ISAP 2011 Building Resilient Societies Plenary Session:

Discussion Paper

The purpose of this early draft of the discussion paper is to frame the discussions that will take place in the Resilient Societies Plenary Session. The discussions will later be reflected in this paper and IGES will publish it as one of the outputs of ISAP 2011.

This discussion paper begins by looking at the only international agreement on disaster risk reduction, the Hyogo Framework for Action, and considers the review of progress made on this agreement in light of the current situation facing Japan – the so-called East Japan Great Earthquake/Tsunami (EJGET). In the discussion the question is raised as to what is a resilient society – in particular in the context of modern development and technological advances. Cases are given drawing on recent fieldwork carried out in the areas most severely affected by the triple disaster in Japan (tsunami, earthquake, nuclear) which provides a backdrop for the deeper discussion on building resilience to extreme events and making resilience a part of the recovery and rebuilding process.

1. The need to invest more in building disaster resilient societies

Globally, the frequency and magnitude of catastrophic disasters is projected to increase. The series of disasters in eastern Japan that the nation is now grappling with highlight the need and urgency for greater attention towards building disaster resilience through national and sub-national policy and planning.

Just a few weeks after the 2004 Indian Ocean tsunami the World Conference on Disaster Reduction was held in Hyogo, Japan. The main output from that meeting was the *Hyogo Framework for Action 2005-2015: Building Resilience of Nations and Communities to Disasters*, a comprehensive and systematic guidance document to strategically reduce disaster losses which was endorsed by 168 member states in 2005. The Hyogo Framework for Action (HFA) builds on a previous document, the Yokohama Strategy, and was the first document of its type to be developed and agreed upon internationally on disaster risk reduction. With the expected outcome

of "the substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries"[i] the HFA outlines five priorities for action:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors.
5. Strengthen disaster preparedness for effective response at all levels.

The 2009-2011 HFA progress review shows increasing attention to risk identification, preparedness, and monitoring; in addition the HFA and associated processes have contributed to creating a common language and understanding of the key components of disaster risk management.[ii] However, across income levels and regions achievements have been much slower or even regressing in addressing the underlying risk drivers, developing governance structures and institutions, and in using education and knowledge to build a culture of resilience. The result is an impaired ability to prepare for and respond to disasters, often as a result of disaster risk management being spread across multiple ministries or located in institutions with little resources or power to influence change to address extensive and intensive disasters.

Extensive risk develops through mainly localized but frequently occurring disasters spread across a country or region and are often related to climate variability such as flooding in Bangladesh.[iii] In the case that a particular area is subject to infrequent but highly destructive disasters with relatively greatly lose of human life, the intensive risk of the area is said to be high (Ibid.). The Haiti earthquake in 2010 which resulted in almost 500,000 casualties and 1.2 million displaced persons,[iv] and the triple disaster in Japan which resulted in almost 25,000 dead or missing and over 100,000 displaced persons[v] are recent examples of intensive disasters.

Natural disasters can be classified as biological, geophysical, hydrological, meteorological and climatological. There is potential for the human toll and economic costs of all of these to increase. Due to climate change, some areas are likely to become more vulnerable to biological disasters, such as insect infestation. The series of disasters in eastern Japan and the recent series of earthquakes in

Christchurch, New Zealand remind us that developed countries are not immune to geophysical events such as earthquakes and volcanic eruptions, though deaths are likely to be greatest in countries experiencing rapid, unplanned urbanization, such as Haiti,[vi] where 222,570 deaths were reported from the January 12th 2010 earthquake.[vii] Hydrological disasters such as flooding are projected to increase in some areas because of climate change, but experiences in China, the Philippines and other countries of the region show that environmental degradation, e.g. reduced forest cover in upper catchments, also contributes to the frequency and scale of these disasters. The summer heat wave in Russia in 2010 responsible for wildfires that destroyed a third of the wheat crop and that caused up to 56,000 deaths[viii] was an example of an *abnormal weather event*, many of which have been reported from around the globe in recent years. These provide signals of the increasing frequency and severity of meteorological disasters (storms) and climatological disasters (extreme temperature, drought and wildfire) that are projected due to climate change.

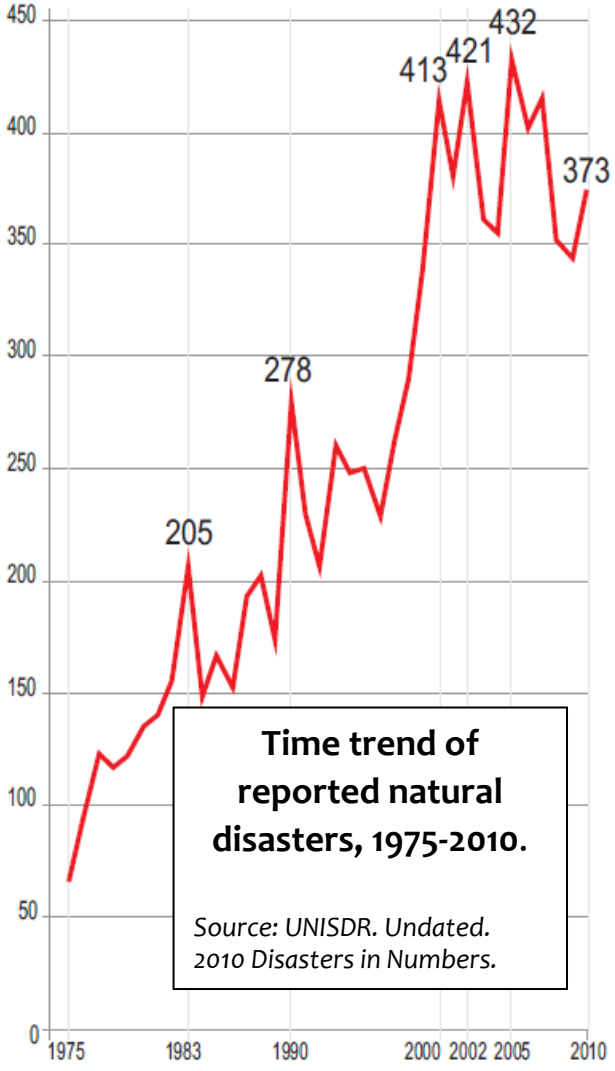
Due to better preparedness and recovery planning made possible in part by economic growth, over the past 40 years mortality risk from natural hazards has been decreasing; however economic growth has not resulted in lowered economic loss from natural hazards.[ix] From the 1970s to 2008 while the number of fatalities from disasters significantly decreased, world economic losses due to natural disasters has been steadily – and often times sharply- rising.[x] However these losses only account for the direct physical impacts of disasters – the long term affects on the local economy in a case such as the recent disasters in Japan could result in significant impacts on Japan's economic outlook in addition to their energy future – and that of other countries which have included nuclear energy as a major part of their energy mix. In terms of extensive disasters the impacts have been greater in lower income countries and those with governance issues, but as the recent incidents in Japan shows new vulnerabilities can arise as a result of the complexities and interdependencies created in technologically advanced, modern, higher-income countries if resilience is not reassessed in terms of the new development context. Without suitable governance and institutional arrangements risk can actually be constructed rather than mitigated through development, regardless of the size of the economy or system of government.

The interconnectedness of development, technology, and disaster risk raises questions as to the resilience and vulnerability of societies – not just developing

societies, as has been the primary focus of discussions on these two factors, but also the resilience and vulnerability of modern "developed" societies in the face of intensive risk, partly as a result of technology and infrastructure development, and increasing extensive disasters due in part to climate change, the so called "emerging risks".

Globally, the number of natural disasters and their costs are increasing

The EJGET is set against a backdrop of upwards trends in the number of global disasters reported and the costs of their impacts. As reported on the International Disaster Database EM-DAT, which is maintained by the Centre for Research on the Epidemiology of Disasters (CRED), 2010 was the deadliest year in at least two decades for natural disasters. CRED reports that in 2010 some 385 natural disasters killed more than 297,000 people worldwide, affected more than 217 million others and caused damages to the tune of US$124 billion.[xi] Asia is particularly vulnerable. From 2000-2009, almost 85% of global deaths from natural disasters occurred in the region.[xii] These upward trends are set to continue due to *unplanned urbanization*, *environmental degradation* and *climate change*.



Time trend of reported natural disasters, 1975-2010.

Source: UNISDR. Undated. 2010 Disasters in Numbers.

What is a disaster resilient society?

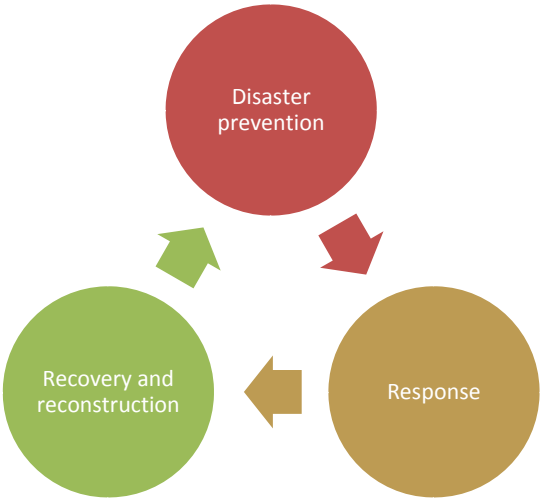
Until the EJGET, Japan was presented as an example of a resilient nation, well advanced in mitigating and bouncing back from natural disasters. The magnitude of the EJGET, however, was not planned for. With a large population, much of whom resides on the coastal plains and fringes, a modern economy in which production

chains are spread across the country (and globally), and with a centralised domestic energy system, Japan found itself vulnerable to this catastrophic event. Already, central and local governments are discussing a range of practical solutions, but these specific solutions need to be underpinned by a shared vision of what a disaster resilient society looks like, and a set of principles for building disaster resilience into the recovery process.

As Brenton Prosser and Colin Peters point out, it can be difficult gaining agreement amongst policy makers on what resilience actually means.[xiii] Nevertheless, there appears to be enough common ground to build policy.[xiv]

Put simply, a disaster resilient community can be defined as "the safest possible community that we have the knowledge to design and build in a natural hazard context"[xv] "minimizing its vulnerability by maximizing the application of disaster risk reduction measures". [xvi] The expressions "safest" and "minimizing its vulnerability" are important. We cannot complete insulate our communities from natural disasters. We cannot conquer the more powerful forces of nature, and indeed this has been a painful lesson from the EJGET.

In terms of the disaster management cycle, which consists of disaster prevention (mitigation and preparedness), response, and recovery and reconstruction, a disaster resilient society is one that "mitigates and prepares for the possibility of natural disasters, is able to deliver quick and effective emergency assistance to victims, and is capable of a smooth transition to implementation of recovery and reconstruction."[xvii]



There are several concepts that are useful for understanding disaster resilience. First is the notion that resilience consists of a number of elements: Robustness – inherent strength, resistance; Redundancy – system properties that allow for alternative options, choices, substitutions; Resourcefulness – capacity to mobilise resources; and Rapidity – speed with which disruption can be overcome and

services, income, etc. restored.[xviii]

Second is the notion of "resilience domains". These are: Technical – physical systems – location based and distributed critical facilities; Organization – attributes, dynamics of organizations and institutions; Social – attributes, dynamics of communities and populations; and Economic – attributes, dynamics of organizations and institutions.[xix] In Japan, perhaps too much emphasis and confidence has been placed on the technical domain, i.e. engineering feats designed to protect communities and infrastructure from natural hazards, and too little on organizational, social and economic domains.

The concepts *of levels and scope of preparedness* are also important. The literature on disaster resilient *communities* focuses on the local level, and discusses the broader context for community resilience in terms of "enabling conditions". However, in a highly integrated economy, such as Japan, the EJGET teaches us that resilience requires the state to provide more than just enabling conditions for local, community-level resilience. Disaster resilience at the national level requires a whole-of-government approach that builds disaster resilience into the national economy. The EJGET has taught us that in Japan even energy policy must be considered in the design of national disaster mitigation strategies.

Facing once in hundreds of years natural disaster, the society which can minimize the damage and return normal as soon as possible, is sustainable. Above all, building resilient society means nothing more or less than establishing sustainable society.

Principles for building disaster resilient society

In his reflection on the series of disasters in eastern Japan, Professor Ryokichi Hirono proposes a set of principles relevant to building disaster resilience in Japan using the concept of the 4H's (Horizon, Head, Hands, Hearts).[xxii]

He discusses *horizon* as the need for "national and local visions of long-term development of all regions of the country", with a particular emphasis on areas previously affected by catastrophic disasters. Here, a scenario approach to natural and man-made disaster prevention and impact minimization that lays out cost-effective alternatives would be useful.

Heads, he explains, refers to:

> Immediate and early drafting by local governments on the basis of the closest consultation among the people in the [disaster affected areas], with assistance and support of central government, of immediate, short-,medium- and long-term measures to be taken by individuals, communities and all the other stakeholders, to prevent and minimize the adverse impact of all disasters, all of which requires the following: i) strong political leadership at the top, ii) transparency of public information and accountability of local and central governments to all stakeholders, iii) closest possible cooperation and collaboration among all stakeholders; iv) clear definition of the responsibilities of all stakeholders, particularly the roles of local and national governments, v) cross-sectoral coordination and integration among sectors and government ministries and departments, e.g. agriculture, fishery, forestry, manufacturing, power, transportation , communication, finance, services, housing, health, education, welfare, security and armed forces, etc.[xxii]

Hands, Professor Hirono explains, is about mobilising all traditional and recent knowledge and experiences, as well as generating new knowledge, through public participation and expert analysis to prevent and mitigate both natural and man-made disasters.

Hearts is about:

> Involving all stakeholders in the decision-making processes related to disaster prevention and impact minimization through: i) basic education at school and in communities, ii) practical skill training and exercises at all levels, c) inculcating of the sense of ownership and participation among all citizens in local communities.[xxii]

Although Professor Hirono's discussion is specific to Japan, many of the principles are generic and have broad application.

Japan faces its most severe crisis and largest reconstruction effort since WWII

Just before 3pm on 11 March 2011, at a magnitude of 9.0 M_w one of the largest earthquakes since modern recording began occurred off the eastern coast of Japan. With its epicenter approximately 72 km east of the Oshika Peninsula, the earthquake generated a massive tsunami that breached and washed over wave barriers and destroyed entire towns on Japan's eastern coast. Analysis later showed that the tsumami was over 20 – 30 meters in some areas.

Magnifying the scale of the disaster, the tsunami also washed over wave defenses protecting the Fukushima I and II Nuclear Power Plants, destroying reactor cooling systems at the No. 1 Plant and triggering a meltdown in three of its reactors. Hydrogen explosions destroyed the storage chambers of two reactors. On 12 March 2011, the Government ordered residents within 20km of the Fukushima power plants to evacuate. A scheduled evacuation order was released for some villagers located in the 20 – 30 km zone. Other areas in the 20 – 30 km zone were designated as "emergency evacuation preparation areas".

The impacts of the EJGET have been enormous and a massive humanitarian relief effort involving government, civil society and international support is now underway. 15,550 deaths, 5,688 injured, and 5,344 people missing have been confirmed.[xx] Almost half a million houses and buildings were totally or partially destroyed,[xxi] and more than 130,000 people have been placed in temporary shelters. The survivors have experienced shortages of food, water, shelter, medicine and fuel. Prime Minister Kan described the aftermath of the EJGET as the most difficult crisis that Japan has faced since the Second World War. With the Government setting aside US$48.5 billion in emergency spending as a first step, Japan's largest reconstruction effort since the War is now underway.

As a mountainous island nation located on the "Pacific Rim of Fire" in one of the most tectonically active parts of the world, and with a climate that features both typhoons and heavy snowfalls, Japan is used to natural hazards, whether earthquakes, tsunamis, floods, or landslides. Japan has built up a certain degree of resilience to these and, in fact, people from around the world have travelled to Japan to study the lessons it has learned and its technological advances on disaster preparedness. New Zealand, for example, is interested in learning from Japan on how to reconstruct the city of Christchurch, which was badly damaged by a series of earthquakes beginning in September 2010.

While Japan continues to struggle with the resulting humanitarian and nuclear crisis, discussion has already begun on how to build a more disaster resilient society. In a press Conference on 01 April 2011, Prime Minister Kan presented an ambitious vision for reconstruction:

> We must then begin preparations toward reconstruction. In fact, we will go beyond mere reconstruction, creating an even better Tohoku and even better Japan. We

> are moving forward with the creation of a reconstruction plan that has this big dream at its core. I have received many opinions over the telephone from the mayors of each city, town and village in the disaster-stricken area. These opinions will be incorporated into the plan for instance, in some areas we will level parts of mountains in order to create plateaus for people to live on. Those residing in the area will then commute to the shoreline if they work in ports or the fisheries industry. We will create eco-towns, places which use biomass and plant-based fuel to provide natural heating. We will outfit cities with infrastructure to support the elderly. We aim to create new kinds of towns that will become models for the rest of the world.

The Cabinet Office established the multi-stakeholder reconstruction planning council (officially named "The Reconstruction Design Council in response to the Great East Japan Earthquake"). The Council held 12 meetings over three months and adopted an action plan that underscores the need to promote reconstruction driven by the local communities. Disaster preparedness and wider use of renewable energy were also highlighted as guiding principles. Each prefecture and city has also formed reconstruction committees.

Case study: Rikuzentakata, Iwaki Prefecture

Rikuzentakata, a city located on the coast in Iwaki Prefecture, is one of the tsumami affected areas. The city's death toll was 1,087 with 704 people recorded missing as of May 2011, out of a total population of 24,246. Economic damages included 3,159 houses completely destroyed; 1,368 fishing boats destroyed (the loss valued at 6.4 billion yen); seaweed and shellfish farming facilities destroyed and fish products damaged; damage to the harbor to the tune of 3.5 billion yen; livestock farms destroyed in two places (3 million yen); horticulture destroyed in 99 places (77.4 million yen); and 336 ha of rice paddy inundated (7.1 billion yen). The number of persons evacuated reached 10,143 and as of May 2011 49 evacuation shelters were operating. The temporary housing is being developed, with 2,200 units expected to be available.

In Rikuzentakata, about 10 fishery ports were operating before disaster. One contentious issue is whether to restore all the ports or consolidate them into a few that will be reconstructed. Funds are limited but the local fishermen are generally against privatizing the ports. The fishermen prefer to maintain schemes based on fishing rights that are in the form of collective fishstock/marine resource management. The current reconstruction financing is bound to support the restoration of the previously existing infrastructure, and is not designed to support the rationalization or consolidation of infrastructure systems. Private partnerships have also been considered, for instance, to support oyster framing restoration in Miyagi. However, this is closer to philanthropic donations rather than investment, and the volume of financing is still far below actual needs.

2. Building resilience to contend with extreme events (infrequent, catastrophic disasters)

Building resilience for infrequent, catastrophic disasters needs special attention. Economic imperatives may lead to a playing down of the risks and likely consequences of extreme, irregular events, though Professor Ryokichi Hirono argues that that Japan should have been prepared for the EJGET and provides a list of previous large-scale events that pointed to the possibility of this type and scale of geophysical event.[xxii]

Restoration of inundated and salinity affected paddy lands

Restoration of inundated and salinity affected paddy lands is another important task in the reconstruction process in the aftermath of the EJGET. Farmers face financial and physical constraints to restore damaged paddy land and farms. Options that have been suggested include removing saline soil and replacing it with deeper lying unaffected soil or soil from other areas. Phytoremediation – the treatment of environmental problems by growing plants –such as rice, sunflower and rape/colza has been suggested. However, once paddy land is converted to farmland, it would take years to convert the farmland back to paddy land. The pros and cons of these proposals need further assessment.

Extreme events are sometimes labelled "black swans". They are events that are outside of normal expectations as past experience does not suggest their likelihood of occurrence. Human memory may not span sufficient generations to ensure that lesson from the history of extreme events is incorporated into today's planning and decision-making, or there simply may be no past human experience of a similar event. Even when there is living memory, the profit motive or competing demands on public funds may lead to avoidance of the costs for preparing for infrequent disasters.

A lesson from the EJGET is that human engineering feats that aim to obstruct the forces of nature cannot protect against the most powerful natural phenomena. Wave barriers have, in the past, successfully protected parts of Japan from tsunamis and will continue to do so for more frequent events of average magnitude. But this type of engineering solution can lull people into a false sense of security, with potentially very high human and economic costs, as we have witnessed with the EJGET. The discussion in Japan has turned to the organizational, social and economic domains of disaster resilience.

Case study: Inter-community relief

The value of inter-community support during the relief and recovery stage has been observed in the aftermath of the EJGET as well as disasters in other countries. As national and prefectural (state) governments must cover all areas directly impacted by the EJGET and because of their internal rigidities, they have found it difficult to supply timely relief on a priority basis. Community-to-community relief has been observed as more flexible than the vertical relief channel of national government to local community.

When a community not directly impacted by the disaster is coupled with a disaster affected community to provide relief, the relief work can be better focused and thus more effective. When organizing relief in the aftermath of the Sichuan earthquake, the Chinese central government paired disaster affected communities with communities in unaffected areas. The unaffected communities competed between themselves to assist their counterpart communities, and this unconventional approach of inter-community relief aid worked successfully.

In Japan, inter-community relief gained popularity after the Hanshin earthquake in 1995. After the EJGET, relief was provided by various communities and municipalities; from both inside the disaster affected area (Tono City, Kurihara City, etc.), and outside the area (League of Kansai Municipalities, Suginami Ward, etc.).

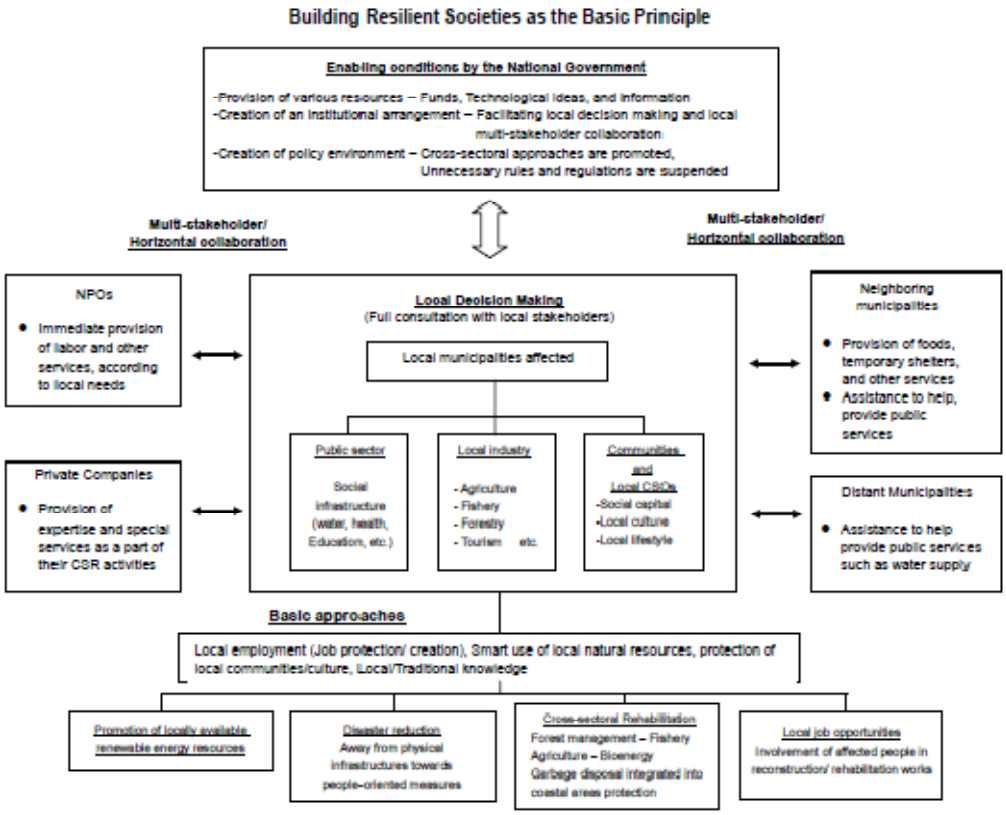
Tono City, located in Iwate Prefecture, where the impacts of the earthquake and tsunami were particularly severe, was relatively unscathed and became a relief supply center for non-governmental organizations (NGOs). An advantage of this inter-community aid was that Tono City is close to the devastated areas, which facilitated information collection and logistics. This is somewhat of an unusual example as in a widely damaged area it is difficult to find less affected communities that can extend a helping hand. Communities further removed from the disaster affected areas can also provide important support, however. Suginami Ward in Tokyo and the Unions of Kansai Governments (UKG) are good examples. Suginami Ward and other cities have long relationships with Minami Souma Cho, one of the areas affected by radiation from the Fukushima Daiichi Nuclear Power Plant, as sister cities. Suginami ward used its inter-municipality network to provide relief assistance to Minami Souma Cho while UKG sent water and sewerage technical teams to the area.

A challenge in organizing inter-community relief aid is coordination. Matching affected and unaffected cities to ensure that the relief provided is based on needs can take time, though sister city affiliation certainly facilitate this process. In Japan, further thought is now required on how government can encourage inter-community relationships as part of a process of building more effective channels to provide relief in the aftermath of disasters.

3. Building resilience into recovery and reconstruction

In the aftermath of a catastrophic disaster, decisions will be taken that have long-term consequences. At an early stage there is a need to identify effective processes for ensuring that resilience building is integrated into the recovery and reconstruction process, so that the impacts of future natural hazards are better mitigated and societies more able to cope with these. Disaster management planning should provide a framework for making informed decisions in a time of chaos and uncertainty, as well as direct decision-makers towards the longer term goal of disaster resilience.

Diagram below presents holistic approach for recovery from catastrophic disasters. It lays out a general governance structure for building resilient society by taking a multi-level, multi-stakeholder scheme. There are many stakeholders involved; nonetheless, it is necessary for each of them to conduct actions which can be delivered most efficiently. For instance, national government should provide atmosphere where local stakeholders can play active roles such as providing funds, decentralizing authorities, creating special economic zone, etc.



At the local level, local government needs to know community specific demand of assistance, and implement policies. At the same time, options and tools – regulatory (e.g. land use zoning) and non-regulatory (e.g. the acquisition and setting aside of hazard-prone lands) – should be set out and their costs and benefits closely studied. Relief aid conducted by NPOs and private companies is important as well as that of other municipalities. Coordination of these stakeholders' activities is crucial, since national and prefectural governments cannot flexibly correspond various needs in local areas. Challenging task is to maintain consistent relief aids from these stakeholders; therefore, national government should set environment to facilitate endurable voluntary relief from different kinds of stakeholders.

Renewable energy promotion in Kuzumaki Town

Kuzumaki Town is a leading locality in promoting renewable energy. Based in the mountainous area in Iwate Prefecture, Kuzumaki produces far more energy through its wind turbines, wood chips and bark, and cow dung than it consumes and sells the surplus to the local power company. The success of Kuzumaki can be attributed to its entrepreneurial mayor and ingenious staff of the town office trained in the leading dairy farm, Koiwai. Kuzumaki was successful in obtaining subsidies from the government. On the other hand, it also faces some constraints in expanding renewable energy. The local power company has a quota to buy renewable energy and it prevents the town from investing in renewables. The distance between the site and settlement area makes it difficult to promote cogeneration and

4. Moving from linear to holistic thinking and contemplating deeper structural reforms

Prosser and Peters explain that disaster resilience is characterized by its "complexity, interactivity and interconnectedness" that traditional linear policy thinking, which is reductionist and works from policy to solution within "tightly defined conceptual modes", is unable to handle.[xxiii] They call for non-linear and holistic policy approaches, which require disaster resilience to be the collective responsibility of all members of society. The challenges are to facilitate both bottom up and high level engagement, and implement the principle of subsidiarity to promote local level flexibility within a strong national framework for disaster resilience.[xxiv] This understanding leads to the definition of a disaster resilient community as one that "works together to understand and manage the risks that it confronts, but is also aware of the responsibility of all levels of government."[xxv]

Resilience includes the ability to "bounce back", but this should not be viewed as merely returning to the way things were. Catastrophic natural disasters can highlight structural weaknesses in societies that make them vulnerable to large-scale natural hazard events. Deep structural reforms may be required, and the aftermath of a major disaster may allow for discussion of reforms that otherwise could not take place in "normal" circumstances.

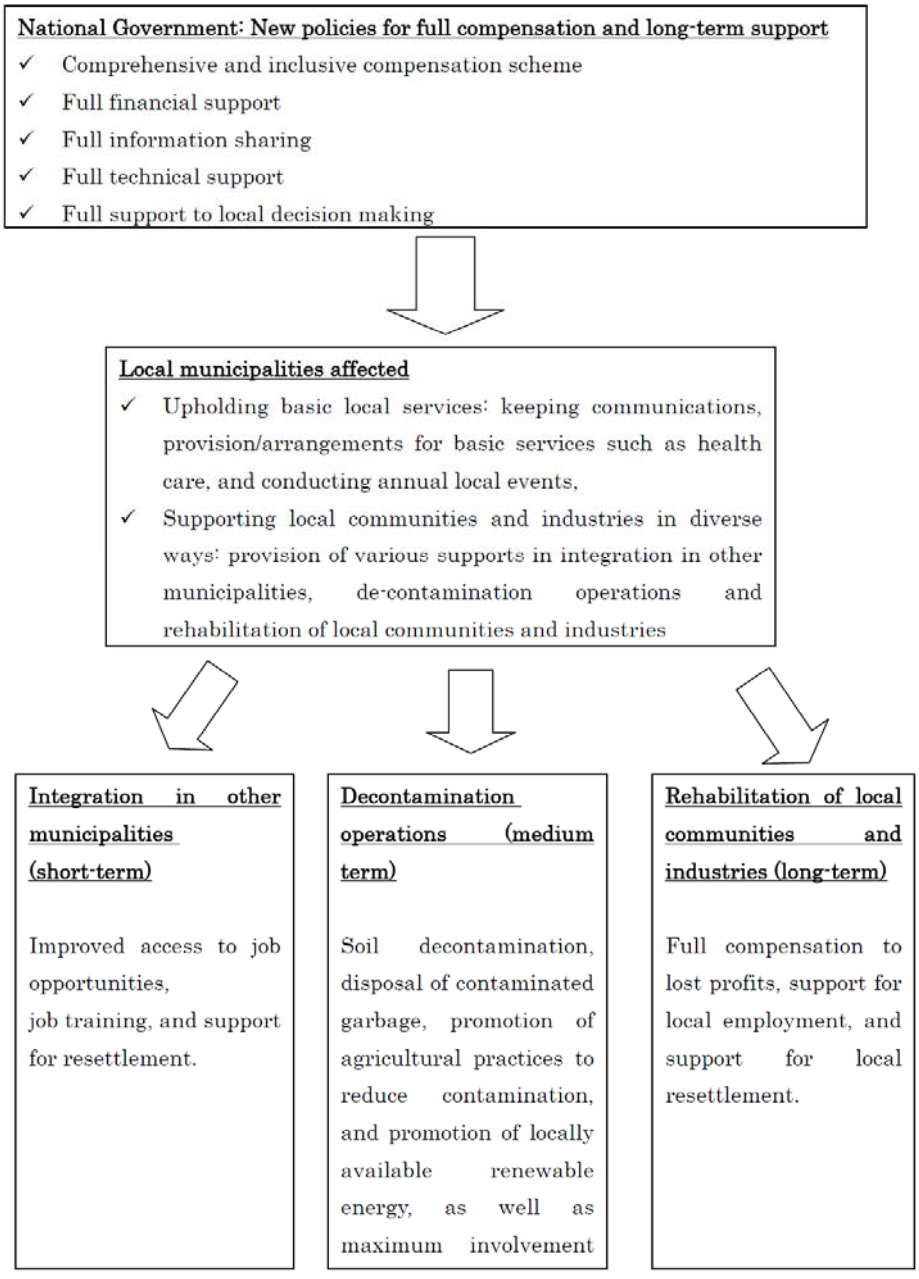
Dealing with waste

Millions of tons of waste were generated by the EJGET that is now obstructing the reconstruction process but might also provide opportunities. Basic separation of waste has been undertaken, but this is not sufficient for final disposal. Biofuel production from wooden waste has been suggested as one way to make constructive use of the waste; however, this requires time for storing the waste and could interfere with reconstruction processes. Creating wave/tide breaking woodlands on waste mounds or using them for memorial parks have also been suggested, though the technical feasibility of these proposals needs to be further examined.

The EJGET has shown that the belief that the preventive measures taken against earthquakes and tsunamis at nuclear power plants were adequate was mistaken. This has led to a deep review of the nuclear power policy in Japan. At the G8 Summit in France, Prime Minister Kan explained his government's determination to, as soon as possible, reduce Japan's dependence on nuclear power by increasing the use of renewable energy such as solar, wind and geothermal power to 20% of the total electricity requirement of Japan by 2020. Will this be possible or "enough"? What other deep reforms are necessary for building disaster resilience in Japan that should now be on the discussion table? How can these reforms be embraced by a future vision for a low carbon, resource efficient, and resilient Japan? These and similar questions about deep reforms and a future national vision now need to be placed on the discussion table. Determining who should participate in this discussion and how it should be facilitated are equally important as deciding the subject matter.

In light of these questions, and to facilitate discussion on solutions, the following framework for rehabilitation in the Fukushima area of Japan near the damaged nuclear power plant was created:

Suggested Framework for Rehabilitation of Fukushima



Approach to disaster areas in Fukushima should be different with others, since effects of radioactive materials need to be considered carefully. The diagram above lays out holistic approach divided into various levels. Considering characteristics of the hazardous materials, compensation scheme is major part of relief actions, including providing alternate lands for locals.

5. Conclusion and the way forward

The preceding sections have outlined major global issues facing policy makers and other stakeholders facing disaster management challenges using the triple disasters in Japan as a current case of risk, relief, and recovery. Globally the most outstanding success factor has been a marked reduction in mortality-risk from disaster. Saving lives is, for obvious reasons, of primary importance, but quality of life is also a fundamental development and disaster management issue. Economic growth and technological advances have added immeasurably to quality of life and changed the social, political, and environmental landscape more rapidly in the past century than any other period of time in history. However these advances have also opened up new risks due in part to the human contributions to climate change generated by our rapid growth, to remarkable technological advances such as nuclear energy, and infrastructure developed without sufficient planning for disaster risk. The latter two situations are arguably made all the more troubling by poor governance and institutional failures due in no small part to short-term thinking. The results of such actions are more extensive and intensive risks suffered mainly by the most vulnerable populations, and increasingly within more developed areas.

The sudden, shocking, and in some ways unexpected nature of the recent disasters, in particular the triple disasters in Japan, are cause for deeper discussion on vulnerability, risk, and the policy decisions that need to be made for building a resilient and sustainable society.

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[xxi] Ibid.

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[xxiii] Prosser, B. and C. Peters. 2010. p.10.

[xxiv] Ibid. p.11.

[xxv] COAG. 2009. *National Disaster Resilience Statement*, Excerpt from Communiqué, Council of Australian Governments, Brisbane, 7 December. Quoted in Prosser and Peters. 2010. p.11.