Disaster Risk Reduction Capacity Assessment: Reflecting on the Japanese Experience

Paul OFEI-MANU*,** and Satoshi SHIMANO*

Abstract: Disaster Risk Reduction (DRR) is an increasingly important issue on the global agenda with great effort being made through policy and science to minimize its impacts on humans and the environment. The paper discusses some components of capacity assessment that are relevant to strengthening DRR capacity and reference is made to the Great East Japan Earthquake (earthquake, tsunami and nuclear accident) on the lessons learned, particularly from the Fukushima nuclear disaster.

Keywords: disaster risk reduction, capacity development, capacity assessment, Japan, Triple Disaster

1. Introduction

Disasters are a fundamental threat to human development because what takes several years or even decades to develop could be wiped away within a short moment thereby worsening poverty because assets and livelihoods are destroyed in the process. The frequency of occurrence and intensity of disasters is increasing against the backdrop of increasing evidence of human-induced climate change. As a result, reducing its often devastating impact on human civilization has become a top issue on the global agenda featuring in major policy processes and summits and scientific conferences. Disaster risk reduction (DRR) is hence highlighted in several international documents, particularly UN-related summits' outcome documents and resolutions. For example, the importance of DRR is highlighted in paragraphs 187-189 of the Rio+20 Summit Outcome Document, 'The Future We Want'. DRR's importance is further reiterated by UNESCO, the lead agency for the UN Decade of Education for Sustainable Development (DESD, 2005-2014) as one of the top three thematic areas it is currently coordinating global efforts to address in addition to climate change and biodiversity as points of entry for promoting sustainable development practices through education and learning.

Launched in 2005 in Kobe in Hyogo Prefecture, Japan after approval by 168 countries at the 1st World Conference for Disaster Reduction, the Hyogo Framework for Action (HFA) has become the platform for global commitment to reduce disaster losses and encourage a more systematic and preventative approach to managing disaster risk. A UN-mandated 3rd World Conference on Disaster Risk Reduction will take place in Sendai City, Japan from 14 to 18 March 2015 and is expected to set the stage for a new global agreement on reducing the impact of both natural and man-made disasters. It will also review the 10-year implementation of the HFA and look for its successor to be referred to as Hyogo Framework of Action 2 (HFA2). Capacity is considered to be at the heart of reducing risk because a strong relationship exists between capacity and a country's DRR. The need for DRR capacity development and assessment can be viewed from the perspective of the experiences of recent major disasters a greater

*Shimano Laboratory, Research Centre of Environmental Education, Miyagi University of Education, Sendai, Japan **Institute for Global Environmental Strategies (IGES), Hayama, Japan

number of which has happened in Asia, particularly earthquakes, tsunamis and flooding. Given the enormous material and human catastrophe that Japan suffered during the Great East Japan Earthquake on 11 March 2011, the choice of the conference venue could not be more appropriate.

This paper discusses some aspects of capacity assessment especially leadership, institutional arrangements, knowledge and accountability considered as relevant to DRR capacity development. References are made to the Japanese situation regarding the lessons learned from the Great East Japan Earthquake (comprising an earthquake, a tsunami and a nuclear accident and will be referred to from hence as the Triple Disaster), particularly the Fukushima nuclear meltdown with the hope of developing a comprehensive, systematic DRR capacity assessment framework in the near future. Part 2 provides a brief description of DRR and capacity building/development. Part 3 presents a summary of a few capacity assessment approaches/frameworks and components and focuses on that of the United Nations Development Programme (UNDP). Part 4 discusses some aspects of the Triple Disaster particularly the lessons generated by the Fukushima nuclear disaster in the context of capacity assessment.

2. Disaster Risk Reduction and Capacity Building/Development

2.1. Disaster Risk Reduction (DRR):

Disaster risk reduction (DRR) is defined as "*the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events*" (UNISDR, 2009: 4). Considered as the flagship document of DRR, HFA is seen as a response to the importance of implementing DRR measures in a comprehensive, integrated and multi-disciplinary manner. The framework presents a detailed strategy to integrate disaster risk reduction into national development policies and programmes over a decade. It also underscores the relationship between reducing disaster risk and achieving broader development goals and consequently mobilises stakeholders at local, national and international level to pay increasing attention to DRR as part of their wider development agendas (CADRI, 2010).

Furthermore, the HFA identifies five priority areas of action namely: 1) ensuring that disaster risk reduction is a national and local priority and is established within both national and local institutions, 2) disaster risk identification, assessment and monitoring are conducted in addition to enhancing early warning measures, 3) use of education, knowledge and renewed mindset to build a culture of safety and resilience at all levels, 4) reducing underlying risk factors, through incorporating activities into appropriate development sectors and programme areas, and 5) a strengthened disaster preparedness for effective response at all levels (CADRI, 2010). Further buttressing the importance of DRR at the global level, 'The Future We Want' recommends the integration of early warning systems 1) "*…into their national disaster risk reduction strategies and plans*", …. 2) "*… knowledge and information sharing…*" and the need to 3) "*…undertake and strengthen in a timely manner risk assessment and disaster risk reduction instruments*", the importance of 4) "*stronger inter-linkages among disaster risk reduction, recovery and long-term development planning, ….. more coordinated and comprehensive strategies that integrate disaster risk reduction and climate change adaptation…*" and participation of a broad range of stakeholders (UNGA, 2012: 36).

2.2. Capacity building/Capacity development

Although often used interchangeably, basic conceptual differences exist between capacity building (CB) and capacity development (CD). For example, in terms of scope CD is generally viewed as being about change and transformation from within and is more comprehensive while CB is more linked with mechanical processes

and with technical cooperation suggesting that capacity is non-existent and has to be built from the scratch. Capacity development is defined by UNISDR (one of several definitions available) as "*the process by which people, organisations and society systematically stimulate their capacities over time to achieve social, and economic goals, including through improvements of knowledge, skills, systems and institutions*" (CADRI, 2010:9). All stakeholders are presented with a challenge by the HFA to focus on CD for DRR and in fact, the five priorities for action can only be achieved if CD issues and measures are integrated into the action agenda (CADRI, 2010). An effective CB/CD programme or strategy should have a well-developed stakeholder analysis and needs assessment methodology. Furthermore, to strengthen the existing capacity in a disaster risk management system, it is important to identify and understand the capacity gaps of past disasters. Formulation of a generic, systematic capacity assessment framework should incorporate those identified gaps and also policy, science, education, research and practice aspects of DRR coupled with set criteria that can be monitored and evaluated.

3. Capacity Assessment and DRR

Several capacity assessment frameworks and approaches exist. They include the following:

- The 5-C approach was developed by the European Centre for Development Policy Management. It assesses individual and system-level capacities in the context of the organization and describes capacity as the meeting point of five central capabilities of organizations. They are the capability to a) commitment and engagement, b) carrying out tasks, c) relating and attracting resources and support, d) adapting and self-renew, and e) balance diversity and coherence (Baser and Morgan in Babu and Kolavalli, 2013).
- Managing for Development Results CAP-Scan Diagnostic Review scores governments' attempts to develop public sector capacity through conduction of assessments that identifies the strengths and capacity gaps. This is done in four capacity building stages namely awareness, experimentation, transition, and sustainable implementation. This is done in the context of five pillars: leadership, accountability and partnerships, monitoring and evaluation, planning and budgeting and statistics (MfDR 2009).
- The United Nations Development Programme's (UNDP) has formulated a capacity assessment framework that is premised on its refined capacity development approach and is structured around five steps namely 1) engagement of stakeholders on capacity development, 2) assessment of capacity assets and needs, 3) formulation of capacity development response, 4) implementation of the response, and 5) evaluation of the capacity development (UNDP, 2010). UNDP uses three dimensions from which it assesses capacity needs/gaps. They are: 1) points of entry referring to the level (individual, organization, or enabling environment)[1] from which assessment can be started; 2) the core issues which define the scope of the assessment and may include: leadership, policy and legal framework, mutual accountability mechanisms, public engagement, and resources (human, financial, physical, and environmental); and 3a) five functional capacities: engage in multi-stakeholder engagement/dialogue, situation analysis and vision creation, policy and strategy formulation,

o [1] The individual dimension relates to a variety of abilities, with an emphasis on aspects including inter-disciplinarity and process skills with influences from such as attitude, perception, cultural orientation and intuitive faculty as subjective determinants

o Institutional capacity requirements emphasises collective learning and institutional change, i.e., understanding and dealing with multiple perceptions or world-views in addition to skills.

o The systemic dimension closely associated with the 'enabling environment', that is, appropriate policy and legal frameworks, a clear definition of institutional roles and mandates, widespread access to information, vertical linkages, etc.

budget, management and implementation, monitoring and evaluation, and 3b) technical capacities (UNDP 2008). Some of the core issues will provide the main context for the discussion in this paper namely 1) institutional arrangements, 2) leadership, 3) knowledge, and 4) accountability.

Institutional arrangements is a core issue relevant across most aspects of governance, public sector management and development activities. It addresses the policies, procedures, systems and processes that countries have in place to functionalise their political mandates, development policies and objectives as a way to promote good governance. Because optimal procedural structures in terms of efficiency and impact are often unacknowledged, inefficiencies in institutional arrangements are only identified during capacity assessments. The reason is because new procedures and programmes are often developed without incorporation into previously existing ones and this is commonly found in intra-ministerial and multi-agency work (UNDP, 2008; UNDP, 2010).

Leadership expresses itself at multiple ways and levels (individual or organisation) and has the elements of vision, competence and integrity at its core. Effective leadership can transcend individual-to-individual capacity level to organisational capacity level and thus help to advance a strategic planning and an agenda that is vision-driven. Leadership capacities can be enhanced through strategies like strengthening the abilities of the organisation regarding vision setting, transparency, a sense of readiness, systems thinking, assessment of potential risks and managing them through establishing collective management systems that encourage learning (UNDP, 2008 and UNDP, 2010).

Knowledge is considered as the foundation of capacity and it includes measures for creating and enhancing knowledge using different teaching approaches and in all educational settings. Developing knowledge through improvement in expertise and organisational learning strategies occurs at organisational level. Professional training, experience sharing and knowledge management systems in the organisations are some of the approaches to strengthen knowledge capacity at this level. Knowledge capacity at a societal level is often best addressed through reforming formal education systems to ensure that younger generations will have the skills and know-how to deal with current and emerging risks. Stimulation of actionable knowledge can also be effected through organisational networks, communities of practice and multi-agency information and learning platforms that assembles together entities of the non-formal education sector including civil society organizations, government and donor agencies (CADRI, 2010; UNDP, 2008 and UNDP, 2010).

Accountability as an important lever of change lies in its provision of oversight, monitoring and evaluation to guarantee that processes and programmes are leading to the expected objectives, and providing mechanisms to overcome obstacles and identify shortcomings when necessary. Additionally, through the establishment of systems for public accountability and transparency, governments' responsibilities to reach the needs of their citizens are also ensured and can provide an added benefit of encouraging mutual engagement in development activities. Other aspects that can improve accountability capacities include strengthening the feedback mechanisms such as open access to information, encouraging people to voice their opinion, ensuring robust monitoring and evaluation systems, and integrating knowledge and experiences into future programmes (UNDP, 2008; UNDP, 2010).

The UNDP capacity assessment approach is being embraced and used in several sectors and fields including the DRR community due to aspects including the following: 1) its flexibility allows one to adapt it to

several CD situations, 2) it is able to link the three points of entry and hence promote a holistic approach across the three, 3) it emphasises systematisation for example of a nation's assets, plans and strategies and expertise as well as measures capacity development systematically, 4) it discourages the use of rigid blueprints and emphasises adaptation to local conditions (UNDP, 2008). Additionally, paragraphs 21-23 of the UNISDR's 'Towards a Post-2015 Framework for Disaster Risk Reduction' describe the importance of institutional arrangements, legislation and policy, coordinated and coherent action, accountability measures both in scale and range to guide government and public awareness of and access to information on disaster risks and support for DRR (UNISDR, 2012).

4. The Japan Experience and DRR Capacity Assessment

This section discusses aspects of the Triple Disaster (particularly the Fukushima nuclear disaster), the capacity gaps identified and lessons generated in the context of DRR capacity assessment.

Japan is well advanced in disaster preparedness and risk reduction and yet was rattled on March 11, 2011 by its largest earthquake on record and the fourth largest ever recorded in the world. This giant temblor generated a 10-15 story tsunami that triggered a nuclear accident and has been rated as equal in severity to the 1986 accident at Chernobyl, the worst nuclear disaster on record according to the International Atomic Energy Agency. This complex catastrophe comprising an earthquake, tsunami and nuclear meltdown killed nearly 20,000 people. Hundreds of thousands (about 500,000) of people were displaced and a large area of beautiful countryside was contaminated and some areas will remain so for several decades. Nearly three years later, the affected communities are struggling to recover and more than 140,000 people are still living in shelters. Significant distrust of industry, government and even of researchers remains due to the emergence of several challenges during and after the accident (FGCP, 2014; IGEL, 2013).

Japan has had more than its share of natural disasters in comparison to its land size. These include multiple active volcanoes, being prone to flooding annually and experiencing several typhoons every summer. It is also a country that sits on multiple active faults. Japan can therefore hardly survive without having a relatively comprehensive disaster mitigation and response planning and infrastructure in place. Consequent to this careful planning, it is viewed as a model for disaster preparedness (Des Marais et al., 2012).

The Central Disaster Management Council (CDMC) is at the helm of Japan's disaster management infrastructure and is the major policy engine for the management of disaster in Japan. It comprises the Prime Minister and the entire Cabinet, local leaders, and experts in the field (Government of Japan, 2005). Established by the Disaster Countermeasures Basic Act of 1961 to "*ensure the comprehensiveness of disaster risk management and to discuss matters of importance with regard to disaster management*", it is responsible for design and implementation of national risk management strategies with regard to issues related to safety, mitigation, and risk reduction (Government of Japan, 2005: 1). The government formulates strategies and engages in different kinds of knowledge construction, information dissemination, and capacity building investments through the CDMC. Early warning and monitoring systems covering the nation are in place following a countrywide risk assessment involving public, private, research and academic partners. Furthermore, information materials geared towards educating and training a variety of fields and sectors as well as education settings have been developed and are buttressed by a complex of national-local and public-private partnerships (Des Marais et al., 2012).

Using the lessons learned from the previous big crisis namely the 1995 Great Hanshin Earthquake, Japan had diligently been preparing for future disasters. However problems emerged partly due to the enormity and complexity of the Triple Disaster which stretched the

effectiveness of the Japanese disaster risk management system to its limit and partly due to human shortcomings. The report commissioned by the National Diet of Japan sums it all up: "*The government, the regulators, TEPCO management, and the Kantei lacked the preparation and the mindset to efficiently operate an emergency response to an accident of this scope. None, therefore, were effective in preventing or limiting the consequential damage.*" (IGEL, 2013:3).

Leadership and knowledge capacities gaps

Although the scale of the Triple Disaster was unprecedented in living memory, however, according to several post-Fukushima reports the disaster should have been anticipated (IGEL, 2013). The judgments made and the actions taken by government and leaders of industry were later found to be inadequate and in some instances compounded the problems. For example, the tsunami and the destruction of the Daiichi nuclear reactors was entirely predictable because it had been recorded in the literature that earthquakes of similar magnitude have struck that part of Japan, once every 100 years on average – a pattern well known since ancient times – and each one generated a catastrophic tsunami of similar magnitude. The previous tsunami in 1933 was in fact, nearly as high as the one that struck in 2011. Furthermore, a monument dating back to the first century still sits on a hill, high above the area devastated by the 2011 tsunami, with the inscription: "*Beware the great tsunami; do not build below this level*" (IGEL, 2013：3). Three areas of capacity critical to leadership in a crisis that emerged from the Triple Disaster and need attention are emergency preparations, leadership style and communications (IGEL, 2013).

Institutional arrangements capacity gaps

At the peak of the nuclear crisis, designation of roles and responsibilities was inadequate and there were coordination and information flow challenges between the office of then Prime Minister (the Kantei) and Tokyo Electric Power Company Limited (TEPCO), the nuclear plant operator. There was also mismatch of administrative boundaries and activities at that level to the point that once the Prime Minister had to visit the plant to ascertain things himself. Also, soon after the disaster there was a shortage of essential items such as food, water and particularly gasoline in the affected region and this was partly attributed to the fear of truck drivers to drive to the Tohoku region because of alleged high level of radioactive contamination. Nuclear experts directly linked to the CDMC failed to participate and be visible during the government's public relations efforts to provide scientific information at least in approximate terms rather than leaving it to the politicians and the plant operator. This contributed to the distrust of the information that was being put out by the government and TEPCO. From partial briefings, provision of vague answers or refusing to answer questions during press conferences, to delayed information, etc., TEPCO's performance has been seen as troubling virtually across the board with the exception of the brave workers who sacrificed their future lives to somewhat save the situation (Kaufmann and Penciakova, 2011).

There have been times when the relations between the local governments in the affected region and the central government have not been very cordial with regard to implementation of some post disaster policies due to different perspectives of understanding of the available information. Stronger linkages between national and local government/people based on transparency in relation to the crisis is crucial for the rebuilding of trust. Those in the position of responsibility need to give attention to transferring risk information and the interpretation of the understanding of such risks to the recipients. More community participation in the decision-making process and provision of relevant knowledge regarding the operations of such infrastructure with significant underlying risks that are close to communities should be ensured.

Accountability capacity gaps

Significant political and economic power is alleged to back the nuclear industry in Japan. The management of TEPCO was said to have built the reactors on a known fault line and then colluded with government regulators to avoid preparing for the inevitable (IGEL, 2013). Furthermore, the government and the nuclear power industry had been warned by the US Atomic Energy Commission that reactors like those in Fukushima Daiichi had not been built to withstand major earthquakes just like other nuclear reactors in Onagawa, Shika, Kushiwazaki, etc. (Kaufmann and Penciakova, 2011). There were also aspects of corporate practices that are not only unique to the Japanese corporate community: situations where private companies' liabilities are capped by the value of their net assets, the amount beyond which the companies pay nothing. TEPCO, like any other private company was then left with "*no incentive to limit damages beyond the value of those net assets*". This resulted in TEPCO wildly underplaying the risk of a gigantic earthquake and tsunami, "*but it did not underplay it carelessly or negligently. It underplayed it rationally - wildly, but rationally*" (IGEL, 2013:3).

TEPCO's overall performance in handling the nuclear crisis has been subpar. There have been recorded failures in the past regarding practice standards and several more after the disaster. Aspects like poor plant safety, poor communication, lacking "basic understanding of measuring and handling radiation", incorrect data reporting, etc. (several of which have been reported in the media) have been problematic to this day. Blame sharing can go around. The regulatory agency, Nuclear and Industrial Safety Agency (NISA), a department under the Ministry of Economy, Trade and Industry (METI) was lax in its inspection (Saito, 2014; Kaufmann and Penciakova, 2011) although this has been recently rectified by replacing it with a more independent National Regulatory Authority (NRA). Even the global nuclear watchdog, the International Atomic Energy Agency (IAEA) was slow in getting involved in the crisis. There have also been reports of contracted workers of some private companies sub-contracted by TEPCO to clean the contamination not being paid well. Granted that the Fukushima disaster is going to take a long time to fix, poor treatment of workers might lead to future shortage of such workers and hence hamper the decontamination and reconstruction programmes. Appointing an independent body or an ombudsman to protect the rights of such contracted workers will be in order. Other gaps to address include: 1) strengthening the independence of the NRA and giving it some level of power to effectively play its oversight role in the nuclear industry, 2) evaluating the "moral hazard" that arises when potential losses of a catastrophe far exceed the value of a company, 3) need for "system chain/process chain" liability, i.e., to hold accountable all actors involved with the nuclear power industry: manufacturers, regulators, operators, government, etc. for negligence when that is determined in a disaster. Currently several joint lawsuits have been filed against 1) three companies that manufactured reactors at Japan's Fukushima Daiichi nuclear plant for making a faulty product (Yamaguchi, 2014), and 2) TEPCO separately or jointly with the Japanese Government for failure to provide accurate information on the radioactive emissions or for negligence of responsibility, with more set to follow. IAEA should be more proactive and intervene in a timely manner during a future nuclear crisis.

Socio-cultural capacity gaps

Riding on the myth of "absolute safeness" of nuclear power as the then Prime Minister himself later admitted in an interview, government and business had managed to place this into the cultural psyche of the people and therefore were not prepared nor did they leave room for the worst-case scenario (IGEL, 2013; Corkill, 2013). Also, the prolonged period and high intensity of the seismic activity (aftershocks) were equally devastating mentally. Although many NGOs and individuals went to offer their support to the disaster victims (Shimano and Hirose,

2012), there was a shortfall of mental health care staff (psycho-social workers, psychologists, psychiatrists, etc). It should also be acknowledged that due to attachment of social stigma to mental problems in Japan, some affected people would not go for consultation/treatment (Brumfiel, 2013).

After much preparation for decades based on prior disaster experiences, the Triple Disaster overwhelmed all that had been put in place partly because some installations and structures had been prepared below the threshold of the complex disaster that struck. For example, the Fukushima Daiichi nuclear complex, was prepared for only a magnitude 8 earthquake and levees and flood barriers were not designed to withstand the category of tsunami that reached 40 meters tall and travelled inland nearly ten kilometres (Des Marais et al., 2012). Issues that need to be addressed regarding the previous discussion include 1) strengthening knowledge capacity for understanding the underlying dangers of relevant risk-prone infrastructure and also the cascading effects of one disaster turning into multiple disasters e.g., earthquake > tsunami > fire outbreak from installations/ nuclear disaster, and 2) addressing the currently existing mental health care challenges in the affected areas and strengthening capacity for future post-disaster mental health care.

But it was not all gloom: 1) the ability of most buildings including houses to withstand this very strong earthquake, 2) constant updates on the crisis accessible on mobile phones and the prevention of derailment of high-speed trains due to improvement in the early warning systems after the Great Hanshin Earthquake, and 3) the stoic nature of the people and their resilience that became an envy of the world were some of the bright spots. Furthermore, having shown generosity to many countries affected by disaster, Japan further showed the way to international collaboration (a key component in DRR) when the "politics of national sovereignty" was kept to a minimum but instead, the government reached out to several countries for help such as medical assistance, food aid, and psychosocial support (Des Marais et al., 2012).

5. Conclusion

Added to several other natural disasters that affect Japan, it is the only country to suffer both intended and unintended consequences of nuclear power: the dropping of atomic bombs on Hiroshima and Nagasaki and the Fukushima nuclear disaster, respectively. Economically, it has experienced the top two most expensive disasters in the history of humanity with the estimated cost running into several hundreds of billions of US dollars – the Great East Japan Earthquake is purported to cost between 235-300 billions US dollars and the Great Hanshin Earthquake of Kobe was estimated to have cost 91 billion US dollars. Although risk management (including DRR management) has been part of the Japanese planning and development processes, yet sometimes there is the issue of what to plan for against the backdrop of limited resources and uncertainty of what threshold to adequately prepare for. Also, risk probability and mitigation cost must be balanced against other societal needs. The need therefore to put in place protocols to increase human resilience to be able adapt to such extreme although rare events is critical.

A recovery from the current disaster and future ones will depend largely on addressing the discussed gaps from the Triple Disaster and from past experience in the context of a couple of things. With reference to the "hardware" capacity strengthening, opportunities exist for implementing some disaster resistant measures particularly during the ongoing reconstruction of infrastructure. Additionally, formulating a generic but systemic DRR capacity assessment framework comprising both "hardware" and "software" capacity that incorporates the HFA priority areas using 'enabled environment' as the entry point and addressing all relevant DRR capacities including solutions to those capacity gaps discussed in this paper will be appropriate. Such a framework should ensure horizontal and vertical

linkages of the constituent DRR capacities from national to local levels. Other frameworks developed for more specific sectors or fields (e.g. the Education for Natural Disaster Preparedness and Reduction framework for the lower and middle formal education sector (Goto and Okamoto, 2012) should be linked to this framework at the appropriate leverage point(s).

References

Babu, C.S. and Kolavalli, S. 2013. Ghana Strategy Support Program: Methods of Capacity Needs Assessment – A Discussion Note. International Food Policy Research Institute. Available at: http://www.ifpri.org/sites/default/files/publications/gsspdn26.pdf

Brumfiel, G. 2013. Fukushima: Fallout of fear. Nature. 493, 290-293.

CADRI (Capacity Development for Disaster Risk Initiative) 2010. Basics of Capacity Development for Disaster Risk Reduction. Available at: http://www.rootchange.org/about_us/resources/publications/CADRI_brochure%20final.pdf

Corkill, E. 2013. Naoto Kan speaks out. Japan Times. August 31. Available at: http://www.japantimes.co.jp/life/2013/08/31/people/naoto-kan-speaks-out/

Des Marais, E.A., Bhadra, S. and Dyer, A.R. 2012. In the wake of Japan's Triple Disaster: Rebuilding capacity through international collaboration. Adv. Soc. Work. 3, 340-357.

FGCP (Fukushima Global Communication Programme) 2014. Information Sharing and Communication for Recovery in Fukushima A Human Security Approach. http://unu.edu/events/upcoming/information-sharing-and-communication-for-recovery-in fukushima.html#overview

Goto, M. and Okamoto, Y. 2012. Building a Culture of Safety through Education Framework to Systematize ENDPR. UNESCO APRBE. Available at: http://www.aspnet-japan-solidarity.asia/wp-content/uploads/2012/05/02_Framework_GOTO_FINAL170512-low-re.pdf

Government of Japan. 2005. National report of Japan on disaster reduction. United Nations International Strategy for Disaster Reduction. World Conference on Disaster Reduction. Available at: http://www.unisdr.org/2005/mdgs-drr/nationalreports/Japan-report.pdf

IGEL (Initiative for Global Environmental Leadership) 2013. Disasters, leadership and rebuilding – Tough lessons from Japan and the US. Special Report. Wharton University. Available at:https://knowledge.wharton.upenn.edu/special-report/disasters-rebuilding-leadership-tough-lessons-japan-u-s/

Kaufmann, D. and Penciakova, V. 2011. Japan's Triple Disaster: Governance and the earthquake, tsunami and nuclear crises. Available at: http://www.brookings.edu/research/opinions/2011/03/16-japan-disaster-kaufmann

MfDR (Managing for Development Results) 2009. MfDR CAP-Scan. Available at: http://www.mfdr.org/CAPScan/1NewDocuments/CAPSCAN_Booklet-En-09.pdf

Saito, M. 2014. Nuclear regulator raps TEPCO over Fukushima radiation readings. Japan Today, February 13. Available at http://www.japantoday.com/category/national/view/nuclear-regulator-criticizes-tepco-operator-over-radiation-readings

Shimano, S. and Hirose, T. 2012. Reassessment of "disaster education" on the great east japan earthquake. Res. Bull. Environ. Educ. Center, Miyagi Univ. Educ.14, 85-90 (in Japanese).

UNDP (United Nations Development Programme) 2008. Capacity Assessment: Practice Note. New York: UNDP. Available at: http://www.undp.org/content/dam/aplaws/publication/en/publications/capacity-development/capacity-assessment-practice-note/Capacity%20Assessment%20Practice%20Note.pdf

UNDP (United Nations Development Programme) 2010. Supporting Capacity Development: The UNDP Approach. New York: UNDP. Available at: http://www.undp.org/content/dam/aplaws/publication/en/publications/capacity-development/support-capacity-development-the-undp-approach/CDG_

Brochure_2009.pdf

UNGA (United Nations General Assembly) 2012. The Future We Want – Outcome Document of UN Conference on Sustainable Development. Rio de Janeiro, Brazil.

UNISDR (The United Nations Office for Disaster Risk Reduction) 2012. Towards a Post-2015 Framework for Disaster Risk Reduction. Available at:http://www.unisdr.org/files/25129_towardsapost2015frameworkfordisaste.pdf

UNISDR (The United Nations Office for Disaster Risk Reduction) 2009. Terminology on Disaster Risk Reduction. Available at: http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf

Yamaguchi, M. 2014. 1,415 sue builders of Fukushima nuclear plant. Japan Today, January 2014. Available at: http://www.japantoday.com/category/national/view/1415-sue-builders-of-fukushima-nuclear-plant