic of case study	Five Priorities of Action				
				HFA1	HFA2	HFA3	HFA4	HFA5
Three Strategic Goals	(a) The integration of DRR into sustainable development policies and planning.	1	Community development/ Building resilient towns			x	x	
		2	Manufacturing/ Glass Power Campaign			x	x	
		3	Water treatment/ Resilient water supply				x	x
	(b) The development and strengthening of institutions, mechanisms, and capacities to build resilience to hazards.	4	Construction/ Construction industry’s BCM				x	
		5	Drug manufacturing/ Preventing medicine shortages				x	x
		6	Finance/ Banks and local business continuity				x	
		7	Finance/ Banks and BCM-based credit ratings				x	
		8	Information technology/ Information sharing using IT	x	x		x	x
	(c) The systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response, and recovery programs.	9	Aerial survey/ Emergency aerial surveys	x	x			
		10	Aviation/ Always being ready to provide flights				x	x
		11	Food retail/ Supermarkets staying open				x	x
		12	Healthcare/ Pharmacists working in the disaster-affected areas	x			x	x
		13	Logistics services/ Delivery and logistics professionals				x	x
		14	Wholesale/ Providing bottled drinks and water	x			x	x

The United Nations General Assembly Resolution 66/199 requests that UNISDR facilitate the development of a post-2015 framework for disaster risk reduction - HFA II. The consultations will culminate at the World Conference on Disaster Risk Reduction in 2015 in Japan, where a new instrument will be agreed upon and put forward to the United Nations General Assembly for endorsement. The current HFA has substantively contributed to further DRR, but the goals and priorities for action are still far from being achieved. A post-2015 framework for DRR should build on the current HFA and focus on those elements that are still in need of further action.

All stakeholders, including private sector, are expected to contribute and participate in the discussions and preparatory work leading to a final draft of a post-2015 framework for DRR. This publication contributes to the discussion by illustrating the myriad of roles the private sector can play, as well as the closeness of collaboration the private sector can achieve with other actors in the pursuit of global DRR.



# The Five Essentials for Business in DRR:

*A Call to Action by the UNISDR Private Sector Advisory Group for Disaster Risk Reduction*

1. Promote and develop public-private partnerships for disaster risk reduction to analyse the root causes of continued non-resilient activity.
2. Leverage sectoral private sector expertise and strengths to advance disaster risk reduction and mitigation activities, including enhanced resilience and effective response.
3. Foster a collaborative exchange and dissemination of data: share information on assessment, monitoring, prediction, forecasting and early warning purposes and action between the public and private sectors.
4. Support national and local risk assessments and socio-economic cost-benefit analyses and capacity-building, and demonstrate opportunities where resilience building and disaster risk reduction is a sound economic strategy, with attractive returns and competitive advantages.
5. Support the development and strengthening of national and local laws, regulations, policies and programmes that enhance disaster risk reduction and improve resilience.

*Source: <http://www.preventionweb.net/english/professional/networks/public/psp/essentials/>*

## UNISDR Private Sector Advisory Group for Disaster Risk Reduction (PSAG)

PSAG is an invitation-only group with 17 representatives from companies around the world, serving the UNISDR in an advisory role. To fulfil this role, PSAG contains three Subgroups: communications is responsible for knowledge transfer and awareness building of DRR to the wider private sector; Corporate Support reaches out to the private sector for building private sector partnerships and corporate sponsorship support; and Partnerships seeks to engage private sector as partners and service providers to the public sector. The Chairperson and CEO of Kokusai Kogyo Co., Ltd. is the leader of the Partnerships Subgroup of PSAG.

*For further information: <http://www.unisdr.org/partners/private-sector>*

## UNISDR Disaster Risk Reduction – Private Sector Partnerships (DRR-PSP)

The DRR-PSP is a global initiative initiated by the PSAG and UNISDR to engage with multinationals and small- and medium-sized enterprises to contribute to DRR. The Development Bank of Japan and Kokusai Kogyo, whose good practices are featured in this publication, are amongst the companies which have committed to the 5 Essentials for Business in DRR. Innovative and leading private companies in the fields of DRR, risk management and sustainability can become a member of this partnership.

*For further information: <http://www.preventionweb.net/english/professional/networks/public/psp/>*

# Acronyms

AGC	AGC Glass Japan/Asia Pacific Asahi Glass Co., Ltd.
APA	Association of Precise Survey and Applied Technology
BCP	Business Continuity Plan
BCM	Business Continuity Management
CSR	Corporate Social Responsibility
DBJ	Development Bank of Japan Inc.
DMAT	Disaster Medical Assistance Team
DRR	Disaster Risk Reduction
DRR-PSP	Disaster Risk Reduction Private Sector Partnerships
GAR	Global Assessment Report on Disaster Risk Reduction
GEJ Earthquake	Great East Japan Earthquake
GIS	Geographical Information System
GMFS	Groundwater Membrane Filtration System
GSI	Geospatial Information Authority of Japan
HFA	Hyogo Framework for Action
ICT	Information and Communication Technology
JAL	Japan Airlines Co., Ltd.
JCE	Japan Civil Engineering Contractors Association
JMAT	Japan Medical Association Team
JPA	Japan Pharmaceutical Association
MHLW	Ministry of Health, Labour, and Welfare, Japan
MIC	Ministry of Internal Affairs and Communications, Japan
MEXT	Ministry of Education, Culture, Sports, Science, and Technology, Japan
MLIT	Ministry of Land, Infrastructure, Transport, and Tourism, Japan
PPP	Public-Private Partnership
PSAG	Private Sector Advisory Group for Disaster Risk Reduction
SME	Small- and Medium-sized Enterprises
TNPC	Tohoku Nipro Pharmaceutical Corporation
UNISDR	United Nations secretariat of the International Strategy for Disaster Reduction (The United Nations Office for Disaster Risk Reduction)



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