

Background Paper prepared for the Global Assessment Report on
Disaster Risk Reduction 2013

**Policy, partnerships and land use planning interventions to reduce future
risks**

International Recovery Platform



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[2012]

I. Government policy can reduce future risks

Building back safer for future hazard events

Disasters often highlight weakness and errors in development that did not fully consider natural hazards (World Bank; United Nations, 2010). Disasters do provide an opportunity to build back safer, in part resulting from an attitude change from people and governments, due to the tragedy and the awareness that the danger posed by hazards can be reduced (Bhatia & Levers, 2011). Resilient recovery increasingly capitalizes on this attitude change to accelerate the mainstreaming of disaster risk reduction into development. In short, recovery offers the opportunity to get development right and correct the causes that turn hazards into disasters (Canterbury Earthquake Recovery Authority, 2012). This is not a new concept, but recent examples show a trend in the better understanding of this concept of learning for improvement. A comparison of the Haiti and Chile earthquakes demonstrates the magnitude of error in case the signals are ignored. In Japan the past land use planning is undergoing change based on the new information and experience from the tsunami of March 2011, while keeping in consideration the needs of the community for livelihoods options.

I. Recognizing the risk – Haitian and Chilean earthquakes

Comparisons of the 2010 Chilean and Haitian earthquakes show how changes to laws, regulation especially building codes during recovery, fifty years previously, reduced the risk towards future disasters. The magnitude 7.0 earthquake that struck Port-au-Prince, the capital of Haiti, on 12 January 2010 killed over 300,000 people. One month later, the death toll in Chile, due to the much larger 8.8 magnitude earthquake, was less than one thousand. Far fewer buildings collapsed in Chile as seismic building codes had been introduced following a devastating magnitude 9.5 earthquake in 1960 and had since been rigorously enforced. In Haiti, the last significant earthquake to hit the country was in 1842 and had long since been forgotten. Building regulations were non-existent and construction quality was very poor. Efforts to mitigate the impacts of natural hazards in Haiti had instead focused on hurricanes that happen more frequently than earthquakes (Institution of Civil Engineers, 2012).

II. Japan – Deciding on land re-structuring options

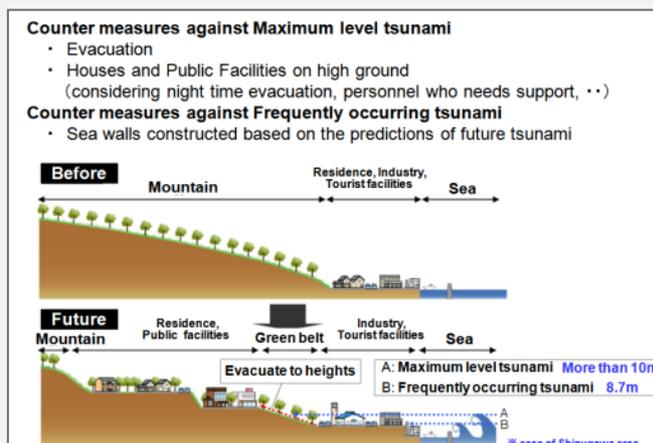
On March 2011, the Great East Japan Earthquake caused enormous damage. The government focused its recovery planning process at the national, prefectural, and municipal level.

The national government issued the Basic Act for Reconstruction and Basic Guidelines for Reconstruction, based on recommendations from the Reconstruction Design Council. The three disaster-affected prefectures developed their own recovery plans. Most of the disaster-affected municipalities developed their recovery plans based on the national and the prefectural recovery policies. The municipal recovery planning involves land use planning relocation of communities,

reconstruction projects, and consensus building among residents.

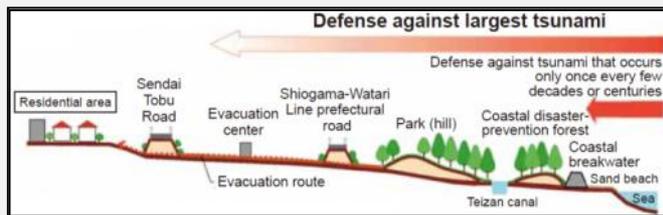
The different geographic and socio-economic contexts in the different municipalities led to different relocation solutions based on the national and prefectural guidance. Different contexts in different municipalities gave rise to innovative solutions on relocation. Yet, all rebuild residential housing in safer areas to protect residents from future tsunamis.

The basic solution to relocation in Ria coastal



area was to relocate people to higher land, where mountains are close enough to the original location. Residents want to live close to their original location and close to the fishing port, for the sake of their livelihoods. However, due to steep slopes, there was not enough land space available. In Minami-Sanriku, a policy of “separate relocation” was adopted with each village, moving to a small hillside space close to the original location. This means that houses and public facilities such as schools will be relocated to safe high ground. Where as tourist facilities, industry and fishing facilities are located near the coast for daytime or working hour usage. Evacuation towers and an early warning system allow for life safety when the next tsunami hits the coastal areas. The safe and unsafe areas are separated by a green belt, offering an additional environmental buffer. Residents’ community development associations facilitate the coordination of detailed relocation planning.

In the coastal part of Sendai, relocation follows the concept of ‘multifaceted protection’. The city government will restrict building houses in high-risk areas. High risk is defined by areas who altitude is within two meters of the maximum tsunami height. Complementing this restriction, the government promotes the relocation



of residents to the western part of the city, providing permission and incentives to develop new residential sites in these safe areas. In addition, the government will construct coastal breakwaters. These breakwaters include a coastal concrete breakwater, increasing the height of roads by using rubble and other debris created by the

2011 tsunami as well as environmental buffers such as forests and park areas. Evacuation centers and an early warning system allow for life safety when the next tsunami hits the coastal areas.

Strengthening existing laws and strategies for future resilience

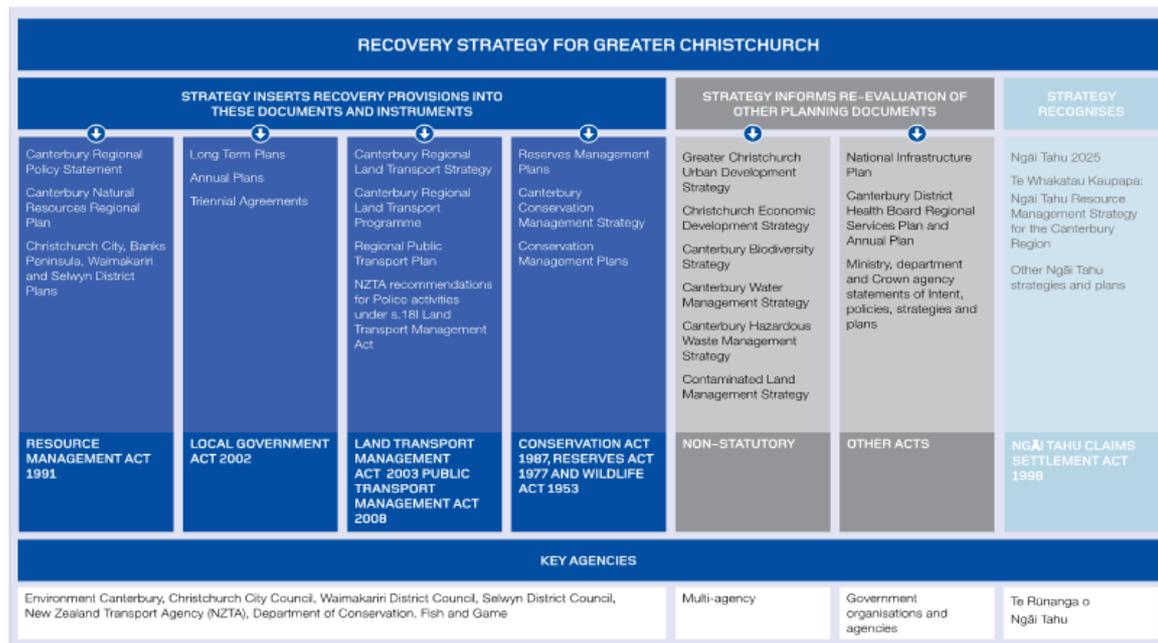
Ideally, recovery frameworks and strategies should focus on re-evaluating and strengthening existing laws, acts, and procedural arrangements. This allows the opportunity to address weaknesses in development processes and to reduce risk for future disasters (Asia Pacific Disaster Report, 2010). It also allows recovery to seize opportunities due to attitude changes in local government to make change a reality. Recovery planning can increasingly influence, reevaluate, or adapt key development laws, instruments, and planning processes, including land use, zoning and building code regulations.

Adapting and changing laws and regulations is an important step in creating an enabling environment to reduce risk from natural hazards. This is well demonstrated in the Christchurch recovery, in Florida and in Kobe Japan.

I. Christchurch – building resilience for future events through amendment of existing laws and regulations

A series of earthquakes starting in September 2010, especially the 22 February 2011 earthquake, caused significant damage to greater Christchurch, in Canterbury, New Zealand. The Canterbury Earthquake Recovery Authority (CERA) developed a recovery strategy for greater Christchurch. This recovery strategy was developed to reduce risk towards future earthquakes. The Recovery Strategy sets the overall direction for the rebuilding and recovery of greater Christchurch. It also inserts provisions necessary for recovery into specific planning documents and instruments, as shown in the following diagram.

The relationship between the Recovery Strategy and other strategies, policies and plans for greater Christchurch



22 RECOVERY STRATEGY FOR GREATER CHRISTCHURCH

Key: → Direct effect

Strategies that were developed before the earthquakes to guide planning and growth in greater Christchurch were re-evaluated in the light of recovery and risk reduction needs. The most significant of these was the Greater Christchurch Urban Development Strategy (UDS). The UDS is implemented primarily through a range of statutory planning processes—in particular, the Canterbury Regional Policy Statement, District Plans, Councils' Long Term Plans, and the Canterbury Regional Land Transport Program. As all of these are required to be consistent with the Recovery Strategy, the Strategy will also influence any re-evaluation of the UDS. Using the Canterbury Earthquake Recovery (CER) Act powers, the Minister for Canterbury Earthquake Recovery has fast-tracked changes to the Regional Policy Statement.

This has resulted in changes to land use patterns, with homes not being rebuilt in seismically dangerous zones. The government has instigated purchases of both land and houses in high risk zones and works with insurance companies to accelerate safe recovery (Canterbury Earthquake Recovery Authority, 2012).

II. Hurricane Andrew – changing and enforcing building codes (Puente, 2012)

Following the devastation caused by hurricane Andrew in 1992, Florida introduced a stricter building-code system that enforces building codes, prescribes training, and licensing for building officials and contractors. Recently, the Insurance Institute for Business & Home Safety ranked Florida in the first three for best building codes out of 18 hurricane-affected states. However, Douglas Buck, a Director at the Florida Home Builders Association warned: "Your code is only as good as your system to make sure you're compliant. Once you're compliant, you can ask if we need more codes" (Puente, 2012).

For full article, see <http://www.tampabay.com/news/article1230599.ece>

III. Great Hanshin Earthquake, Kobe, Japan, 1995 Topic: Construction Codes

The 1995 earthquake was the first test of building codes instituted in Japan in 1981. The structures built to this newer code performed well. Code changes enacted in the early 1980s prohibited the use of non-ductile reinforced concrete structures in favor of ductile reinforced concrete structures. These newer structures provided greater flexibility, allowing structures to withstand the strong ground shaking levels experienced in Kobe. The 1995 earthquake also illustrated several structural shortcomings which

Japan's central government and engineering community moved quickly to address, adopting several new laws and key code amendments in the first years after the earthquake. Design standards to prevent soft story failures were reviewed and revised. Moreover, the detailing, material strength, and hardware requirements, as well as the foundation and shear wall design for wooden buildings have also been significantly improved. To enhance overall construction quality, interim construction inspections are now required for all new buildings, in addition to the construction completion inspections that were enforced prior to 1998. Additionally, all pre-1981 buildings in public use must have a seismic evaluation and retrofits are required if needed.

Source: Risk Management Solutions. 2005. 1995 Kobe Earthquake 10-Year Retrospective. <http://www.rms.com/Publications/KobeRetro.pdf>

Balancing speed of recovery and reducing risk of future hazards

Few recovery frameworks include policy incentives to promote resilient recovery rather than mere reconstruction, whilst maintaining speed. Incentives include the purchase of land and houses in danger zones, land use restructuring, linking insurance with resilient infrastructure, and providing tax incentives for resilient businesses (Canterbury Earthquake Recovery Authority, 2012). Recovery frameworks can include special incentives, such as improved building codes, special arrangements to promote investment, employment in specific industries to speed recovery, deduction of income tax to increase spending power, or reducing tax to drive land restructuring or improve the enforcement of building codes.

Christchurch - Incentives for relocation and addressing insurance as a bottleneck

One of the innovative aspects of the recovery program included the decision to reduce exposure to future earthquake damage by re-locating people from the 'Red Zone' (high risk area) and offering attractive incentives in terms of house and land purchase. Over 300 million people live in urban seismic zones around the world which are just as high-risk as Christchurch but without the advantage of New Zealand's very high rate of insurance coverage of about 90% which includes earthquake insurance and, uniquely, also covers land damage.

In October 2011, the government divided the rebuilding zone into different categories offering a range of options for the repair and rebuilding of houses. Within a year, around 80 percent of the owners with a house in the Red Zone, the worst affected area, have taken one of the options offered by the government usually involving purchase of the land and building and a takeover of the insurance claim. The speed of processing the insurance claims created a bottleneck for residences to move to safer areas. Whereas, the government policy of working with residences and insurance companies and its option of taking over the claim facilitated the speed of relocation (Canterbury Earthquake Recovery Authority, 2012).

Aligning stakeholders for resilient recovery - enhancing partnerships

The first guiding principal of the recovery strategy for greater Christchurch is "Work together- No one agency will be able to achieve recovery alone" (Canterbury Earthquake Recovery Authority, 2012). Collaborative effort provides access to a wider range of resources.

Stakeholders use collaborative assessments and planning processes in more recoveries but challenges remain. Different contexts demand the involvement of different priority groups. This requires increased clarity for stakeholders of their roles, responsibilities, and opportunities.

Communities and government remain central to resilient recovery. But increasingly the role of professionals such as urban planners, engineers, and the link to insurance companies is more predictable

and their contributions to reducing risk clearer. This allows resilience to be built into recovery correcting vulnerabilities in previous development. In New Zealand, the recovery strategy highlighted insurance as a key area for collaboration and a bottleneck for recovery. Whereas in Japan, special measures focused on development of private sector facilities, agricultural and green energy sectors, as well as tax incentives for the promotion investment, employment and research for key industries and businesses.

The sharing of quality information allows stakeholders to make better decisions and collaborate better. The WB and UN paper, natural hazards and unnatural disasters first policy implication is *government can and should make information more easily accessible* (World Bank; United Nations, 2010). Available quality information allows a range of collaborators to make good decisions and commit resources for recovery. A key guiding principle of the Christchurch recovery is *Keep it simple -Communication must be clear and stick to the facts. It must give landowners, residents and businesses the information needed* (Canterbury Earthquake Recovery Authority, 2012).

I. Canterbury recovery strategy – guiding principles of involvement and communication

Three of nine guiding principals in Canterbury recovery strategy highlight the importance of multi-stakeholder involvement, these are

- 1. Work together** - Recovery is a collaborative effort. It is essential to have constructive relationships between the private sector, NGOs, local and central government agencies, and the wider community.
- 2. Keep it simple** - Communication must be clear and stick to the facts. It must give landowners, residents and businesses the information they need.
- 3. Use the best available information** - A wide range of information, including spatial information, will be collected and shared. This information will help decision-making, improve transparency, promote best practices, and enable the public to participate in the recovery effectively.

Canterbury recovery strategy, New Zealand – involving the public

The Christchurch Earthquake Recovery Authority prioritized community and stakeholder engagement and consultation as an important part of the process to develop the recovery Strategy. In June and July 2011, eight community workshops were held to gather input to inform the development of the draft recovery strategy. In September and October 2011, written commentary was sought for the draft strategy to inform the final strategy. Four hundred and sixty three written comments were received over a seven-week period and available online. Comments received informed the development of recovery programs.

A comment summary and analysis report was prepared to transparently communicate the results of public engagement on the draft Recovery Strategy. Respondents showed general support for the vision and principles and variable support for the goals proposed in the draft Recovery Strategy. Some asked for strong leadership, better communication, a greater emphasis on the natural environment and opportunities to stay involved in the recovery. Insurance issues and the need to quickly attract investment were underlined as important along with a priority on community wellbeing and sport and recreational opportunities (Canterbury Earthquake Recovery Authority, 2012).

(For further information, see the Canterbury Earthquake recovery strategy on www.cdn.cera.govt.nz)

II. Santa Tecla, El Salvador: A Risk-Sensitive City Development Plan

Santa Tecla is part of the metropolitan area of El Salvador's capital, San Salvador. "Santa Tecla, suffered two earthquakes in 2001. In just five seconds, a mudslide caused more than 700 deaths, displaced 20% of the city, and badly damaged 38% of the infrastructure. Real estate prices plummeted. We had to think deeply about what we could do," says Oscar Ortiz, the Mayor. "In order to turn our city around and make it disaster resilient, we realized we needed to stop improvising when disaster strikes and start planning ahead. We need to manage our land in a responsible and sustainable manner. We developed a ten-year plan to redevelop the city and now have a longer-term plan for a sustainable future through

2020. Citizens need to understand the significance of what we are doing or very little change will take place. We try to do this by encouraging participation in ‘Mesas de Ciudadanos’ (citizens groups), which bring a wide cross section of different stakeholder organisations together in periodic discussions and decision making. They soon come to understand that these are issues and decisions that concern their livelihood, their children, their schools and their productivity.” (Source: Interview with Mayor Oscar Ortiz, February 2011, UNISDR) For more information: <http://www.santatecladigital.gob.sv/> Click on: Gestión de Riesgos 13.11 (in Spanish).

III. Great Hanshin Earthquake, Kobe, Japan, 1995 - Community-level planning

The earthquake destroyed thousands of housing units in the city of Kobe. Japan instituted a top-down, government-led, reconstruction planning and implementation process. The municipal and regional governments applied the lessons of previous reconstruction efforts, such as the land readjustment and urban redevelopment used extensively after World War II. The recovery plan did not anticipate a large increase in urbanization caused by various direct and indirect factors (including economic recession and a search for housing), or the fact that complex ownership patterns - compounded by land readjustment processes and lack of private resources – would fuel an on-going, reactive, housing policy. Because the government’s policies and programs for private housing reconstruction tended to favor full reconstruction and repair funding was more limited, demolitions and full-scale reconstructions were unintentionally encouraged. In spite of all of this, the government was able to maintain the continuity of neighborhoods, and to return a sense of community where it had been weakened or lost in the years following the earthquake, by ensuring that government funded planners were aware of and gave due consideration to community-level concerns. Despite that this was a government-led recovery effort; stakeholder consensus on recovery plans was garnered through negotiation with neighborhood groups as conducted by government-funded planners. Japan used the lessons of previous development and reconstruction efforts, such as land readjustment and urban redevelopment used extensively in previous decades to modernize land ownership patterns and facilitate WWII rebuilding. Complex ownership patterns, compounded by land readjustment processes and lack of private resources, fueled an on-going, reactive, housing policy (particularly for cooperative housing and condominium projects). The government’s policies and programs for private housing reconstruction tended to favor full reconstruction and there was a more limited amount of funds for repairs, which encouraged demolitions and full-scale reconstructions. Government-funded planners and the neighborhood-level planning processes have been critical in maintaining neighborhood continuity throughout the reconstruction period.

Of particular note about these policies, however, was the unintended consequence they had in terms of relegating the more vulnerable groups to suburban districts. The logic that "the weak such as the aged and the disabled should be given relief as soon as possible," which seemed to be advantageous in light of the catastrophe the population was facing, caused a disjoint between members of the same communities, and the same extended families. Priority was placed providing the vulnerable groups with immediate temporary housing constructed in expansive suburban subdivisions, often on manmade islands. Meanwhile, the stronger, and relatively younger, populations remained in the inner city area given that they were unable to leave their livelihoods. The social structures of medicine, support, communication, and other factors were destroyed by this policy, and the more vulnerable were isolated. Greater role of community in the recovery planning may have reduced the impacts of such measures.

Sources: Johnson, Laurie. 2000. Kobe and Northridge Reconstruction: A Look at Outcomes of Varying Public and Private Reconstruction Financing Models. Euro Conference on Global Change and Catastrophic Risk Management. Austria.

http://www.iiasa.ac.at/Research/RMS/july2000/Papers/johnson_housing0401.pdf

Risk Management Solutions. 2005. 1995 Kobe Earthquake 10-Year Retrospective. <http://www.rms.com/Publications/KobeRetro.pdf>

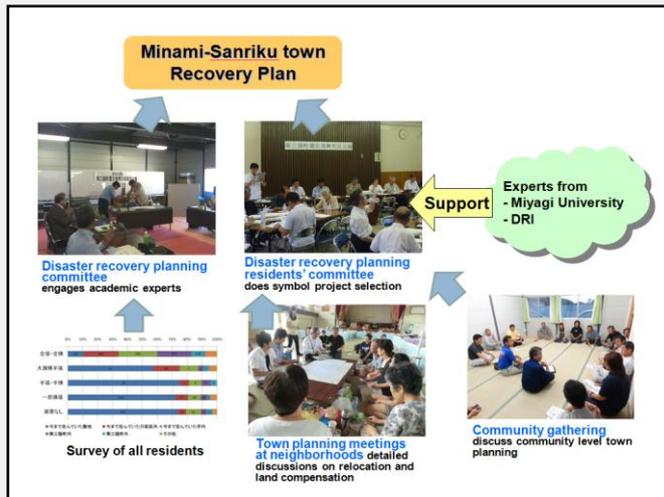
Source: Shiozaki, Yoshimitsu, Eiichi Nishikawa, Toshikazu Deguchi, eds. 2005. Lessons from the Great

Hanshin Earthquake. Hyogo Research Center for Quake Restoration; Kobe, Japan.

IV. Great East Japan Earthquake and tsunami – improved community level planning

Learning from the Great Hanshin-Awaji (Kobe) Earthquake of 1995, the government prioritized involvement of communities in the planning process.

Almost all municipalities involved communities in the planning process from the initial stage. Recovery planning committees include experts and representatives of residents developed recovery plans. To further include residents' opinions, surveys and workshops were conducted. In Minami-Sanriku of Miyagi Prefecture, a "Resident's Committee" played the key role in proposing "symbolic projects" that were integrated into the municipal reconstruction plan. Local universities supported residents' activities.



Similarly in Ofunato of Iwate prefecture, "residents' workshops" and "students' reconstruction meetings" were held involving more than 3,000 residents in the planning process. In Sendai, the largest city in the Tohoku region, the mayor herself actively visited the residents' workshops and talked directly with the victims. About 80 workshops were held to share information between residents and the city government, and more than 2,000 comments on the draft recovery plan were submitted by residents, to be reflected in the plan as much as possible.

The central government and other local governments outside of the disaster affected area supported the effort of the municipalities in formulating their recovery plan by conducting necessary research and by dispatching their staff and/or professionals from the private sector with the expertise necessary to provide technical support. Experts such as university faculty members, architects, engineers, lawyers, and members of NGOs have actively and voluntarily participated in the municipal planning process. Their roles include providing technical support and advice to residents based on their fields of expertise.

II. Influencing markets through land use planning can reduce risks

Understanding risk sensitive land use planning

A 2010 report Natural Hazards, UnNatural disasters states that "a disaster exposes the cumulative implications of many earlier decisions, some taken individually, others collectively, a few by default. A deeper questioning of what happened and why, could prevent a repetition of disasters" (United Nations; World Bank; 2010). Applying and enforcing realistic, risk-compliant building regulations and land use planning principles does reduce risk, save lives and money (ISDR, 2012). In recovery, understanding why land use planning contributed to increasing risk or was limited in reducing risk is important in preventing a repetition of disasters to hazard events.

Disasters often expose why natural hazards cause destruction. One key reason, especially in urban environment, is non-risk sensitive land use planning. As cities expand, flood plains are concreted over; ground water extracted and homes built in high-risk areas. Both social and economic forces in fast growing urban settlements contribute to the increasing risk. It is often the case that the most desired

land is also the most risky. For instance, the slopes of volcanoes and floodplains adjacent to rivers offer fertile soil. Coastal shores are desired for aesthetic and tourism benefits as well as access to fishing. Other times, inappropriate use of land is a matter of lack of awareness of risk, poverty, or urbanization. Construction near or above seismic faults may exist for decades or even centuries before the existence of the fault is known or remembered, such as in Haiti. Whereas informal settlements along flood prone rivers or unstable urban hillsides, are likely to be the result of poverty and lack of viable options for the poor (IRP, 2010)

The tragic effect of disasters can highlight the reality of risk for people and officials. This can change people and officials attitudes toward risk, albeit over-emphasizing the recent hazard. This change in attitudes can provide an opportunity for recovery, to identify and correct errors of the past and investments to be more resilient (Asia Pacific Disaster Report, 2010). In a few cases, Governments have taken leadership to work with people in re-evaluating land use plans. Successful cases involve reevaluation of existing plans and strategies with a greater focus risk. This review and the resulting changes to land use plans and actions contribute to reducing the risk to people of future hazard events. Emerging key components of these, reviews include

- Using existing plans – such as regional strategies, urban plans
- Working together – with government, private sector and civil society
- Sharing available and reliable information – for informed decision making
- Addressing economic concerns –with market forces including informal settlements

Without this review of existing plans or without sufficient information on the nature of risks errors of the past will remain. Homes and businesses will be rebuilt in flood or earthquake prone areas or people from informal settlements will return to cheap marginalized land. As cities continue to expand, the risk will continue to multiply.

Key elements of risk sensitive land use planning

- Incorporate disaster risk reduction and climate change impacts into the urban land use plan and regulations, based on the city risk assessment. Land use planning must incorporate peripheral land around urban developments and the wider rural environment.
- Use plans to prevent/control development in extreme-risk areas and to mitigate risk in existing developments; prescribe restrictions on building type, use, occupancy, and density in high-risk areas.

Integrated Climate Change and Flood Management Plan, Pune City, India

The city of Pune in Maharashtra State, India, has a population of nearly 5 million people and is located at the confluence of three rivers, the Mutha, Mula and Pavana. Pune city has been affected by severe periodic flooding for decades. Anticipating that the impact of climate change may increase the frequency of events, the city has put programs in place to build capacity, assess hazards and vulnerability, and implement a city-wide action plan, which contains structural and planning measures for restoring natural drainage, widening streams, extending bridges and applying natural soil infiltration methodologies. Watershed conservation techniques, such as afforestation and building small earthen check dams, were undertaken in the hill zone. Property tax incentives were provided to encourage households to recycle wastewater or to store run-off rainwater for domestic use. These efforts were complemented by improvements in flood monitoring and warning systems and social protection for affected families. The initiative was driven jointly by the elected municipal government, the municipal commissioner and Alert (active citizen groups), and involves many different city departments.

For more information consult Briefing Note 02: Adaptation to climate change by reducing disaster risks: Country practices and lessons (UNISDR 2010) at <http://tinyurl.com/6nmww8t>.

Recovery often instigates a change in attitudes that provides people and government the opportunity to re-evaluate risk. Risk sensitive land use planning is a key tool for people and institutions to reevaluate risk with and take preventative measures. Prevention is cost effective. Prevention pays, but one does not always have to pay for prevention (United Nations; World Bank;, 2010). A few recovery experiences show that cheap and effective measures can make a significant difference to making risk sensitive land use plans work: -

1. Government can and should make information more easily accessible
2. Government should permit land and housing markets to work.
3. Government should ensure that policies balance the risk sharing burden

First, governments can and should make information more easily accessible. People and businesses are often guided in their prevention decisions by the information they have on hazards and risks. After a disaster, people are more motivated in accessing risk information to make key decisions. Yet, the seemingly simple act of collecting and providing information is sometimes a struggle. For example, the Federal Emergency Management Agency (FEMA) in the United States has updated coastal flood maps for the U.S. Gulf, but it cannot get coastal communities to accept them because the information would reduce property prices. This is often the result of vested economic interests. Making maps of flood plains and seismic fault lines easily accessible would make developers and property owners more aware of the risks—and more motivated to build appropriately (United Nations; World Bank;, 2010). The increased emphasis on risk after a disaster provides the political capital to make key information available. The example of Bangkok city after the 2011 floods demonstrates the possibilities in risk reduction by private actors, once accurate information is available.

Second, governments should permit land and housing markets to work, supplementing them with targeted interventions when necessary. When land and housing markets work, property values reflect hazard risks, guiding people's decisions on where to live and what prevention measures to take. After a disaster, increased perception of risk and reevaluation of risk sensitive land use plans can focus political capital on policy changes that allow the markets to work. Often, the poor withstand the worst of the cumulative effects of such policies (tax structure, city financing arrangements, and so on) that produce only a limited and unresponsive supply of affordable, legal land sites for safer housing. In some cases, security of property (clear land titles) allows people to invest in prevention measures.

Similarly, risk sharing mechanisms like business and household insurance not only play a part in sharing the burden of recovery after a disaster but premiums can play a significant role in house and rent prices. Insurance invariably draws in the government as regulator, as provider (in many countries), or as reinsurer. Insurance has been introduced as a policy in a few cases after a disaster, such as in Turkey after 1999. Insurance when linked with risk reduction measures can provide financial incentives to reduce risk as well as providing resilience as a risk sharing mechanism.

Insuring Private Assets

The establishment of the Turkish Catastrophe Insurance Pool (TCIP) helped the Government of Turkey reduce its contingent liability by promoting domestic property catastrophe insurance for private dwellings (see Box). Making it possible for homeowners to purchase insurance, the Government of Turkey has increased the number of citizens who would be compensated by the private sector in case of an earthquake. In addition, by making insurance compulsory for middle- and high-income urban households, the Government of Turkey has significantly reduced the number of homeowners likely to require financial assistance after a disaster.

The provision of property catastrophe insurance requires both technical capacity (in product design, rating and loss adjustment) and financial capacity (as catastrophe insurance is highly capital intensive), as well as a strong regulatory framework. Therefore, these market-based solutions can be considered only when the domestic non-life insurance market is relatively well developed. The development of

catastrophe insurance markets will thus require dedicated efforts from developing country governments to promote the use of insurance but also to ensure appropriate regulation and controls.

The Turkish Catastrophe Insurance Program

The Turkish Catastrophe Insurance Pool, TCIP, was established in the aftermath of the Marmara earthquake in 2000, with assistance from the World Bank. Traditionally, Turkey's private insurance market was unable to provide adequate capacity for catastrophe property insurance against earthquake risk, and the Government of Turkey faced major financial exposure in the post-disaster reconstruction of private property. Consequently, the Government of Turkey's objectives for TCIP were to:

- Ensure that all property tax-paying dwellings have earthquake insurance cover;
- Reduce government fiscal exposure to the impact of earthquakes;
- Transfer catastrophe risk to the international reinsurance market;
- Encourage physical risk mitigation through insurance.

TCIP was established in 2000 as a public sector insurance company, managed on sound technical and commercial insurance principles. The company's initial capital was supplemented by a World Bank contingent loan. TCIP purchases commercial reinsurance and the Government of Turkey acts as a catastrophe reinsurer of last resort for claims arising out of an earthquake with a return period of greater than 300 years.

The TCIP Policy was designed as a stand-alone property earthquake policy with a maximum sum insured per policy of US\$65,000 and an average yearly premium of US\$46 and a 2% deductible. Premium rates are based on the construction type (two types are possible) and property location (five earthquake risk zones were identified) and vary from less than 0.05% for a concrete reinforced house in a low risk zone to 0.60% for a house located in the highest risk zone.

The policy is distributed by about thirty existing Turkish insurance companies, which receive a commission. The government invested heavily in insurance awareness campaigns and made earthquake insurance compulsory for home-owners on registered land in urban areas. Cover is voluntary for homeowners in rural areas.

The program is reinsured by international reinsurers. Since its inception in 2000, TCIP has achieved an average penetration rate of about 20% of domestic dwellings (about three million dwellings). Romania is about to study the possibility of establishing a similar pool for earthquakes and floods.

Insuring Public Assets

If insurance is expensive compared to other risk financing instruments, one may ask why some governments insist on insuring their public assets or promoting private sector insurance? It should be noted that, in both developed and developing countries, public programs are often self-insured, and governments are in fact transferring only limited amounts to the private markets. Private-public partnerships can sometimes be put in place to facilitate efficient management of risk born by public assets. The work done by the *Instituto Nacional de Seguros* (INS) in Costa Rica, with the assistance of the World Bank, is a good example of how such programs can be established to provide for more efficient coverage of public sector risk (see Box).

Insuring Public Assets in Costa Rica

A clear benefit of insurance is that it allows for risk to be structured and allocated efficiently. As such, numerous governments require managers of public assets to buy insurance for the assets under their purview. In Costa Rica, the World Bank has been working with the public insurance company (INS) to design a dedicated vehicle to insure public assets at lower cost than currently available. The proposed vehicle allows for the Government of Costa Rica to retain most of the risk while transferring only excess losses to international financial markets. By retaining the lower risk layers through reserves, complemented by a simple guarantee or through a contingent line of credit, the Costa Rican

Government takes a calculated and limited risk while ceding the part of the exposure that it is not willing to assume. Preliminary analyses show that the proposed vehicle would improve coverage with a net savings of at least US\$5 million every year.

However, an inappropriate premium has adverse effects that are difficult to rectify later: too low a premium encourages construction in hazard-prone areas (for example vacation homes in Florida). Similarly as with the 2012 forest fires in the USA often the government can increase risk by allowing taxpayers to foot the bill to protect private houses from forest fires. "The fact that the bill for protecting private homes is borne by taxpayers at large removes the incentives for landowners ... to take responsibility for their own protection and ensure homes are constructed and landscaped in ways that reduce wildfire risks," reported the Office of Inspector General U.S. Department of Agriculture.

Making information available, from the Mapping out where to live and build, The Bangkok post

When the great flood of 2011 ravaged many districts of Bangkok, those affected realized they had failed to do one important thing when they built or bought their properties - to check city plans for flood zones. Therefore, it is not surprising to see long queues of people at City Hall's public works offices seeking land zoning information and other data as they plan for future property developments.

The Bangkok Metropolitan Administration (BMA) City Planning Department has drawn up a 3D city planning map highlighting traffic routes, infrastructure and risk areas for potential property owners and developers. A digital 3D image shows Bangkok's downtown area, a part of City Hall's digital city plan map that is now available online. "This application is very important because in the past we have not had the technology to help the general public make decisions that factor in ground-level data to prevent flooding," BMA deputy governor Vallop Suwandeew said. "The floods that hit the capital last year have raised public concerns about choosing a [building] location by adding the ground level to the equation." (The Bangkok Post, 2012)

For full article see <http://www.preventionweb.net/english/professional/news/v.php?id=27456&a=email>

Investing in and maintaining plans

There is a need to monitor, maintain, and enforce a risk sensitive land use plan. Disasters can highlight the need to have right service and infrastructure. Often maintenance is ignored. This leads to vulnerable or poorly functioning prevention measures. For prevention measures to be effective canals, rivers and lakes need to be dredged, storm-water drains cleared of blockage and early warning and evacuation measures maintained.

In addition, re-evaluating risk sensitive land use planning can highlight the financial benefit of investing or protecting environmental buffers and enforcement issues in protecting parts of the land use master plan. Environmental buffers offer protection from hazards within physical limitations. Protecting the environment is cheaper than restoring it, but knowing what to protect is hard because development involves change, and many changes are unforeseeable (United Nations; World Bank; 2010). Indeed investing in mangroves or maintaining flood plains is normally cheaper than building dams and dykes. Post disaster recovery has initiated a few good examples such as the re-planting of mangroves for financial benefit and coastal protection in Viet Nam, Philippines and eco tourism in Thailand.

I. Developing eco-tourism in post-tsunami Thailand

The waves had a very serious impact on Thailand's natural environment, with coastal national parks severely damaged, coral reefs destroyed by backwash debris and agricultural land affected by salt-water intrusion. UNDP Thailand immediately initiated a coral reef cleanup programme run completely by a volunteer network. To date, 17 reef areas important to fishing and tourism have been cleared of debris and rehabilitated. Underwater reef trails, signboards, floating fences and mooring buoys have been established in protected areas. On Lanta Island, ecotourism initiatives are underway with nature trails being cut through the jungle, an ecology centre is planned, and a campaign is in the works to promote sustainable tourism and fishing practices in student summer camps.

Developing Lanta Island into an environmentally and economically sustainable tourism destination is part of the strategic development plan of district leaders. Part of southern Thailand, an internationally acclaimed tourist destination, the initiative strives to cultivate the cultural heritage and natural beauty of Lanta Island while providing economic growth through sustainable tourism. "Although the tsunami wreaked much devastation upon our island, it was also a kind of a springboard for the people of Lanta to see that we have to be unified in order to solve our problems and plan for the future,...This development plan that we have devised based on nature and cultural heritage will eventually be designed for the entire island, and will hopefully one day be used at the district level."

Source: Indigenous Livelihood Restoration and Sustainable Ecology for Lanta Island, Retrieved from <http://www.undp.or.th/resources/download/Lanta.pdf>

Survivors of the tsunami: One year later, Retrieved from [http://www.cs.pitt.edu/s-citi/tsunami/workshop1/UNDP%20 %20Survivors%20of%20the%20Tsunami.pdf](http://www.cs.pitt.edu/s-citi/tsunami/workshop1/UNDP%20%20Survivors%20of%20the%20Tsunami.pdf)

II. Reforestation to protect ecosystems and reduce disaster risk in the Philippines

Through a partnership between the Toyota Motor Company, Conservation International, the Philippine Department of Environment and Natural Resources, and Local Government Unit of Peñablanca, 2,500-hectares of formally barren mountainside is now dotted with more than 18,000 mango trees and 680,000 other indigenous forest trees. 22,000 more mango trees are scheduled to be planted and the project aims to expand the growth of rambutan, pomelo, langka (jack fruit), cacao and other trees endemic to the area.

The project has three objectives: Reducing risk of landslides and flooding; providing sustainable economic opportunities for local communities; and rehabilitating the forest ecosystem.

To discourage people from cutting trees for firewood, project members have educated and encouraged communities to plant fast-growing ipil ipil trees in designated areas for firewood. Toyota and Conservation International will also provide rice-hull stoves for 900 families in the area. Livestock has also been restricted from grazing in the area to give vegetation ample time to regenerate.

Although too early to tell, there have been reports from local forest rangers and conservationists that the area experienced less soil runoff and reduced flooding when hit for several days by Typhoon Pepang in October, 2009.

Source: Conservation International, accessed at

http://www.conservation.org/sites/celb/news/Pages/01292010_Toyota_Philippines_Project.aspx

Philippine Daily Inquirer, accessed at

http://services.inquirer.net/print/print.php?article_id=20091102-233517

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