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BACKGROUND PAPER

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PRIVATE INVESTMENT AND DISASTER RISK MANAGEMENT

Bingunath Ingirige
University of Salford, UK

Dilanthi Amaratunga
University of Huddersfield, UK

Mohan Kumaraswamy
University of Hong Kong, Hong Kong

Champika Liyanage
University of Central Lancashire, UK

Aslam Perwaiz
Asian Disaster Preparedness Centre, Thailand

Peeranan Towashiraporn
Asian Disaster Preparedness Centre, Thailand

Gayan Wedawatta
Aston University, UK

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The Background and the Context

Globally, the extent and severity of natural disasters have increased significantly and continues to rise alarmingly with an upward trend. For instance, the year 2011 remains one of the costliest ever in terms of natural disasters with nearly US$ 380 billion lost globally with millions of people affected directly and indirectly. Natural hazards have become more unpredictable in nature and the social and economic costs have increased in recent years due to population growth, change in land use patterns, migration and unplanned urbanization, environmental degradation and global climate change. The Japanese earthquake of 2011 is a reminder that disasters can affect both developed and developing countries severely. Such damages and losses are an impediment to economic development, sustainable development and poverty reduction. Experiences from around the world have proven that disaster prevention and preparedness is far more effective and less costly than recovery and relief efforts.

The effects of disasters on the private sector are significant. For instance, Biagini and Miller (2013) quoting world Bank GFDRR (2012) states that "Insurance company Munich Re received claims worth more than $350 million from the 2010-2011 Australian floods, contributing to a 38% quarterly profit decline. A single extreme weather incident, such as floods in Thailand in December 2011, can have a major impact on a country's GDP and eliminate tens of thousands of jobs, and disrupt global supply chains for manufacturing products from cars to computers (World Bank GFDRR, 2012)". A disaster can have many impacts on businesses based on a temporal scale. Business operations can be significantly affected almost instantly after the impact or they can also be impacted due to a slow recovery cycle of a disaster. It is recognised by policy makers, business leaders and researchers that the process of recovery can be complex involving several stakeholders. Therefore a focus on effective business continuity planning and awareness of simple tools of recovery and preparedness are important

The UNISDR in its third edition of the Global Assessment Report (UNISDR, 2013b) emphasised the importance of a business case for Disaster Risk Reduction. It highlighted how the transformation of the global economy over the last forty years has led to rapid increases in disaster risk in low, medium and high-income countries, affecting businesses and societies. The report stated that economic losses linked to natural disasters are 'out of control' and will only increase without more focus on disaster risk management. This can only be reduced with an effective partnership with the private sector, hence the importance of this thematic area 14; private investment in disaster risk management (DRM).

Despite this importance of private sector and private investment, business investment practices were neither highlighted in the initial Hyogo Framework for Action (HFA) nor have interactions between business investment and disaster risk and the factors that mediate those interactions been seriously examined. Like the HFA, research and literature on this topic has concentrated on the role of governments, communities and households rather than of businesses. Increasing disaster risks represent a growing problem for the economic and business community at different scales.

It is also recognized that business investments, which are aimed to strengthen competitiveness and productivity may have inadvertently contributed to increasing the risk. Economic globalisation has enabled critical gains in business productivity and efficiency, but those gains might have been at the expense of an over- accumulation of disaster risk in many business sectors and in the global economy as a whole

The need to build resilient societies to disasters and the critical importance of realizing human security as a basis of such resilient societies has been recognised in many parts of the world. More over the long-term economic efficiency of investment in disaster risk reduction has become very evident. For instance, the Thailand floods in 2011 had a devastating effect on the private sector causing major supply chain disruption globally. This caused the total economic loss to reach USD 46.5 billion (APEC, 2012). Therefore the role and engagement of private sector will be key in deciding national priorities in reducing disaster risks and preparing for unpredicted, yet manageable disasters.

The rest of the chapter is organized as follows. First, the chapter discusses the current state of disaster risks, which presents some of the alternative measures. The chapter then demonstrates cases where value is generated out of private sector investment in disaster risk reduction. This aspect has not received much attention within the currently available literature. Several mechanisms such as partnerships between the public and the private sector to improve its resilience as well as considering the private sector as a holistic supply chain is discussed under some of the future considerations to improve the thrust in this area further. Finally the way forward and the conclusions are presented.

The current state of disaster risk management investment

Financial treatment of disaster risk investment

Disasters can cause financial challenges to governments. In addition to causing direct damages to lives, buildings and infrastructure, disasters can also cause indirect damages with the potential for cascading and systematic effect such as business interruption, loss of employment and outputs, decreased tax revenues, impaired institutional capacities and a rise in poverty levels (Baba 2014).

In an aftermath of a major disaster, local and national governments are often called upon to provide financial assistance on damage caused by the disaster, which can impose a major drain on government resources. Thus, to allow governments to respond more effectively to disasters while allowing the government to preserve economic and national budgetary positions, appropriate mechanisms should be put in place beforehand (Worldbank 2012). From a policy perspective, governments need to establish effective risk finance and risk transfer as part of their Disaster Risk Management Framework.

Financing vs transfer of risk

Disaster risk management strategy generally starts from the disaster risk being assessed in terms of its severity, geographic distribution, and frequency. Information obtained from the

risk assessment process allows risk managers to make proper plans for reducing such disaster risk. Nevertheless, disaster risk cannot be eliminated entirely. The remaining risk needs to be covered by financial means, hence the term 'Disaster Risk Finance (DRF).' Disaster Risk Finance refers to any means or a combination of different ways used to cover financial losses incurred from a disaster event. Depending on the time when a disaster risk finance option is implemented, i.e., after or before a disaster, DRF can be categorized into 2 types, namely ex-post and ex-ante financing Gurenko 009 .

Ex-post risk finance relies on financing mechanisms that are brought in after a disaster to cover the losses. These include international aid or loan, reallocation of government budget, and fund raised by rising government revenue such as taxes Gurenko 009 . All of these options are unplanned and normally will deter the government's priority away from development activities, hence reducing future economic viability of the country. On the contrary, ex-ante risk finance refers to the appropriate arrangement of financial means 'before' any disaster strikes. Since the finance is arranged beforehand, there is no need to reallocate funds away from other projects when a disaster happens. Ex-ante DRF options include setting aside national reserve or contingency fund (risk retention) as well as risk transfer options such as catastrophe (synonymous with the term 'disaster') insurance, catastrophe bonds (so called Cat bonds), and risk pooling Gurenko 009 .

Catastrophe (or Disaster) Insurance

Insurance is a mechanism by which the financial well-being of an individual, company, or other entity is protected against an incidence of unexpected loss. In catastrophe insurance, policyholders buy insurance coverage for their assets, while insurance companies provide financial protection for the damage on those assets as a result of a predefined disaster (Investopedia 2014). Catastrophe insurance is a mechanism where the risk is shared across a large group of policy holders who buy such insurance. The insurance payments can be made based on the actual losses sustained (indemnity insurance) or based on physical parameters of a disaster event (parametric insurance).

Catastrophe Bonds or Cat Bonds

Catastrophe bonds are a disaster-based investment mechanism. They are securities that transfer defined catastrophe risks to investors via bond instruments. Individuals or corporations invest in catastrophe bonds by betting that a disaster will not take place within the time period defined for the bonds. If no disaster occurs, then the investors enjoy a medium-to-high interest return on their investment. On the other hand, if a disaster of certain magnitude (defined either by its physical parameters or losses incurred) takes place, it triggers the Cat Bonds and prevents the bonds issuers (normally insurance companies) to make a good return to investors as the principals from the investment will be used to cover losses as prescribed in the terms of the bonds (Louberge, Kellezi and Gilli 1999, Grossi and Kunreuther 2005, Cummins 2008).

Private Sector Involvement

According to UNISDR (2011) the private sector is crucial in making the world economy more resilient. UNISDR is advocating partnerships with the private sector, which is slowly beginning to take disaster risk investment more seriously.

The private sector contributes enormously to a country's economy. This is common to developed, developing and newly industrialised countries. In Australia, private sector contributes to 85% of aggregate gross value added in the Australian economy (Deloitte, 2011). In the UK, 92% of the turnover is generated by the private sector (BIS, 2012). In Bangladesh; which is a developing country, almost 78% of total investment is contributed by the private sector (Ministry of Finance, 2012) whereas this is 74% in Mauritius (Statistics Mauritius 2013). Due to the significant contribution of the private sector to economies around the globe, it is strategically placed to make communities safer and more resilient by:

- Setting standards and quality assurance criteria for critical infrastructure in urban areas.
- Contributing investment funding for programs or individual country and community risk reduction efforts
- Providing expertise to help with its technical areas of work, e.g. administration and internal business processes as well as external disaster risk assessments
- Acting as a funding source and provider for socially responsible volunteers and funding

According to the World Bank (2014), private sector development and investment, i.e. tapping private sector initiative and investment for socially useful purposes, are critical for any developing or developed economy. In parallel with public sector efforts, private investment, especially in competitive markets, has tremendous potential to contribute to growth. Private markets are the engine of productivity growth, creating productive jobs and higher incomes. In a market-based economy, private firms contribute to development through many channels (see Box 14.1 below).

Box 14.1: The private sector's role in development: the Monterrey Consensus (Source : UN, 2002)

The 2002 Monterrey Consensus included specific reference to the private sector as partners in the development process. The following paragraphs could be cited:

"23. While Governments provide the framework for their operation, businesses, for their part, are expected to engage as reliable and consistent partners in the development process, we urge businesses to take into account not only the economic and financial but also the developmental, social, gender and environmental implications of their undertakings. In that spirit, we invite banks and other financial institutions, in developing countries as well as developed countries, to foster innovative developmental financing approaches. We welcome all efforts to encourage good corporate citizenship and note the initiative undertaken in the United Nations to promote global partnerships.

"24. We will support new public/private sector financing mechanisms, both debt and equity, for developing countries and countries with economies in transition, to benefit in particular small entrepreneurs and small and medium-size enterprises and infrastructure. Those public/private initiatives could include the development of consultation mechanisms between international and regional financial organizations and national Governments with the private sector in both source and recipient countries as a means of creating business-enabling environments."

The general idea that the private sector is central to any development activity is not a new one. However, it is only in recent years that the private sector has arguably come to be seen as central to development efforts, and that the full range of activities and actors associated with the "private sector" began to be fully considered as part of development strategies (Allison, 2012). As Dade (2006) confirms, "…it is not the role of the private sector that is new, but rather our awareness of its role."

Because of private sector's prominent role in the economic development process as mentioned above, it has a direct relationship with customers, suppliers and everyone in between, and is strategically placed to make communities safer. This makes, according to Margareta Wahlström (Special Representative of the UN Secretary General for Disaster Risk Reduction), private sector the perfect advocate for resilient thinking (UNISDR, 2013a).

In the view of DRR, UNISDR (2008) identifies three main types of private sector activities associated with DRR. They are outlined as follows:

- Advocacy and Awareness Raising Projects
- Social Investment and Philanthropy Partnerships
- Core Business Partnerships

Advocacy and Awareness Raising Projects

The Ministry of Culture and Tourism of the Republic of Indonesia partnered with the Bali Hotels Association to develop a toolkit for tsunami preparedness on several island across the country including Lombok, Bali, and Gili Trawangan. Future goals include developing a tsunami certification for hotels to indicate their preparedness against tsunamis.

The Private Sector mobilization in empowering communities on disaster risk reduction in the Dingala, Aurora, Philippines focused on community trainings, multi-hazard mapping, and provision of emergency response equipment. These activities were directed towards the formulation and efficient implementation of contingency plans at the barangay and municipal level. It is pioneering in the sense that other private sector interventions for disaster risk reduction do not offer a package as comprehensive as PRIME-DRR. As a result, communities covered by the project were able to separately formulate their contingency plans, test this through a community drill and link it with the contingency plan of the municipal government.

Social Investment and Philanthropy Partnerships

In social investment and philanthropy partnerships, the private sector provides financial support, contributes volunteers or expertise, or makes in kind contributions, including product donations. In order to address the problem of clean and safe drinking water following a disaster, Siemens in cooperation with the non-profit SkyJuice Foundation created the "SkyHydrant", a highly efficient, potable water filtration unit that converts contaminated water into clean, potable water. In Bangladesh, following Cylcone Sidr in November 2007, SkyHydrants were supplied throughout several affected communities.

Core Business Partnerships

In core business partnerships, partners collaborate to create employment and foster entrepreneurship, contribute to economic growth, generate tax revenues, implement social, environmental or ethical standards and provide appropriate and affordable goods and services.

TATA Steel, one of the largest steel manufacturers in India was chosen by the government of Uttar Pradesh and UNDP in a partnership that saw TATA Steel sharing the investment in the training of 360 architects throughout the state in safe and earthquake resilient building techniques using TATA Steel's products. The government gained by being able to organize more training events with the additional funding from the company. The company gained by an increased coverage of its product publicity program.

Recent initiatives for risk financing

According to UNISDR (2013), financial institutions face potential massive losses from disasters, and therefore are pushing for the improvement of their clients' business continuity capacity; therefore looking to businesses to develop new ways of ensuring safer investment decisions. 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 as a result of the earthquake and tsunami. Fuel shortages and rolling blackouts were also frequent throughout the affected areas.

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. This should continue to increase as financial institutions, like the Development Bank of Japan (DBJ) which is beginning to increase their support to businesses that invest in their own DRR process. DGJ has developed their own rating system for BCPs, which serves as a third party method to measure resilience and is conducted alongside a routine credit check of the company. The rating system monitors both hard and soft DRR strategies of the company as defined in the BCP. Smaller banks, like Shiga Bank in Japan, who primarily lend to small and medium-sized businesses, have begun to offer their clients disaster risk consultancy services while developing a BCP.

In broad terms, this chapter focuses more on economic and social infrastructure development for DRM. But by bringing in a fourth 'P' representing relevant groups of 'people' later in this chapter, this also makes a case for building and mobilising social capital. This would reinforce the social infrastructure, since the 'people' are taken to include representatives of relevant NGOs, professional and trade bodies, media and community groups. This leads to the next section in investigating what drives private sector organisations in taking up DRM measures.

The current drivers for private sector investment in DRM

The ultimate goal of DRM is to be able to assure a commumity that a level of resilience has been reached to reduce or to avoid damage and losses due to disasters. This could only be achieved when all the actors, including the private sector, are themselves resilient. Underlying assumtion here should be that not only the reduction or mitigation of the current or the existing risk of disasters but a proper assessment should also be done to ensure that any risk mitigation measures does not result in any new risks arrising. This section explores some of the forces that drives private sector investment to undertake DRM initiatives.

According to Edo at al, (2014), businesses engage in DRM activities to achieve three objectives;

- to obtain economic benefits/make profits;
- to comply with existing laws and regulations; and,
- because of social responsibility.

The above authors (Edo, 2014) also state that businesses meet these three objectives using a triple approach;

- protecting themselves;
- supporting the community; and,
- assisting the government.

The current drivers and approaches are interrelated and some of the approaches seem integrated. For instance, investments in DRM with an initial profit motive and legal compliance might bring about wide ranging process changes in individual businesses that

might open up new opportunities for businesses and also create sustainable and long term advantages of increasing reputation and open up new markets for the business.

The creation of value and equity by effective risk sharing

It has firmly been established that economic losses from disasters have spun out of control and there are calls on the world's business community to incorporate disaster risk management to their investment strategies to avoid further losses. The major disasters that struck during the recent past revealed how disasters can impact businesses. Earthquakes, floods and storms can damage exposed and vulnerable factories, offices and other facilities and resources, interrupting and paralysing output and business processes.

The management of disasters has shifted from a reactive, top down approach to a more inclusive approach that seeks to proactively reduce the risk of disasters occurring and to minimise the negative consequences for human lives and economic activities. The new paradigm of disaster risk reduction as also articulated in the Hyogo Framework for Action, explicitly identifies the need to include the private sector in disaster management activities. But disaster risk does not stop at the factory gate. Businesses depend on infrastructure and urban systems run by utilities and the public sector. Damage to transport and energy networks, ports and airports or to neighbourhoods where employees live interrupts business and imposes additional costs. And in today's globalised world, even businesses in safe locations may be affected by disasters that hit suppliers and partners on the other side of the globe.

Extended insurance coverage may enable businesses to compensate for both direct loss as well as supply chain interruption. But disasters have broader, more pervasive effects on business competitiveness. When business is interrupted, skilled workers may leave, market share may be lost to competitors, relationships with key suppliers and partners may be severed and confidence and reputation may be eroded. Once business is lost, it may never come back. Businesses, of course, come in many shapes and sizes. And different sizes are exposed to different kinds of risk. Small businesses, for example, that serve local markets are affected directly by localised extensive disasters, as associated with flooding or landslides. And these businesses also depend heavily on local public infrastructure. Destruction of a bridge in a flash flood, for example, may isolate a local smallholder farm, workshop or restaurant from markets and suppliers for days. And many such businesses go bankrupt because they lack the cash flow or reserves to be resilient (UNISDR, 2013b)

The direct economic benefits of disaster risk reduction are for the most part the avoided economic costs of disasters as discussed above. Before the disaster occurs, these costs are only possible costs and their value is in part dependant on when a disaster might happen and how likely it is. In some cases, economists can estimate the economic value of such extended benefits. For example, the value of the provision of services such as water, electricity and shelter can be estimated. In other cases, monetising extended benefits could be seen as inappropriate, such as the improving women's involvement within communities. Nevertheless, such extended benefits need at the very least to be clearly stated in any assessment of the economic benefits of a disaster risk reduction programme, noted the 2013 Global Assessment Report (UNISDR, 2013b). The report, which carried out reviews of

disaster losses in 56 countries, found that direct losses from floods, earthquakes and drought have been underestimated by at least 50 per cent. In this century alone, losses from disasters amount to some $2.5 trillion. Businesses able to estimate and manage their disaster risks will be less likely to invest in hazard-prone areas. And if they do, they will more likely invest in measures to reduce the vulnerability of their facilities. The same businesses will be more likely to have addressed disaster risks in their supply chains. And the disaster risks they have decided to accept will be explicit rather than hidden on their balance sheets. (UNISDR, 2013b) highlights how the transformation of the global economy over the last 40 years has led to rapid increases in disaster risk in low, medium and high income countries. The report analyses three key global investment sectors – urban development, agribusiness, and coastal tourism – and reveals that prevailing business models in each sector continue to drive disaster risk. UNISDR (2013b) surveys 1,300 small and medium-sized businesses in disaster-prone cities in the Americas and finds that three-quarters have suffered business disruptions related to damaged or destroyed power, telecommunications and water utilities demonstrating the inter-dependence between the private and public sectors when it comes to disaster risk management. Yet only 14.2 percent of companies with fewer than 100 employees had even a basic approach to crisis management in the form of business continuity planning. More importantly, they will have recognised that investing to avoid shared risks and costs and to address underlying risk drivers, in partnership with the public sector and civil society, is not only good but rather essential for business itself. Unless those shared risks are transformed into shared values, future business will not be competitive, sustainable or resilient. Some encouraging trends are emerging (UNISDR, 2013b):

- More businesses will shift their focus from preparing for and responding to disasters to identifying, analyzing and managing disaster risks.
- Businesses will increasingly integrate disaster information into a broader analysis so that investment decisions are taken with eyes wide open. Behaviour will change over time as businesses scrutinize the disaster risk internalised in locations before deciding investments. This in turn will influence government approaches to risk reduction
- Businesses will begin to undertake integrated reporting of disaster risks providing a fuller picture of exposure and performance.
- In 2014, for instance, USD1.9 trillion of foreign direct investment (FDI) is foreseen, and businesses now see disaster risk management as an opportunity and a key sector in what is a huge market.

The economic, social and environmental costs of disasters remain high and have continued to rise. With growing populations and prosperity leading to expanded developments in risk prone areas, the costs of disasters are most likely to continue rising over the decades to come. Thus, there is a strong economic case for investing in disaster risk reduction, alongside the social and environmental reasons for undertaking these investments. Nevertheless, the technical challenges of making a sound economic assessment to facilitate a decision to investing in reducing disaster risk remain and need to be addressed carefully.

Further, the policy challenges are considerable as public good nature of disaster risk reduction, ironically, makes it especially difficult to secure much needed public investment. Building on insights captured from a review of the recent literature, this section suggests two approaches, which could help to strengthen the economic case for disaster risk reduction and improve investment decision-making at national and local levels. It also proposes one initiative for information sharing which could be implemented at the international or regional level (Vorhies, 2012).

Future considerations

Private sector approaches to achieving value out of investment in DRR

Economic losses as a result of disasters – particularly of catastrophic disasters in industry agglomerated areas – have extensive economic impacts for nations and to the global economy. As noted earlier, loss of employment and population outflow from the area can also have irreversible social impacts. The private sector can play a significant role in promoting resilient continuation of area business and early regeneration of local industry. In addition, the public sector also needs to pay attention to industrial agglomeration areas in order to avoid catastrophic impacts on the national economy by developing strategies for area-wide disaster management and involving the private sector in the system of the management.

Private sector has rarely been addressed as a target group. However, they also are highly at risk and suffer considerably from disasters (e.g. through flooding, earthquake, tsunami, landslides, disruption of business continuity); they play a key role in economic terms and are pivotal for post-disaster economic recovery in guaranteeing income and employment.

By making clear that disaster risk reduction is perceived as an opportunity and a value creating activity, there lays a shift of emphasis from the possibility of an event (something to face) to the possibility of an action (something to do). This is a good starting point to analyze the main drivers behind private sector's involvement in DRR.

The ultimate goal of DRR is a reduced damage and losses due to disasters through increasing the resilience of society, and this could only be achieved when all the actors, including the private sector, are themselves resilient. As business disruptions can lead to major economic losses and can significantly impact the long-term growth of economies, governments share the responsibility of ensuring business resilience (APEC 2013). Therefore, DRR needs to be bidirectional, in the sense that risk management should work not only towards reducing the existing risks that a company faces, but also towards preventing the creation of new risks for the society due to risk-insensitive investment decisions or any other risk-exacerbating irresponsible behaviours thus creating value out of both short and longer term investment. Investing in DRR and surviving a crisis or a disaster when your competitors simply perish will build up your reputation further. It will also improve a company's image as well.

Investing resources in DRM has proven to yield economic benefits, which is the ultimate goal for any business. As an example, according to UNISDR (2013b, p. viii) the New Zealand

company Orion, invested US$ 6 million in seismic protection that ultimately saved the business US$ 65 million. It is obviously less costly to invest in DRM or to avoid unnecessary risk than to pay for the losses after a disaster hits. Increased reputation and brand value, as well as the so-called "license-to-operate", account as economic benefits since they have a positive impact on sales and ultimately on profits. DRM investments can also provide a more favourable access to financing through enhanced disaster resilience. Investing in DRM makes businesses more competitive before, during and after a disaster because of improved reputation, preparedness and resilience, respectively. By reducing risks, particularly extensive risk from small but frequent disasters, a business can be much more competitive in the long run. In fact, businesses that have invested the most in risk management may financially outperform their peers (UNISDR 2013b). Finally, investing in DRM can generate new business opportunities, both within and outside the DRM context. On the one hand, an example within the DRM context would be the participation in an emergency agreement with the government in order to perform a specific task during, or in the aftermath of, an emergency. On the other hand, an example outside the DRM context would be the identification of new or previously overlooked market gaps, for example, based on changing needs of the community after a disaster.

The Box 14.2 below shows how the investment on a hotel certification programme by the private sector has yielded benefits (see Edo et al, 2014).

Box 14.2 Hotel ready certification programme (Source : Edo et al, 2014)

Tourism is one of the fastest growing sectors in the Asia-Pacific region. It directly accounts for 146 million jobs and US$ 523 billion to regional GDP annually. However, the locality of many tourism destinations also makes this sector one of the most at risk to disasters. Small Island Developing States (SIDS) are particular reliant on tourism while also being highly exposed to national disasters. To promote disaster risk reduction in the tourism sector, the UN office for Disaster Risk Reduction (UNISDR) in collaboration with the Global Initiative for Disaster Risk Management (implemented by GIZ) is proposing to support the implementation of 'Hotel Ready,' a programme that will certify hotel disaster resilience (e.g. resilient buildings, risk management, preparedness). This programme will provide hotels a certified standard that will assist them in reducing business risk and the risk of clients and partly surrounding communities to disasters, as well as in demonstrating the safety of their premises to clients, insurers and financers.

How to adopt strategies and strengthen implementation of regulations in building resilience for corporate sustainability

The 5th Asian Ministerial Conference on DRR (see AMCDRR, 2012) outlined priorities for private sector engagement namely; developing and supporting local and national governments' risk assessment, resilience building and investment decisions; cooperating

with multiple partners to prioritize resilience in land use planning and design; and ensuring investment are resilient to impacts of extreme climactic events and new risks presented by rapid urbanization, such as stress to eco-system services and natural resources. The key pillars to promote resilient economy (Figure 1) requires risk informed decision and building capacities of private sector

Figure 1: Key pillars to promote resilient economy (source: AMCDRR, 2012)

Yet in many developing countries, few preventive measures have been taken by private sector on natural hazards and to adapt to climate change (e.g. setting incentives for climate change adaption construction measures, appropriate management methods, insurance policies, financing mechanisms). The reason for this includes a lack of institutional mechanism, awareness and information of the risk of damage, little knowledge of the options for adaptation, limited financial resources to implement technical preventive and non-technical adaptive measures, and a lack of advisory and support services from the government. (AMCDRR, 2012)

Private sector influence in supply chain and business continuity planning: a resource based perspective in generating stakeholder value and sustainability

Introduction

The private sector is in a unique position to influence the accumulation of risk through leveraging operational business strategies, such as supply chain management and business continuity planning that promote corporate sustainability and shareholder value. However, business investment decisions are not taken on a vacuum, where possible profits and risks govern business decision making. Key barriers that limit implementation of DRR by private sector include resource constraints and presumed imbalance between costs and benefits. Establishing priorities and investing resources accordingly is important in planning for disasters (Frost 1994). This is especially likely to be a challenge for SMEs, which are by definition constrained by resources. Often, possible costs associated with disasters are underestimated by businesses, negatively affecting cost benefit analysis of DRR (Wedawatta, Ingirige and Proverbs 2014). As Tierney (2007) discussed, impacts of disasters on businesses give rise not only to direct business losses, but also indirect losses and

economic ripple effects. Inability to realise the full range of direct and indirect impacts associated with a disaster leads businesses to underestimate possible costs, leading to incomplete cost/ benefit analysis. If the private sector is to be widely and effectively involved in DRR, such barriers need to be eliminated through policy incentives. Following sections briefly considers current state of private sector involvement in DRR; especially in implementing business continuity planning, supply chain planning and other business strategies.

Current state of involvement of private sector in DRR

Business continuity planning and how to promote business continuity planning and incentivise business continuity management

Following the major disasters in 2011, the APEC leaders called on member economies in to promote and facilitate the use of Business Continuity Planning (BCP) to better prepare businesses and communities for natural disasters and to mitigate their impacts. However, the BCPs are relatively new concept as compared to the disaster risk management planning done by the national and local governments. A recent survey (Ono and Shibata, 2011) conducted by the Asian Disaster Reduction Center (ADRC) and the Taiwan Institute of Economic Research (TIER) show that despite the threat posed by these disasters, only 13% of SMEs have Business Continuity Plans (BCPs) and fewer than 50% are aware of the concept. (In contrast, the surveys show that 47% of large businesses have BCPs and 75% are familiar with the concept. Businesses both large and small that have experienced a disaster are more aware of the BCP concept than those that have not. The survey indicated that the top three obstacles preventing businesses from putting BCPs in place are: lack of knowledge about the BCP concept and the process of developing a plan; insufficient information about the potential risks to develop a BCP; and low awareness by management of the need for a BCP.

In Thailand, BCP is widely embedded in large organizations as well as certain public entities. Yet, the concept to ensure business resumption after disruptions is rare among Thai SMEs. Main causes behind low rate of BCP implementation among SMEs in Thailand include lack of management awareness, lack of expertise and lack of financial resources. Nevertheless, in order to overcome these weaknesses, determined government policies as well as private sector cooperation are required.

The Asian Disaster Preparedness Centre (ADPC) conducted a survey on 'Recommended methods to promote BCP among SMEs in Thailand' with approximately 79 respondents from both public and private sector. The aim of this survey is to recommend possible measures on improving BCP status among Thai SMEs to concerned government agencies and private enterprises. Respondents were asked to rate the level of necessity of recommended measures from their own perspectives, divided into following options: critical, medium, low and not necessary. The result shows that 72.15 per cent of respondents believe that it is critical for government to publish and disseminate BCP Guidelines or Manuals for SMEs in

each sector. Majority of the respondents also consider that public-private partnership and investment in the pilot BCP program should be the government's prioritized actions in order to promote BCP development in the country. Meanwhile, more than 50 per cent of respondents believe that all methods provided in the survey are necessary. In the meantime, the establishment of governing body by the government to ensure that all business sectors have BCPs is the least preferable method as 16 per cent and 4 per cent of respondents rated 'low' and 'not necessary' for this option respectively.

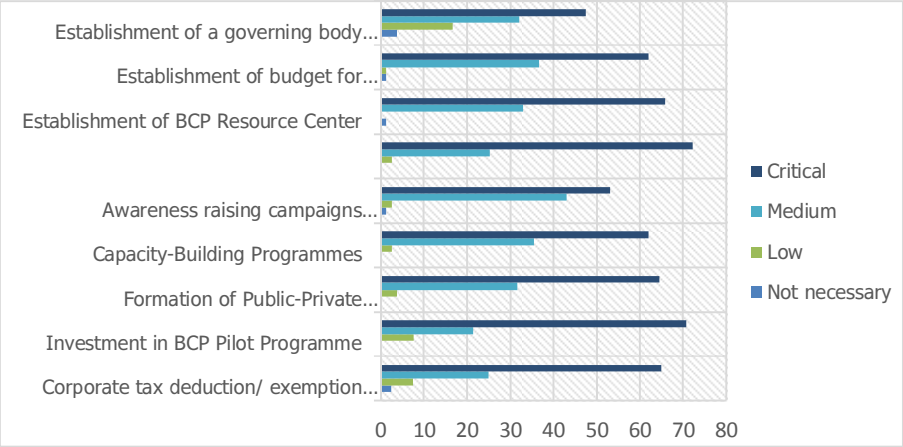

Figure 2: Recommendation to the public sector (source: ADPC study, 2014)

With regard to what private sector including financial institutions and insurance companies can do to increase BCP adoption among Thai SMEs, 62.5 per cent of respondents would like insurance companies to provide coverage for losses with special conditions (i.e. low premium rates) to businesses which have standardized BCPs. Moreover, 60 per cent believe that large companies with experience and expertise in BCP development should share their knowledge to SMEs in the same sector. In the meantime, the rest of respondents consider that it is necessary that a company that possesses a written and standardized BCP can requested clean or low interest rate loans from banks, and that companies should make it obligatory for their suppliers to have a BCP as well.

Supply chain partnering and DRR

For businesses, key risks associated with disasters often relate to markets and supply chains (Ukcip 2011), especially due to the widespread nature of modern supply chains which run across different industries and economies (Wedawatta, Ingirige and Amaratunga 2010). In addition to direct impact, disaster impact on businesses in the supply chain can easily cascade down to other supply chain partners who may not necessarily be directly affected by the disaster (Wedawatta, Ingirige and Proverbs 2014). Therefore, disaster impact can be felt by a much larger number of businesses than those physically affected by a disaster, based away from the disaster affected region or country. For example, the earthquake and tsunami in Japan in 2011 disrupted both domestic and global supply chains in many industry sectors, including global automotive industry which has led to plant shutdowns in USA due to critical part shortages (Park, Hong and Roh 2013). Given the desire of businesses to

streamline efficiency and performance of their supply chains, disaster impacts carry the potential to create widespread disruption. It is essential that businesses prudently assess how to strike a balance between supply-chain efficiencies and disaster risks, and invest in strengthening the long-term continuity plan of the supply chain (Abe and Ye 2013).

Following experience of significant disruptions, businesses have begun to consider disaster risk to their supply chains in business planning. For example, following the 2011 earthquake and tsunami, Japanese manufacturing firms have begun to consider the use of strategies such as increasing their inventory levels, adopting standardised component parts, increasing the number of lines/facilities/suppliers, and relocating production centres (Park, Hong and Roh 2013). However, at a global level, disaster resilience of supply chains is yet to be considered as a key business risk by private sector businesses. This is partly due to their inability to assess the indirect impacts of disasters; such as those on supply chains (Wedawatta, Ingirige and Proverbs 2014). Presence of a large number of SMEs in supply chains presents a key challenge for businesses to enhance their supply chain resilience. This is due to the fact that SMEs are highly vulnerable to disaster impacts and are less likely to be prepared for such events. Larger businesses including multi-national corporations can play a significant role in enhancing the resilience of supply chains, as well as of their smaller counterparts. It is essential that larger businesses with power to influence their supply chains undertake DRR and encourage smaller businesses in their supply chains to do the same. For example, larger businesses could contractually require their suppliers located in disaster prone areas to be aligned with industry standards (Edo et al, 2014) and consider DRR in their business planning. A holistic approach where the entire supply chain becomes disaster resilient could avoid the risk of indirect impacts related to supply chains significantly. Partnering between the members of a supply chain is identified as an approach that can achieve this objective.

Supply chain partnering is where there is an attempt to build close, long-term links between organisations in a supply chain, where a close working relationship is agreed although the organisations may remain distinct (Boddy, et al, 2000). It is an approach that will result in mutually beneficial supplier relationships. Supply chain partnering is expected to result in long-term relationships, develop capabilities, share more information and engage in more joint planning (Boddy, et al, 2000). Benefits of such an approach to DRR across the supply chain are manifold. For example, sharing more information and joint planning can minimise disruptions on the supply chain due to disasters and help individual organisations to enhance their capacity for resilience collectively. The approach will also enable SMEs to benefit from their relationships with larger businesses in their supply chain and minimise disaster impact.

Supply chains depend on key infrastructure such as transport and utilities, and the failure of these due to a disaster can affect the performance of supply chains. Often, responsibility for the DRR of such key infrastructure lies with the local and national governments. Therefore, national and regional government policy and DRR initiatives concerning key infrastructure affect the supply chain resilience of businesses. Thus, government policy is likely to play a significant role in building supply chain resilience. Ye and Abe (2012) note that as policies that prevent the potential impacts are likely to be more effective, governments should

incorporate actions that enhance disaster-resilient supply chains into their long-term development plans.

Other operational business strategies supporting DRR

Insurance is a key business strategy utilised by the private sector to recover damages and get back to business following disasters and is likely to be the only strategy adopted by many. Therefore, insurance is a key aspect of business resilience. However, in many parts of the world; especially in developing countries, businesses do not have adequate insurance to cover disaster risk. It is important that businesses fully understand the extent and limitations of their insurance cover, rather than expecting it to be a universal remedy (Brown, Seville and Vargo 2013). In addition to insurance, other common measures adopted by businesses include adaptation of properties, backing up critical business information, flexible working practices, and co-operation with other businesses. However, implementation of such measures is not wide-scale among businesses (Tierney 2007, Unisdr 2013, Wedawatta, Ingirige and Proverbs 2014).

Strategies adopted by businesses can be categorised in to four distinctive strategies as avoiding, reducing, sharing and accepting (UNISDR, 2013). Although DRR is not common practice among businesses, their uptake of DRR has been observed to increase following experience of a disaster. Therefore, businesses are likely to opt for DRR reactively after experiencing an event rather than proactively. Whilst businesses that actively consider DRR may opt for a range of disaster specific actions, in most businesses actions supporting DRR are likely to be extensions to their existing risk management practices; often undertaken with other risks/business opportunities in mind. For example, Wedawatta et al (2011) discussed how businesses have realised some businesses strategies implemented with commercial advantage in mind have helped their disaster resilience, thus encouraging them to specifically consider those strategies in relation to escalating disaster risk.

The key role played by SMES within the private sector DRR

Small and Medium-sized Enterprises (SMEs) form the principal portion of private sector businesses in many economies; especially in developing countries. For example, of businesses, over 96% in South East Asia (ASEAN, 2013) and over 99% in Europe (European Commission 2008) are considered as SMEs. They make important contributions to local and national economies in terms of employment and turnover generation. In Bangladesh; a country significantly vulnerable to disasters, SMEs provide employment to over 40% of the population (Mintoo, 2006). Manifold contributions of SMEs include assisting technological progress, increased competitiveness, creation of new jobs and the economic revival of regions (Tilley and Tonge, 2003). Further, SMEs contribute to a more equal distribution of income and wealth (Hallberg, 2000).

SMEs are often observed as inadequately prepared to cope with and recover from the impacts of disasters (Tierney and Dahlhamer 1996, Alesch *et al.* 2001, Yoshida and Deyle 2005, Crichton 2006, Dlugolecki 2008, Wedawatta, Ingirige and Amaratunga 2010). For example, 70% of SMEs affected by the Chilean earthquake in 2010 have not had insurance, requiring the businesses to endure the costs themselves (Muir-Wood, 2011). Hence, they

are often affected disproportionately hard by disasters, compared to larger businesses. Once affected by a disaster, it may take a considerable time for a SME to get back to business. SMEs affected by a regional flood event in Cockermouth, UK, had taken about 4-6months on average to move back to their business premises after reinstatement (Wedawatta, Ingirige and Proverbs 2014). Loss of income over a considerable period of time could lead to significant economic hardships to SME owners as well as local economies and industry sectors. It may also take a considerable period of time for them to get back to their pre-disaster activity levels, especially if DRR strategies were not in place. For example, Sardana and Dasanayaka (2013) noted that SMEs affected by the 2005 Asian Tsunami in Sri Lanka have only recovered up to about 65% of the pre-tsunami activity level even after nearly six years following the event. Much of this can be avoided or minimised by SMEs, if DRR is integrated within business planning.

In addition to being able to minimise negative impacts of disasters, DRR will help SMEs to be more competitive. As SME owners are often based locally, they are likely to be affected by disasters in two fronts; as business owners and local residents, creating significant psychological stress and trauma. This also makes it difficult for SMEs to move to another area. Therefore, it is in their interest to increase business resilience. Further, SMEs are an integral component in local community cohesion. As local businesses aiding community connectedness, SMEs can play a significant role in developing disaster resilience and recovery of local communities. For this to happen, it is vital that SMEs themselves are made resilient by integrating DRR in business planning; a practice that is seldom implemented as of now.

Lower level of DRR activities among SMEs is partly due to their lack of resources, which makes persuading SMEs to implement DRR a significant challenge. However, research has identified criteria that can be effectively utilised in engaging SMEs in DRR. For instance, key lessons identified by the UK Climate Impacts Programme in their work with SMEs included low awareness of SMEs, advantage SMEs hold because of their flexibility to change, highlighting opportunities associated with disasters to engage SMEs, action is likely where benefits are certain, and informal approaches can be more effective (UKCIP, 2011). Therefore, for policy initiatives targeting the private sector to be successful, the unique characteristics and requirements of the SME sector as identified above will need to be considered. Policy will also need to provide SMEs appropriate guidance and incentives to encourage them to implement DRR such as business continuity planning.

Current policy context

Some countries have already taken the initial steps towards substantially involving private sector businesses in DRR. For example, in the UK, businesses are increasingly encouraged to adapt to flooding and other disasters by implementing strategies such as business continuity planning and adapting their properties (See Box 14.3). These policy initiatives are likely to require private sector businesses to invest their financial and other resources. This is a challenging task unless businesses realise the business case for DRR. Whilst global businesses are now beginning to consider DRR, much of the businesses still do not consider disasters as a major business risk (UNISDR, 2013). However, their willingness to engage

with and implement DRR activities is likely to increase following experience of disaster events. Businesses that have been affected by one or more disaster events have been noted as more likely to implement DRR strategies than those without such experience (Kreibich *et al.* 2010). Whilst larger businesses could be in a position to implement DRR strategies, committing financial and other resources for DRR is likely to be challenging for SMEs. Therefore, policy initiatives will be required to be sensitive to the requirements and capacities of SMEs; which form the overarching majority of private sector businesses in many economies.

Box 14.3 DRR and businesses: The UK policy context

In the UK, business continuity planning is compulsory for some institutions. Civil Contingencies Act 2004 requires Category 1 responders (e.g. local authority, emergency services, health, Environment Agency) in the UK to maintain plans to ensure that they can continue to perform their functions in the event of an emergency (The United Kingdom 2004). In order to fulfil their business continuity management duty, Category 1 responders are expected to maintain an Incident Management Plan, a Business Continuity Plan and a Business Recovery Plan (Cabinet Office 2012). Following the flooding of 2007 that affected many parts of the country, it was recommended to extend this duty to include Category 2 responders which include utility and transport service providers (Pitt 2008), which often belong to the private sector. Acknowledging that it is not feasible to prevent flooding altogether (Defra 2011), recent policy changes in the UK encourage businesses at risk to adapt their properties. The National flood and coastal erosion risk management strategy for England (Defra 2011) that complements Flood and Water management Act 2010, states that "householders and businesses at flood risk should take the appropriate steps to better protect their properties through property level resistance and resilience measures" (Defra 2011: 26). Therefore, the policy seems to increasingly encourage businesses to take responsibility for their own resilience and implement business strategies to address disaster risk.

Considering that businesses will not be able to re-establish in isolation following a major disaster without restoration of public infrastructure, Japan International Cooperation Agency (JICA) has developed a new concept titled Area Business Continuity Planning (Area BCP) and Area Business Continuity Management (Area BCM). The aim of an Area BCP/BCM is to secure the critical external resources that are essential in supporting business operations in and around an industrial area (Baba 2014). The concept integrates individual business continuity plans of private companies in an industrial area within the area BCP/BCM. This can be considered as a further extension of the policy initiatives identified above in Box 14.3, and an approach that seek to actively involve businesses in DRR.

Enabling new initiatives: Public private partnerships for DRR

Basics of PPPs and recent trends

Broadly, a public-private partnership (PPP) scheme is a contractual partnership between the public and private sector agencies, which is usually targeted towards financing, designing, implementing, and operating infrastructure facilities and services that were traditionally provided by the public sector (Asian Development Bank, 2006). PPP is also referred to in many developed countries like the UK and US as a contractual agreement between a public sector agency and a commercial private sector party to deliver a public service or infrastructure project while sharing the resources and risks (Akintoye et al., 2003). The World Bank Institute (2012) describes PPP as a long-term contract between a private party and a government agency, for providing a public asset or service, in which the private party bears significant risk and management responsibility.

Many opinions have been formed for explaining the concept of PPP worldwide. For example, the concept of PPP is underpinned by the public sector's desire to resolve financial constraints in the provision of public facilities and services. Therefore, the UK government has been using private management skills to increase the efficiency, effectiveness and quality of facilities and services been delivered in the country (HM Treasury, 2000 cited in Li et al., 2005). Most recently, PPPs in the UK have developed mainly through the Private Finance Initiative (PFI), first announced in 1992 by the then Conservative Government (Li et al., 2005). The concept of PPP has gained substance in the 1970s in USA and UK with contracting out initiatives where it takes its origin from planning and urban development problems as a result of considerable shortfalls in finance (Sobuza, 2010).

There is no clear date for the actual commencement of PPP approach globally as there are different views on the historical application of the scheme for delivering public services. For example, various dates have been identified by scholars and public bodies on what should be regarded as the time or period for the take-off of the scheme. Some of these are: in 1853, Compagnie Generale des Eaux – CGE (public) and Veolia Environment (private) made partnership arrangements to supply water to the city of Lyons, a 50-year contract to supply water to Paris in 1860, a contract with the municipality of Nantes to clear the streets of manure and refuse and to convert same into fertilizer (Confederation of British Industry, 2007); the Great Indian Peninsular Railway Company operating between Bombay (now Mumbai) and Thana (now Thane) was in 1853, the Bombay Tramway Company running tramway services in Bombay was awarded in 1874, and the power generation and distribution companies in Bombay and Calcutta (now Kolkata) in the early 20th century (Asian Development Bank, 2006). UN-Habitat (2006) citing many scholars stated that the United States experience in the PPPs began with the New Deal in 1932, when the Federal Government first became involved in housing in a variety of regulatory, supports and subsidies. UN-Habitat (2006) further reports that the first major partnerships in Turkey took place as far back as 1948 with the Yenimahalle Housing project in Ankara.

The development, which started more than 200 years back still manifests in different forms, especially in many developed countries. However, adoption of PPP approach requires a contractual collaboration between public and private sectors in financing, designing, implementing and operating infrastructural facilities and services that were traditionally provided by the public sector (Asian Development Bank, 2006). It is a strategy of governments as an alternative funding mechanism for the provision of public services in a collaborative arrangement between the public and private sector.

The major characteristics of PPP are: long term, between 20 to 50 years of service provision; transfer of risk to the private sector; and value for money (UNISDR, 2008). There are also different types of PPPs for different reasons, based on the degree of needs for infrastructure services delivery. Therefore, PPPs do not have a specific form of procurement and the literature reviewed embodies a range of different models which fall under the umbrella of PPP. The variety of arrangements used can be complex and may suit to specific industries or projects better than another. A PPP can take many forms like joint investment or resources, such as time, expertise, information, funding, development sites and materials; joint risk-taking and benefit sharing; or shared responsibility and authority (Austin, 2008). The most common types of PPPs currently in-use range from civil works and service contracts; management and operating agreements; leases; joint ventures; and concessions (e.g. Concessions, Build-Operate-Transfer = BOT, Design-Build-Operate = DBO). Significantly, considering recent trends, the most commonly used PPP in many countries take a form of concession contracts, which brings private sector management skills, funds and technical know-how to the public sector (UNISDR, 2008). Concession contracts seem to have gained more popularity due to their advantages relating to synergy, transformation, budget and capacity enlargement and risks transfer for public project procurement (Boxmeer and Beckhoven, 2006). Of the concession contracts, the most common type used is Private Finance Initiatives (PFIs) that take a form of Design-Build-Finance-Operate = DBFO.

Public Private Partnerships (PPPs) have seen a marked increase in use and interest globally in recent years due to the global recession occurred in latter part of the 2007/08. The number PPPs are on the increase and their use geographically is also multiplying. The UK, Australia, France, Ireland, Portugal have used PPPs for public projects delivery very commonly, followed by countries like the Netherlands, China, New Zealand, Canada and US.

Typical applications – Brief Examples and Pros & Cons of PPPs in general

PPPs have been successful in the delivery of a number of public infrastructure projects in the areas of education, health, urban and rural water supply, energy and transportation sectors of the economy in many countries as aforementioned. Some of these are: In 1999, the Government of Israel awarded a 30-year concession agreement to Derech Eretz to build and then operate the largest and most complex transport infrastructure project – the Yitzhak Rabin Trans-Israel Highway of 186 miles across Israel; In 1999, Suez Corporation, through a joint venture with Siza Water Company (SWC), was awarded a 30-year concession contract with the then Borough of Dolphin Coast (BODC) as the first private company to manage and implement a water and wastewater utility in the South Africa region; in 1993, Melaka-

Manipal Medical College (MMMC) as the first joint venture partnership in professional education between the Malaysian and Indian governments.

(A) Advantages of Public-Private Partnerships

The countries that have adopted PPPs, International organisations and scholars have put forward arguments to support the initiative as a preferred alternative to the traditional public projects delivery methods. The reasons for their arguments are based on many factors as follows:

Risk Sharing: It gives the public sector partner the opportunity to particularly divest itself of the risks relating to time, cost and quality objectives associated with the delivery and operation of desired public facilities and services (Akintoye et al., 2005). UN-HABITAT (2011) is of the view that PPPs are usually designed so that risk is transferred between the public and private sectors, allocating particular project risk to the partner best able to manage that risk cost-effectively.

Relieves Burden of Public Debt and Gives Budgetary Benefits: PPPs can help to alleviate chronic underinvestment in capital intensive projects and can also serve as a vehicle for the injection of private sector financing while allowing government to maintain their fiscal targets and avoid taking additional debt (The Business Council of British Columbia, 2002 cited in Palmer, 2009). PPP seeks to reduce the amount of public money usually tied up in capital investment under traditional procurement as it relieves government of a substantial proportion of public debt (Akintoye et al., 2005) and enables developing some projects at little or no expense on the part of public authority as cost of service provision can be transferred to the users in the form of road tolls or water bills though at rates below the real cost (Singh, 2012).

Value for Money: An important benefit of PPP is that the initiative gives value for money to justify collections by government from the taxpayers. This can manifest in the following aspects (Singh, 2012): better coordination and greater synergy between the phases of design, construction and operation; allows for an innovative design, the application of re-engineering principles and efficient management techniques; it places emphasis on quality of service offered to user; aimed at minimizing total project cost throughout the project life cycle (capital investment + maintenance + operators); and promotes efficient use of capital investment.

Social Benefits: PPPs pave way for a lot of social benefits to be enjoyed by the citizens and users of the public projects delivered under the schemes. This is attained by using private sector investments to improve the level of infrastructure development, standard service delivery and enhancement of output management and maintenance.

Timely Delivery: PPPs contractual agreements are usually on long-term basis with the private partner carrying the burdens of responsibility and debts. The private sector would not want to delay the completion of a project in which it has direct financial interest. Any delay in meeting the agreed timelines of completion can lead to additional costs for the private partner as it alone carries the debt for a longer period of time (UN-HABITAT, 2011)

Improved Level of Service: According to The private sector involvement in public service provision makes private investment useful for tackling the problem of bottlenecks in infrastructure demand and supply (Akintoye et al., 2005). For instance, the specialist skills, knowledge and experience acquired by the private sector over the years from previous assignments will be useful for the application of innovative techniques and approaches to produce quality service.

Availability of Funds: Public-Private Partnerships initiative increases available funds for infrastructure project delivery through the potential cost savings inherent in the PPP approach and through access to private sector financing (UN-HABITAT, 2011). Government therefore does not have to provide capital for the delivery of infrastructure project particularly where it has a poor credit rating and is not able to raise finance from financial market (Katz, 2006).

Technology Transfer: PPPs provide opportunity for the utilisation of private sector resources particularly the technical know-how. The private sector partner will make use of high level experts who might have acquired requisite experience in engineering, financing and legal field which results in transfer of technology or know-how in terms of construction and operating system, project management, financial engineering and institutional engineering (Singh, 2012).

(B) Disadvantages of Public-Private Partnerships

The numerous advantages of Public-Private Partnerships notwithstanding, there are some disadvantages as well for successful implementation of the initiative as an alternative approach to public infrastructure delivery.

Complications: PPP contracts can be full of complications than the traditional procurement contracts (Katz, 2006) thereby making the creation of value for money which is regarded as an important advantage of PPPs to consists of some disadvantages (Herpen, 2002).

High Cost of Transaction: Though, PPPs represent good opportunities to lower overall project costs but when compared with traditional procurement, the complete PPP process invites additional costs that, if not managed properly, can erode some of the potential economic benefits of the model (UN-HABITAT, 2011). Tendering and developing costs in PPP contracts are usually much higher than the case with conventional procurement (Herpen, 2002). PPP procurement allows for several bidders to bid for a project which makes each party spending considerable time and resources in designing and evaluating the project prior to submitting a tender including substantial legal cost in contract negotiation (Katz, 2006).

Delay in Transactions: PPPs contract deals are complex requiring public and private partners to engage the services of experts to be able to address any likely future contingencies. The delay caused by the complex nature of PPP contracts adds to the completion time and capital cost of projects. The London Underground PPP/PFI project and in New South Wales, Australia, where planning and decision making for a motorway project dragged on for nearly one and half decades are two major examples of PPP contract delay.

Reduce Control over Public Assets: The government usually looses substantial control over public assets delivered through PPP funding arrangement while the contract agreement last. This is particularly true of Design-Build-Finance-Operate/Maintenance (DBFO/M), a situation whereby the private sector company designs, builds or constructs, finance and operates or maintain a new facility such as road, water or electricity project under a long-term lease of between 25 and 30 years before the facility is transferred back to the government.

Rigidity in Long-Term Contract: PPP contract agreements are usually for long-term periods of between 25 and 30 years or even more. It may therefore be difficult to alter some of the terms agreed upon as where and when necessary. This is a key concern with the long-term nature of PPP procurement as it limits the public sector's ability to make changes to the contract if unexpected economic or situational challenges arise like the need to change the use, technology or type of an infrastructure asset (UN-Habitat, 2011).

Loss of Accountability: The issue surrounding loss of accountability particularly to the tax-payers is an important argument against PPP procurement. Palmer (2009) identifies "off-book" financing as the most common issue whereby the private sector borrows money for investment in public infrastructure to which government is liable by entering into a long-term agreement to repay from future revenues but the borrowed funds are not registered on the government's balance sheets. If PPP agreement is not clearly defined and sorted out, UN-HABITAT (2011) argues that the contract can overlap roles and responsibilities and blur lines of accountability for the public taxpayer.

Inefficiencies and Bankruptcy: It is rather not possible to predict accurately all positive and negative occurrences over the span of life of PPP contract when fixing terms of the agreement in view of the complex nature of some public infrastructure projects. Katz (2006) argues that given the length of time spanned by the PPP contract, it is almost inevitable that circumstances will arise, which cannot be foreseen.

Differing Goals and Cultural Gap: PPP arrangement brings public and private sectors together for the delivery of public infrastructure. However, the two entities have different operational objectives. While the pubic authority is looking to maximize the socio-economic profitability of public sector investment (i.e. optimising the cost - to - benefit ratio from public stand-profit), the private sector operator is looking to maximise its financial profits i.e. increased return on capital out lay (Singh, 2012). Consequently, users are made to suffer in terms of increased costs of services.

(C) Suggestions for Improvement

Despite the negative factors of PPPs as identified by scholars and stakeholders, useful suggestions have equally been offered to neutralise the effects. In addition to the various suggestions, the wide acceptability and records of success of the application of PPPs internationally have shown that the initiative as an alternative public projects delivery mechanism is the right step in the right direction. The following can be required for improvement in PPP schemes: good governance, partners working as transparent as possible, ensuring standardised output so as to achieve value-for-money objective,

promoting flexibility, and allowing for uncertainties and technological change, and keeping the number of pre-qualified bidders relatively low as much as possible

According to Herpen (2002), it is required that and each actor trying to adapt to the other actors in order to make PPP arrangements succeed. Working together of the partners without anyone having any hidden agenda will make them trust each other and work as a team. Transparency is a key driver for the delivery of the dividend of PPP projects (Herpen, 2002; Katz, 2006; Grimsey and Lewis, 2007).

Potential and Pitfalls of PPPs and the Informal Sector inputs in post-Disaster Reconstruction and Recovery scenarios

The above sub-section indicates that PPPs (3P) may suit certain scenarios and some projects therein, but not all. Depending on the strengths and weaknesses of the public and private sectors in a country or region, PPPs may be chosen to combine their resources for delivering public infrastructure and services, albeit in certain projects only. Similarly in disaster management, some reconstruction and rehabilitation projects may be best left to the public sector e.g. major transport networks, while some others may be seen to benefit from both public and private sector inputs in the rebuilding or even in the new development and sustenance of certain types of physical and social infrastructure, for example in utilities such as power, water and communication infrastructure and in health, education and social services.

However, the extent and modalities of potential private sector involvement are also scenario-specific, for example they also depends on (a) the pre-existing public-private mix in the local economy e.g. if toll roads and private power providers had already been operating well in the region; and (b) the levels of trust/ suspicion or the degree of confidence with which each sector views the other, and more importantly, with which the end-user community views both.

In the context of the latter, it is very common that apart from international inputs, most sectors in a country – public, private, informal and NGOS etc. - do eventually get involved in most disaster recovery, reconstruction and rehabilitation exercises. But this is not just *post hoc*, but also *ad hoc*, hence unstructured, often disorganised and wasteful of resources. Apart from demoralising or even alienating well-intentioned participants, it is often realized that the process could have been far more efficient and higher value outcomes achieved, had the resource-mix and procurement been planned carefully and implemented better.

Obviously, there is no time and little spare energy available for such careful planning and smooth mechanisms in the immediate aftermath of a disaster. This is why most countries have now set up high-profile, if not high-powered disaster planning and management organisations and mechanisms. However, not many have as yet, recognised the imperative to integrate, not just involve, the private and informal sectors in these systems. Therefore, just as before, these two rich resource pools are often left untapped in the pre-disaster planning systems and so the various elements may if at all, only get involved in sporadic, unstructured and even counter-productive conflicting modalities after a disaster.

Another retarding factor could often be the suspicion with which some private sector or NGO offers of assistance may be viewed, given certain apprehensions of some possible underlying vested interests. For example, some NGOs have been accused of harbouring longer term interests of securing strategic footholds in certain communities with ulterior motives, be they allegedly political, religion-linked or otherwise. Also, some private organisations may be suspected of ultimately seeking routes to boost their bottom line, despite any good intentions at the start, for example targeting windfall profits on less carefully managed emergency infrastructure procurement programmes.

Overcoming Pitfalls of PPPs (3P) and 'People' in suitable disaster management scenarios - through Pre-Disaster Planning that embeds the 4th P in ex-ante 4P frameworks

The World Economic Forum (2010) proposed a new model of PPP (3P) to improve reconstruction practices and overall disaster management performance. In this model, the private sector shifts from any previous 'donor' role to a more active mode of sharing expertise and specialist knowledge and skills. From another angle, the private parties also strengthen relationships and reputations with government and the public, develop their personnel and open up more business opportunities.

Going a step further, to include a fourth 'P' ('People', including NGOs and informal groups as in the previous sub-section [4.3.3], as well as academics, professionals, community groupings etc.), improves the potential and resources for a wider and longer-term value focus. Secondly, the potential barriers to assembling the best teams possible, including public and private and 'people' groupings, for rapid recovery, reconstruction and rehabilitation, are better addressed in advance, rather than in the heat of the event. To address this, a case for - '*Ex-ante* Frameworks for Disaster Mitigation' was formulated by Kumaraswamy (2008).

This proposition also brought on board the need to recognise and effectively mobilise and integrate a fourth 'P' – 'People' into these frameworks, in order to address some of the shortfalls in trying to link public and private parties in sometimes incompatible partnerships, where common objectives are ill-defined and unclear. In such cases, divergent agendas may lead to conflicts and breakdowns. Bringing in 'people' could help identify, then prioritise and focus on the real public needs, both immediate and longer-term e.g. in achieving sustainable value. In this way, if relevant groups of 'people' are mobilised effectively, they could firstly help cement the partnership by facilitating a focus on broader-based, longer-term and common (holistic system-wide) value elements, and secondly help synergise and energise the team to develop/ redevelop more valuable physical and social infrastructure that will also be more resilient and sustainable than what they had before.

'People' covers various groupings such as assorted NGOs, professional institutions, academics, media and community groups ranging from official/ quasi-official local bodies to charities, associations, societies and clubs, such as Jaycees, Lions and Rotary. Many of these group get involved downstream anyway in *ad hoc* and less effective ways, so why not integrate them more systematically into broad synergistic groupings in advance? This would of course entail careful scenario planning, including a broad classification of potential

situations to be dealt with, amidst the various expected disaster types, scales and the possible consequences to people, infrastructure and various other systems

For example, both rapid restoration and longer term reconstruction/ improvement of physical and social infrastructure used by the public, such as roads, schools and hospitals, could benefit from private sector expertise and efficiencies, as well as local 'people' inputs based on their longer-term end-user interest in resilience and sustainability that could help 'check and balance' any potential private party temptation to cut corners later on 'after the dust settles'. Therefore local knowledge, commitment and vigilance will be valuable facets of the 'social capital' that will be mobilised.

In another example from the other 'side of the coin', private parties who are already operating important, if not disaster-critical facilities (e.g. in the food chain, from production and distribution to retail supermarkets), would welcome pre-disaster planning that sets out the basis for partnerships with relevant public sector support units e.g. from some utility service providers, security units (public sector), as well as local groups/ community leaders ('people' / 4th P), to maintain business continuity.

A *caveat* is warranted on the downsides of involving too many additional players in an already complex and potentially explosive mix. Conflicting agendas could retard if not, stall relief programmes. Responsibilities could get diluted and accountabilities blurred, with 'passing the buck' becoming easier. On the other hand, abuse of absolute authority/ power and the potential for waste and/or even corruption in some scenarios is less likely than if left to the public sector by itself.

Excellent 'stakeholder management' and 'relationship management' are called for in order to identify and release the potential synergies through well-coordinated team working. Suitable framework structures should be set up to start with, while some operational elements may draw on some previous examples as below.

Box 14.4 discusses some of the practical examples for well-coordinated synergies and structures.

Box 14.4 initiatives and emerging practices that contribute to 4P arrangements

Innovative inputs from the private sector have already enhanced some pre-disaster planning and post-disaster response systems, albeit in scattered examples. Similarly, 'local' inputs from various 'people' groups such as NGOs, charities, professional bodies, academia and community-based units have boosted the effectiveness of disaster mitigation and the overall value of the reconstructed/ rehabilitated physical and social infrastructure.

Involving various relevant groups of 'people' is neither surprising nor new. For example, over 25 years ago, Maskrey (1989) argued based on evidence from Peru and other countries, that ' when mitigation measures are carried out by community organisations they are not only more effective, but can also lead to a permanent reduction in vulnerability'. He made 'a powerful case for aid agencies and governments with responsibility for disaster relief and mitigation to focus more on the empowerment of community groups.'

More recently, there have been initiatives to mobilise formal and informal organisations from even outside the disaster area, for example: (a) 'twinning arrangements' between geographically distant municipalities/ prefectures have 'proved to be effective in dealing with emergencies' following the 2011 earthquake in East Japan (World Bank, 2012), since those in unaffected areas had engaged in advance in mutual commitments to help those in disaster-affected areas; and (b) in a similar example, albeit post-disaster arrangement in the Sichuan reconstruction, Zhang and Kumaraswamy (2013b) summarised: 'A "paired assistance" mechanism was adopted in Sichuan reconstruction, such that 19 provinces / municipalities paired with the 19 most seriously affected counties on a one-to-one basis (CDRR, 2009). The pairs were set up according to the GDP ranking of the provinces / municipalities and the damage severity of disaster affected counties. For example, Wenchuan, as the epicentre of the earthquake and the most damaged region, was assisted by the most developed province with highest GDP ranking - Guangdong Province.'

In terms of involving private sector resources, funding support mechanisms including for insurance/ re-insurance, have been developed as would be reported in more detail in other sections/ sub-sections. For example, the California Earthquake Authority (CEA, 2014) is a public-private organisation set up for earthquake insurance after the Northridge earthquake in 1994.

Other initiatives to further extend the private sector reach, include a series of exercises to involve private parties in climate change adaptation, through programmes seeded by for example, the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), established under the 2001 UN Framework on Climate Change (UNFCCC). These include a pubic private sector forum to promote investment and entrepreneurship to tackle climate change induced risks to water supplies and capacity building in Sierra Leone, as well as actual water system improvements with private participation in Freetown.

Formulating Procurement and Partnering protocols and arrangements for 4P in Pre-Disaster Planning and Disaster Management

Readers may have come across many more examples of elements of 4P practices, such as in those in the immediately preceding sub-section, both on the ground and in the literature, as indeed have the authors. Being unfortunately scattered, these have neither been codified

nor consolidated into a segment of knowledge that can be effectively applied to leverage both higher value and more sustainable outcomes from reconstruction and rehabilitation. In addition, the lack of tried and tested structures and mechanisms are a barrier to large scale initiatives to formally mobilise both the private sector and 'people'. Therefore it seemed timely to consolidate and develop suitable frameworks, principles, protocols, good practice examples and guidelines to this end.

Research by Zhang (2012) sought evidence for, evaluated and 'operationalised' the propositions advanced by Kumaraswamy (2008) in terms of formulating *ex-ante* 4P frameworks for pre-disaster planning, rapid response during disasters and significantly better-focused and co-ordinated post-disaster reconstruction and rehabilitation of physical and social infrastructure.

While details are available elsewhere (Zhang, 2012; Zhang and Kumaraswamy, 2012, 2013a; 2013b), to summarise the research approach and methods employed in this study, an interlocking series of exercises were conducted as follows: A set of 'first-round interviews' were conducted to explore the feasibility of applying PPP in reconstruction, as well as of integrating 'people' into PPP. These interviews were exploratory, hence semi-structured. Findings from these first-round interviews shed light on current practice and pitfalls in the Disaster Management cycle especially in reconstruction. These were next examined in two parallel questionnaire surveys targeting experts / experienced professionals in Disaster Management and PPP respectively. The findings from 14 first-round interviews and 80 responses received to the questionnaires revealed that 4P has great potential to deliver better performance in certain types of reconstruction projects.

Based on the above findings, nine 'second-round interviews' helped to test and improve the established preliminary 4P framework. In order to drill deeper into current and potential roles of 'people', a case study was conducted of a privately funded set of school construction projects in Southern China, where the design and construction management services were 'donated' by staff and students from the University of Hong Kong. This case study covered three separate and sequential projects, the last being a reconstruction project after a school was destroyed by the May 2008 Sichuan earthquake. Finally, the proposed 4P framework which was developed based on the above research, was validated through a focus group meeting as described further below.

4P FRAMEWORK

A 4P framework was developed to provide a theoretical foundation for effective and efficient procurement and delivery of the envisaged 4P projects. This consists of two elements – a procurement framework and a partnership framework. The procurement framework presents the major mechanisms and procedures to procure typical 4P projects. The partnership framework aims to boost relationship management as would be essential for the smooth execution of 4P by overcoming the inherent obstacles arising from involving multiple participants. This 4P framework was validated through a focus group meeting with knowledgeable participants from academia (two), a client department, a financial institution and a consultant in the construction industry, as well as two research students (Zhang, 2012).

The findings were very encouraging overall in terms of net benefits, but also unearthed vulnerable areas to be addressed or guarded against, so helped in refining the proposed 4P framework. For example, some areas needing attention were in: (a) overcoming apprehensions and resistance from some public bodies to involving more parties, (b) overcoming 'cultural'/ value system differences of diverse 'people' groups, (c) installing checks and balances to avoid windfall profits accruing to some private sector organisations. Indeed, bringing 'people' formally into the strategic and operational levels in 4P, already reduces the likelihood of collusion between some public and private partners that is sometimes camouflaged under the cloak of needs for emergency response with quick decisions that bypass the usual accountability checks.

(A1) Proposed core Procurement Framework

The three major stages of procuring 4P projects are illustrated in Figure 3 (Zhang and Kumaraswamy, 2013a). In the context of the Disaster Management cycle, the first two stages cover preparation of the base 4P frameworks in a pre-disaster phase, while the third stage represents post-disaster 4P development, focus and implementation.

The first stage includes choosing appropriate procurement strategies. Potential infrastructure projects could be categorized according to their location, complexity, scale and type (economic/ social/ special infrastructure), followed by more specific and focused examination. Each infrastructure package/ network/ element could be then assigned to a relevant public 'client' body for deeper study. Business cases could be developed for each infrastructure package/ element, with possible example/ reference projects. Qualitative analysis covering project scope, needs, criteria, strengths, weaknesses, threats and opportunities as well as quantitative analyses such as Public Sector Comparator (PSC) and Value for Money (VfM) assessment exercises can be conducted to select a procurement strategy that is the most likely to deliver good VfM over the long-term. If and only if, certain projects are identified as probably suitable to be procured by 4P, the following stages (i.e. stage 2 and 3) could be initiated.

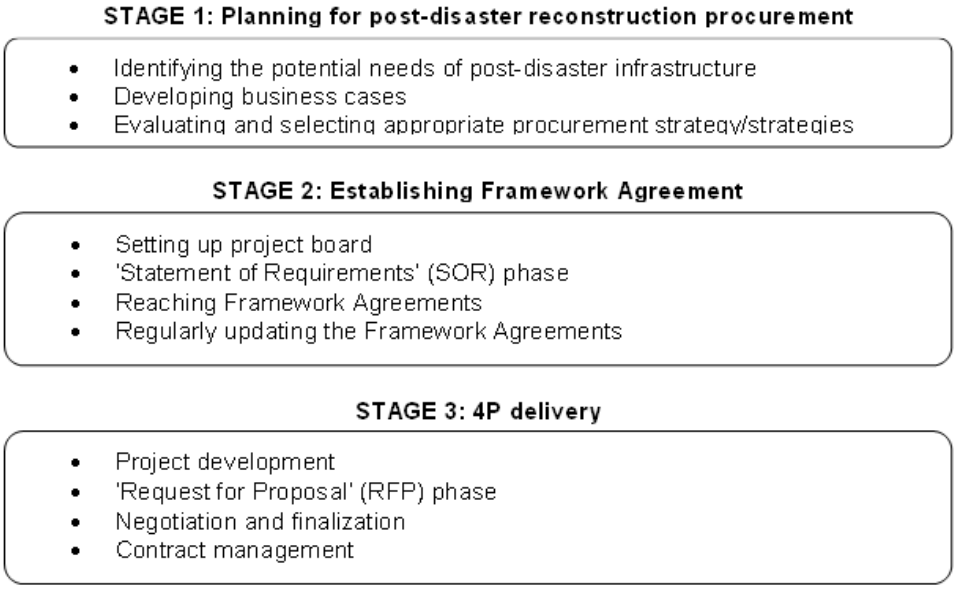

Figure 3: The procurement framework with a '4P' delivery format (Source: Zhang and Kumaraswamy, 2013a)

'Project boards' would be established to procure, manage and deliver their assigned categories of 4P infrastructure. They could prepare and issue documents of 'statement of requirements' to describe the basic information and standard requirements of potential 4P projects to invite bidders. Evaluation could focus more on the financial, technical, managerial capacity and past performance and reputation of the bidders, rather than the price, which can not be realistically assessed at this stage. Three to five groups of bidders could be selected to enter into Framework Agreements (FAs), in which general terms such as quality standards, payment mechanisms and risk allocation strategies will be laid out. Some base rates/ benchmark prices may be incorporated against reference criteria, if feasible in certain scenarios. The FAs could be updated every three to six years, depending on scenario needs.

4P delivery could be commenced for suitable projects only, immediately after any disaster materialises. After issuing a 'request for proposals' containing detailed project profiles, required services and expected outputs to the pre-qualified candidates, bidders could be selected according to their financial plan including rates and prices, construction and operation schemes and other technical, safety and sustainable parameters. Successful bidders could enter into a further negotiation phase to finalise specific contracts based on their general FA, and then proceed to the design, construction, operation and maintenance stages of 4P.

(A2) Proposed core Partnership Framework

The 4P contract could be signed between a relevant public sector body and a selected Special Purpose Vehicle (SPV), comprising private sector organisations and 'people' groups whether from NGOs, community groups and/or professional bodies depending on the project needs. The envisaged 'partnership' covers relationships between the public sector and SPV,

within the SPV between its major players, across the SPV with its advisors, contractors, suppliers etc., as well as non-contractual relationships between SPV and the general public, communities and media.

The partnerships are clearly complex and long-term in such 4P projects. The responsibilities to investigate, evaluate, promote 4P concept and procure, supervise and support the delivery of 4P projects rest with the government agencies. The private sector organisations may deliver non-core services, which are the physical construction, throughout design, construction, operation, maintenance and transferring back if expected. Some core services traditionally delivered by the public sector such as education and medical/health services could be transferred/ delegated to NGOs, professional groups, academia and integrated local communities, starting from the planning phase.

The uncertainties and complexities in a long-term 4P increase the possibilities and risks of conflicts and disputes, hence highlighting the need for the better management of relationships to improve their cooperation for enhanced overall value. To improve 'relationship management' in 4P, open and co-operative relationships, mutual trust, respect, transparency and teamwork are prerequisites (Ryan 2007; Smyth and Edkins 2007). A vast body of literature, and many developments in the construction industry in general (e.g. Glover, 2008; Rahman and Kumaraswamy, 2012) show that such relationship-based approaches can generate trust, commitment, team spirit, co-operation and enthusiasm that will reduce waste and increase efficiencies far beyond what is possible with traditional contracting. Indeed, such arrangements would come under the umbrella of 'relational contracting', which moves beyond classical contracting and neo-classical contracting. Relational contracts are expected to deal with greater uncertainties and the fact that all eventualities cannot be catered for in the contract documents, hence build in contractual flexibilities to be handled with better relationships (Kumaraswamy, 2006).

More information on the proposed 4P partnership framework itself is available in Zhang (2012). Furthermore, parallels may be drawn with 'Relationally Integrated Value Frameworks' formulated for 'supercharging supply chains' in the construction industry in general by Kumaraswamy et al. (2010).

Concluding Observations on potential for 4P and PPP (3P) in Disaster Risk Reduction

Apart from the potential of the above 4P framework and associated arrangements, some of the emerging variations within PPP (3P) itself can be suited for particular disaster management scenarios. The bottom line is to proactively mobilise and organise stakeholders much better in advance. This is more effective and efficient than letting them come on board in loosely structured *ad hoc* 'add-ons' after the event.

International funding bodies have recognised the needs for the above, as evidenced by a recent series of seed funding and capacity building initiatives, for example in Sri Lanka alone. Examples include: (a) a US 110 million Climate Resilience Improvement project (CRIP) funded by the World Bank, which will finance both short-term and long-term interventions to reduce climate and disaster risk; (b) a LKR (Sri Lanka Rs.) 1.3 billion project for Disaster Risk Reduction and Preparedness Plan for four Sri Lankan towns hit by the 2004

tsunami that will help 165,000 people – to be implemented by UN-Habitat with the Urban Development Authority and the Ministry of Disaster Management (both in Sri Lanka) with inputs from the Univesity of Moratuwa (Sri Lanka); (c) a Japanese grant of LKR (Sri Lanka Rs.) 37 million to a Japanese NGO (who will work with a local NGO) for a 'Capacity Building Project on Community-based Risk Reduction', that includes for example, training masons for disaster resistant construction. The above types of initiative goes beyond the rehabilitation and resilience building of built infrastructure and traditional social infrastructure by themselves, since they also aim to accelerate balanced socio-economic-environmental development along appropriate pathways. Taken together, the climate change resilience and socio-economic capital building examples above, may also be linked to the nurturing of knowledge-bases and skill-sets with an over-arching culture of sustainability amidst adversity, hence resilience.

Way forward and Conclusion

A number of processes have started in Thailand in order to set up a legislative and institutional framework for disaster risk management based on a multi stakeholder approach. Those with a good potential to be utilized in promoting public private sector partnership for DRR and CCA include National Adaptation Platforms (NPs), the DDPM provincial action plan for DRR and the Strategic National Action Plans (SNAPs) of Thailand. The benefits and opportunities provided by collective or collaborative private sector initiatives need to be recognized and a dedicated institutional setup within the Government is crucial in this regard as it provides leaderships, focus and continuity to collaborative efforts between the public and private sector. Similar initiatives take place in other parts of the world. For instance, in the UK the element of private sector has been taken into consideration within the UK Climate Change Risk Assessment (UK CCRA) report that informs the national adaptation plans from 2017 onwards (see Http://www.theccc.org.uk). Private sector initiatives in DRM have received very high priority among the stakeholder engagement process for the UK CCRA. From an Asia-Pacific perspective Edo et al (2014) recommends that there should be an enabling environment to both the private sector and the PPP's to flourish. This enabling environment includes appropriate taxation incentives, appropriate legal and regulatory frameworks and methods and measures to involve SMEs within the private sector business category. The 4P framework with the social infrastructure element also proposes the private sector involvement at very early stages of PPP partnerships so that their importance and emphasis is made more prominent.

Business expertise and views need to be channelled into national and local disaster risk reduction frameworks and strategies as well as into regional DRR interventions such as ASEAN Agreement on Disaster Management and Emergency Response (ADMER). On side of the SMEs it is needed to set up an institution to gather and distribute DRR input, e.g. in form of a SMEs advisory group. On side of the government it is required to assist the relevant Ministries to liaise with companies on disaster risks reduction issues

Most SMEs think of DRR and CCA as a moral issue but the impact from climate change is a business issue. It is crucial to further build understanding of the climate change adaptation and disaster risk reduction concept among companies and to show them ways of getting engaged. The business case for PPPs for DRR needs to be disseminated. This would also

help organizations and institutions already working with the SMEs on community investment or disaster relief to expand their partnership. It is also required to increase the understanding of decision makers and the general public regarding the importance of corporate sector and SMEs involvement in CCA and DRR.

With the ongoing global debate on climate change adaptation, businesses are putting more attention on climate change adaptation and thus on climate change risks and vulnerabilities. This provides a unique opportunity to involve businesses including SMEs in DRR if a way is found to align corporate climate change adaptation efforts with broader DRR programmes.

As shown in this chapter, investing in DRR particularly by the private sector should be viewed as an initiative that adds value into their business as such it improves the image of the private sector business as well as its reputation among the competitors in the market. Edo et al (2014) explains this from the point of view of contributing to the HFA2 initiative with a few cases from the Asia Pacific region. ADPC in Thailand is also involved in an on going survey involving private sector business (see some of the results given earlier of the ADPC study (2014). On the one hand there needs to be a process of engagement between the different stakeholders that interact with the private sector businesses, which highlights the importance of public and private partnership approach or a supply chain resilience approach. On the other hand it should be well understood that partnership approaches are not self-propelled. Concerted efforts from policy makers such as both Central and local Government bodies and agencies are needed to ensure that private sector businesses are putting more attention on climate change adaptation and thus on climate change risks and vulnerabilities. It is important to seek more good practice examples of cases where private investment in DRR earns value both in the short and in the longer term.

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