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Community-Based Disaster Risk Reduction

A comparative study of Japan and Maldives, and techniques to integrate disaster risk reduction into the community

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The views expressed in this paper reflects the views of the author and do not necessarily reflect the views of any organization. The boundaries and names shown and the designations used on the maps in the report also do not imply official endorsement or acceptance by any organization.

COVER PHOTO: *Senbazuru* (A string of thousand origami cranes)

The picture on the cover page was taken at the Nagasaki Atomic Bomb Museum. It shows part of a string of thousand origami cranes or *senbazuru* in Japanese. *Senbazuru* became famous following Sadako Sasaki, a Japanese girl who was two years old when she was exposed to radiation from the atomic bombing of Hiroshima during World War II. Sadako developed leukemia because of exposure to radiation. She heard the legend of the *senbazuru* through her friend Chizuko, who one day brought a gift of a golden origami crane. Cgizuko tells Sadako about the legend that God would grant the wish of a sick person if she folds one thousand paper cranes and make her healthy again. However, Sadako died at the age of twelve after spending a significant amount of time in a nursing home, but the *senbazuru* stands as a symbol of hope and peace and can be seen everywhere in Japan. (from *Sadako and the Thousand Paper Cranes* by Eleanor Coerr, Puffin Books: 1977.)

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I. INTRODUCTION

1. Background and significance of the study

Maldives is a nation of 1200 islands spread across an area of 750 kilometers by 120 kilometers on the Indian Ocean. Maldives lies on the Equator and is the flattest country on Earth with the highest natural point merely 2.4 meters above sea level. The population of the Maldives is 338,400 (2012 estimate).[1] The population is scattered across 199 inhabited islands among the twenty administrative atolls. However, almost one-third of the population lives in the capital, Male' City. The geography of the nation and the erratic distribution of the populace, along with the weak economic stature make something as simple as providing basic services to each inhabited island a logistical nightmare. Therefore, the imminent threats from natural and man-made disasters are vast, and should a disaster strike, it would have devastating effects on the archipelago.

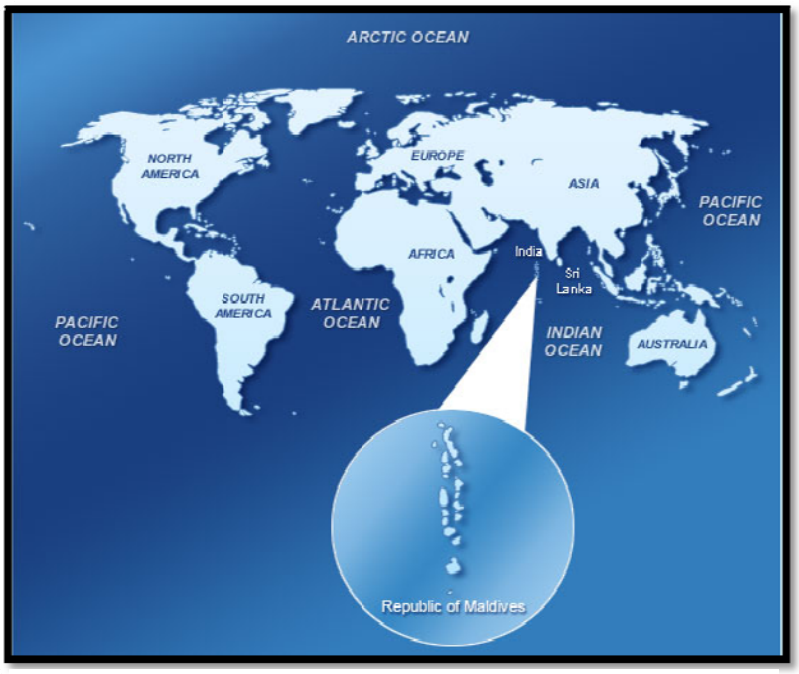

Figure 1: Location of Maldives

From long-term threats such as sea level rise to yearly disasters such as storm surges and flooding, Maldives has always been passive when dealing with disasters and the State is still at an infant stage when it comes to disaster management. National institutions lack the capacity and fiscal resources to build a holistic disaster management framework. At present, the government spends all the national funds allocated for disaster management to respond to disasters [apart from the salary of the staff]. Arguably, the government has already spent enough funds doing damage control due to annual disasters that could have been spent on mitigating some of the crises. What is clear is that Maldives could minimize the effects of most of the disasters with proper mitigation steps.

The National Disaster Management Centre is the national body that deals with disaster management in the country. Maldives National Defence Force and the Maldives Police Service play the pivotal role of responding to disasters, and their operation centres are far and few among the islands. Based on the limited manpower of the response force, the number of these centres

[1] World Bank Website, Country Profile of Maldives, http://www.worldbank.org/en/country/maldives.

would remain the same in coming years. Given this conditions, the only viable method to prevent and minimize effects of disasters is to foster disaster risk reduction (DRR) within the community. At present, the government and other national agencies make ad-hoc efforts at the island level to inculcate DRR within the community. However, the central and local governments cannot sustain these efforts due to lack of institutionalization and inadequate funding.

Community-Based Disaster Risk Reduction (CBDRR) should play a critical role in the disaster management of Maldives. CBDRR is important to prevent disasters and minimize the damage, should one occur. Japan, one of the most disaster prone countries in the world, integrates CBDRR into national strategies and plans for disaster management. This combined with the support structure of local governments and national organizations is the key to Japan's success in its DRR efforts. Today, Japan stands as a testament of disaster resilience at every level.

Maldives being a small country, even the loss of life a single citizen due to disaster has a major impact at the national level. From this angle, disaster risk reduction plays into national security. Unlike the traditional approach to national security, it is no longer state-centric, but rather human-centric and places the citizen at the centre.[2] Therefore, protecting the citizens from disasters is vital to the security of the State. In order to achieve this in the Maldives, the government needs to protect the citizens through empowerment and make them accountable for contributing to safeguarding the community against disasters at every level.

2. Disaster risk profile of the Maldives

a. Likely natural hazards in the Maldives

Maldives face five basic types of natural hazards. They are:

i. Storms;
ii. Tsunamis;
iii. Sea level rise;
iv. Water shortage;
v. Earthquakes.

i. Storms:

Storms present the most frequent hazard to the Maldives. As sea transportation is the main mode of travel between islands, especially for local merchant vessels, storms and rough seas could potentially be detrimental to fishing and agriculture industry in addition to flooding and sea surges. The biggest problem that arises from flooding is sanitation issues and spread of diseases such as cholera and dengue fever. Besides heavy rains and strong winds during monsoons, hazardous weather events which regularly affect Maldives are tropical storms or 'tropical cyclones', and severe local storms

[2] *Human Theory in Security and Practice*, (United Nations Trust Fund for Human Security: New York, 2009), 7-8.

(thunder storms/ thunder squalls). The people of Maldives popularly refer to such severe local storms as 'freak storms'.[3]

Apart from the destruction caused by the wind during tropical cyclones, torrential rain during the aforementioned 'freak storms' cause severe flooding across the country. Not to mention the increasing gusts during storms could cause a sudden rise in sea level along the coast, leading to storm surges and affect low-lying islands.

ii. Tsunamis:

The Indian Ocean Tsunami of 2004 was an eye opener for Maldives. While the damages caused in the Maldives were comparatively small in relation to the rest of the affected countries, many Maldivians are still recovering from the devastation nine years later. The elevation throughout the Maldives is merely 1.5 meters on average and this makes tsunami a deadly threat if one occurs. However, due to the spatial distribution of the atolls and islands, some islands are at a smaller risk compared to others. The economy of the Maldives is largely dependent on tourism. Therefore, apart from loss of life and damage to infrastructure, a tsunami would greatly affect the economy of the country, as the number of tourists who come to Maldives would decrease significantly.

iii. Sea level rise:

Sea level rise due to global warming is one of the biggest long-term hazards faced by the Maldives. As the islands of Maldives are coral based with very low elevation, the beaches erode based on the monsoon and man-made causes. When erosion occurs naturally, if one side of the island erodes, the beach on the other side of the island usually 'grows'. However, when the changing climate and man-made causes disturb the natural process, the erosion is permanent. Many islands have already lost a lot of land due to erosion. If sea level continues to rise as expected by several studies, Maldives faces the threat of sinking in the distant future.

iv. Water shortage:

Even though not considered a disaster in the conventional sense, shortage of fresh water has been a recurring crisis in the Maldives since the 2004 Indian Ocean Tsunami. People in the majority of the island communities use water from the ground for cooking. However, following the tsunami in 2004, the fresh water lens of many islands became salty. As a result, many islands face shortage of fresh water during the dry season.

v. Earthquakes:

Earthquakes of large magnitude are not common in the Maldives. However, Maldives lies in the proximity of several faults and ridges. The biggest threat, apart from the earthquake itself, to Maldives from an earthquake is a tsunami. Having stated that,

[3] Maniku H. A., "Changes in the topography of the Maldives," *Forum of Writers on Environment,* (Male': 1990).

buildings in the country do not have the required engineering measures to withstand seismic activities and the effects of an imminent tsunami.

b. Recent disasters

i. Storms/flooding/tsunami:

Floods are annual occurrences in the Maldives and the government does not keep proper records of annual flooding data unless it becomes a national crisis.

Year/Event	Islands affected	People affected	Dead	Missing	Damage
2012 (Cyclone Nilam)[4]	Caused flooding in 51 islands, 28 islands were severely flooded, 4 islands critically flooded	33,826	-	-	133,090.60 USD
2004 (Tsunami)[5]	53 were severely damaged	Nearly 12,000 displaced. 1,200 IDPs still live in 6 islands	88	20	470 million USD Estimated cost of reconstruction is 406 million USD

Figure 2: Damages from storms, flooding, and tsunamis

ii. Water shortage:

Due to the contamination of the fresh waters lens during the 2004 tsunami, many islands face shortage of fresh water during the dry season every year. Since the island communities do not have the capacity to provide for themselves, the government sends emergency water supplies to the affected islands. Even though this does not technically count as a drought or a disaster, Maldives has faced this crisis every year since 2005 due to programming issues and ineffective recovery programs.

Year	No. of Islands	Total amount of water delivered (in tons)	Total amount spent (in USD)
2005	91	2,728	159,221.80
2006	86	2,905	145,525.30
2007	82	2,694	131,031.10
2008	74	2,088	101,556.40
2009	117	7.469	472,144.70
2010	*Water provided by province offices*		
2011	108	3,920	142,178.30
2012	86	2,500	286,075.80
		Total:	**1,437,733.00**[6]

Figure 3: Money spent on providing water

[4] *Operational Report: Flooding and Related Damage due to Extreme Weather Event - October/November 2012*, (Male': NDMC, 2012).
[5] Government of the Maldives, "The Maldives: *One year After the Tsunami*," (Male': Novelty Publishers: 2005).
[6] Cost information from NDMC: Fikry, Umar. Email to Author, August 21, 2013.

3. Objectives

a. Aims of the research

The main aims of this research are to:

i. Understand CBDRR implementation in Japan and its integration at each level of the government;
ii. Understand how CBDRR plays into disaster management at the national level;
iii. Find out how the community, NGOs and other agencies are integrated into CBDRR;
iv. Map out the important factors that contribute to the CBDRR process in Japan;
v. Address the social issues hindering the implementation of DRR measures within the community in Maldives;
vi. Outline the importance of preventive measures as compared to responsive measures;
vii. Reinforce individual responsibility in reducing the risks of disaster in a community.
viii. Reinforce the importance of making CBDRR a priority at the grassroots level.

b. Long-term goal of the research

The long-term goal of this research is to build on this study in order to integrate the CBDRR effort into the national planning process of the Maldives and to institutionalize the CBDRR process to sustain and maintain continuity of such programs.

4. Delimitation of the study

This research will not present a solution on how to implement CBDRR in the Maldives. On the contrary, the research will seek to highlight the importance of CBDRR and the steps taken by Japan to ensure disaster resilience at the community level. Furthermore, the research will highlight best practices and CBDRR education in Japan. Since Maldives will not and cannot match the fiscal prowess of Japan to conduct the exact CBDRR activities, the major payoff from this study is to identify key concepts used by Japan in implementing CBDRR, which Maldives could replicate.

The first part of the study will begin with an overview of the disaster management process of the Maldives. It will cover existing frameworks and a SWOT (Strength, Weakness, Opportunity, Threat) analysis of Maldives' CBDRR efforts. It will also look at current CBDRR projects in the Maldives. The consequent parts will cover the CBDRR efforts in Japan, how the central government and local governments have institutionalized CBDRR, and CBDRR concepts used in Japan and their effectiveness. The research will conclude with a summary of the study and its key-concepts, and a discussion on future areas of studies in CBDRR.

II. LITERATURE REVIEW AND FINDINGS - MALDIVES

1. Disaster management in the Maldives

A presidential decree established the National Disaster Management Centre (NDMC) soon after the 2004 Indian Ocean Tsunami. Through its haphazard establishment, the mandate of NDMC was to coordinate the recovery process for the tsunami relief effort. However, as things progressed, the government handed the mandate of disaster preparedness and disaster risk reduction as well to NDMC. However, there is no legal framework in the Maldives for a disaster management system. Work is underway to ratify a Disaster Management Act. At present, the draft of the bill is at the Attorney General's Office for amendments and validation before NDMC presents the draft to the parliament for ratification. NDMC is currently under the nomenclature of the Ministry of Defence and National Security as the mandate of responding to disasters falls under the Ministry of Defence and National Security. Hence, the primary response force is the Maldives National Defence Force, which is also under the Ministry of Defence and National Security.

Even though Maldives lacks a legal framework, the Decentralization Act of the Maldives states that the local councils and the Local Governance Authority have a stake in disaster management. Local councils are responsible to undertake, upon appointment by the President, the task of planning and carrying out search and rescue, or provide temporary relief or restore normalcy to the area during times of natural calamity, disaster, state of emergency, famine, or an epidemic in any island, or administrative division.[7] Furthermore, the local councils have the responsibility to allocate funds for losses incurred during natural disasters in their budgets.[8] It is also up to the local councils to coordinate with NDMC to provide aid and relief from the central government in case the situation worsens.[9]

Maldives lacks a disaster management strategy, policy, or a plan. However, work is underway to formulate a National Emergency Operation Plan (NEOP) to define the roles, responsibilities, the standard operating procedures, and the framework required to manage disasters at every level. NDMC will publish the NEOP by the time the Parliament ratifies the Disaster Management Act. Furthermore, NDMC is currently in the process of introducing a damage assessments toolkit in order for island communities to report the damages they face during hazards. This process would introduce a tool to collect damage and needs assessment information, and provide NMDC timely assessments of the crisis. The first phase of this project is to begin in 2013. This phase would focus on institutionalizing the tool and establishing

[7] Unofficial Translation of Act 7/2010: Act on Decentralization of the Administrative Divisions of the Maldives. Section 142, http://www.shareefweb.com/documents/LocalGovReforms/MaldivesDraftlaw&regulations /Draft%20Translation%20of%20decentralisation%20ActMaldives.pdf, accessed on 11 November 2013.
[8] Ibid., Section 97, Article 'k'.
[9] Ibid., Section 72.

procedures for communities to send information, in order for NDMC to analyze and share it with other stakeholders, and finally, how NDMC would get the pre-crisis information.

NDMC is in charge of DRR and other related programs and has to apply through the government's annual budget process to get funding for all their activities. For the current year, NDMC estimated a budget of around 702,268.93 USD, but received just enough to cover the salary of the staff and did not allocate funding for any proposed programs for disaster related activities.[10] Nonetheless, the government allots a contingency fund each year for recovery efforts if there is an emergency/disaster. This budget is strictly for the purpose of recovery and the Ministry of Finance and Treasury controls these emergency funds.

2. Community-based disaster risk reduction in the Maldives

a. Legal structure

The vital component of institutionalizing CBDRR is having the legal structure. As mentioned in the previous section, Maldives is still waiting to enact the first ever Disaster Management Act. Mr. Umar Fikry from the NDMC, who worked in drafting the bill, states that the bill promotes mainstreaming DRR into different sectors of the government and has a special clause specific to CBDRM.[11] Maldivian Red Crescent (MRC), one of the leading agencies that conduct CBDRR programs in the country, also notes the lack of laws on disaster management to make DRR a priority at the national level and to provide the necessary framework for CBDRR as its biggest challenge.[12] In addition to the law, NDMC is also in the process of formulating a national framework for CBDRM. This would streamline the works of the organizations doing CBDRM in Maldives and establish a mechanism at NDMC to institutionalize CBDRM plans of islands. NDMC would also publish a facilitator's handbook to complement the framework.

b. Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis[13]

i. Strengths:

- ✓ Maldives has a national body for disaster management (NDMC) along with agencies that have the capacity and/or mandate to conduct CBDRR programs in the country.
- ✓ UNDP and MRC already use the Participatory Rural Appraisal (PRA) tools used in CBDRM. As a result, Maldives has been able to contextualize these tools.
- ✓ Community knowledge (traditional and contemporary) exists in terms of risk reduction, such as the traditional houses that have the kitchens in a separate building from the main house, as a strategy to keep the main house safe from fire incidents.

[10] Estimated Budget of the Maldives 2013, (Male: Ministry of Finance and Treasury, 2013).
[11] Fikry, Umar. Electronic conversation with the author, October-November 2013.
[12] Rishana, Fathmath. Email to author, October 31, 2013
[13] The author formulated the SWOT analysis by input by personnel from the National Disaster Management Center, Maldives Red Crescent, and own experience.

- ✓ UNDP, MRC, and MNDF have been conducting CBDRR trainings.
- ✓ The nation gives disaster management and especially DRR a priority when a disaster occurs. Maldives has had an increase in the number of flooding due to irregular climate patterns. The government and other institutions could use these disasters to build momentum towards DM and DRR. The affected islands have already been requesting NDMC to formulate CBDRM plans for the community.
- ✓ Ministry of Education has started to integrate DRR into the curriculum.
- ✓ NGOs and National Organizations such as the UN provide funding and technical support.
- ✓ An increasing number of NGOs are working in DM/DRR and social causes: such as Care Society, Society for Health Education, and Maldivian Youth Climate Network.
- ✓ Coordination between stakeholders is good during disaster situations.
- ✓ A high adoption rate of technology at the community level assists in establishing a better communication network for dissemination of information. Television, radio, mobile phone, and social media have increased the reach of information for remote areas.
- ✓ Maldives has homogeneous close-knit communities. People are of the same faith, speak the same language, and share an identical, unique, and rich culture.
- ✓ Several island councils (local governments) have given support to establish CBDRR in their constituency.

ii. Weaknesses:

- ✓ Lack of laws and regulations is the biggest challenge as it stops any institutional effort, and in a society caught up on legality of everything, DRR efforts lack constitutionally derived authority.
- ✓ Maldives lacks the human resource capacity in CBDRM, and only a handful of people in UNDP, NDMC, and MRC are aware of the CBDRM process in the Maldives.
- ✓ Communities cannot link their traditional knowledge to DRR and DM concepts and use it. Thus, the younger generations are ignorant of such knowledge.
- ✓ Due to the high turnover of people in islands and government institutions, it is difficult to maintain the trained people so that the communities could benefit from their knowledge.
- ✓ Lack of awareness regarding disasters/hazards in the country.
- ✓ DRR knowledge and capacity is very limited at the policy level in the government. Therefore, inclusion of DRR is not a priority in policymaking and developmental planning. As a result, many government projects are not disaster-sensitive and it might increase vulnerability to disaster in the future.
- ✓ Political disharmony hinders continuity in DRR efforts.

- ✓ Lack of accountability and proper planning is the island council level pushes the burden onto the central government.
- ✓ The government does not allocate funds to DRR efforts at the national or local level.
- ✓ Lack of coordination within sectors – Every institution tries to tackle DRR separately instead of adopting a holistic approach and integrating DRR into every sector. One example is the Ministry of Environment who mostly tends to work alone.
- ✓ There is little to no coordination among DRR experts in the country.
- ✓ The population of the Maldives is scattered across two hundred islands. It is impossible to provide the same service to every island given the economic status of the country.
- ✓ The administrative structure is very weak at every level and relevant authorities do a poor job of documenting CBDRM/DM projects. This trend continues to documenting disaster related information. As a result, it affects continuity and makes it difficult to get data on past disasters.

iii. Opportunities:

- ✓ The current Decentralization Act gives the mandate and the freedom for island councils to have a disaster management plan and to have a land use plan for the island.
- ✓ Island councils have the opportunity to seek funding through government budget for DRR activities if they include these activities in their annual budget plans.
- ✓ The Disaster Management Bill would be the quintessential step to start the comprehensive disaster management process in the Maldives.
- ✓ NDMC is in the process of formulating a national framework for CBDRM. This would streamline the works of the organizations doing CBDRM in Maldives and establish a mechanism at NDMC to institutionalize CBDRM plans of islands.
- ✓ There are few people trained in DRR, even though there is little coordination between them. However, NDMC can use their expertise if required.
- ✓ Educated youth are able to grasp technical concepts, and are sensitive to the effect of climate change and the impact of disasters on the economy.

iv. Threats:

- ✓ Land scarcity in islands means vital infrastructures and living area would always be near to the shoreline. There are no high grounds for evacuation and erosion exacerbates the situation.
- ✓ As DRR is not a priority and the members of the Parliament have little to no knowledge of DM/DRR, the requested budget for DRR programs do not get funding from the national budget.
- ✓ A weak and declining economy makes the government and the private sector reluctant to finance DRR efforts.

- ✓ Liable authorities are sometimes reluctant to take responsibility and shift it to another agency. This creates conflict of mandate among the institutions.
- ✓ Leakage of funds allocated for projects and government's hesitancy to accept leakage occurs. This would eventually cause disinclination from international organizations such as the UN to fund programs in the Maldives.

Looking at the findings on the above analysis, one would see that all the factors tie into the lack of authority for DM within the country. One could also argue that most of these problems arise from societal factors, such as a lack of willingness from government officials and the local community. Therefore, the mindset of the people as a whole should change before the nation could establish an effective CBDRR, if not a comprehensive DM, system.

c. CBDRR Programs in the Maldives

The 2004 Indian Ocean Tsunami ignited the beginning of the comprehensive disaster management process in the Maldives. However, given the infancy of Maldives in disaster management, let alone CBDRR, and, given the lack of funding for NDMC and unavailability of resources to conduct DRR programs, only private organizations and NGOs have been able to conduct CBDRR programs throughout the country. However, NDMC acts as a facilitator with the UNDP and other international agencies to facilitate capacity-building programs for the Maldives. The three main organizations that conduct CBDRR programs in the Maldives are MRC, MNDF, and UNDP.

i. Maldives Red Crescent:

Maldives Red Crescent is a relatively new national society. Hence, most of its focus is on institutional development and capacity building. Maldives Red Crescent Act mandates MRC to work in the area of disaster management and response. MRC also has the mandate to implement disaster risk reduction and climate change adaptation-related activities at the community level through the Strategic National Action Plan (SNAP) on DRR and Climate Change Adaptation (CCA) in Maldives. Consequently, DM is one of the strategic areas of program implementation set in the MRC Strategic Plan 2011 – 2015.

At present, MRC is implementing a CBDRR Project with focus on integrated preparedness, mitigation, and response components to increase resiliency to disasters and climate change risks for four Maldivian communities. This project uses a strategy of building the capacity of MRC in order to strengthen the delivery of community service and contribution to building resilience. It uses new DRR approaches, in line with the priorities outlined by the Hyogo Framework for Action (HFA) and the Millennium Development Goals (MDG), with focus on CCA. This project will go from 2010 until 2014. The Canadian Red Cross (CRC) funds the CBDRR project, and MRC manages the project, including logistics, planning, and implementation. MRC gets technical support from CRC and IFRC.

The Project Goal of this project is: ‘communities have capacity and resilience to address their basic needs’ and the eventual outcome is: reduction of the impacts of disasters on targeted communities as derived from the Canadian Red Cross (CRC) Strategy 2015. In order to reach the goal and the eventual outcome, the project will strive to achieve four immediate outcomes:

- ✓ National society long-term advocacy role: Increased national society DRR/CCA policies and advocacy actions that consider needs of the community;
  This component will facilitate MRC to fulfill its role as specified in the Strategic National Action Plan (SNAP) and the Disaster Management Bill where it has been positioned as a key partner in the implementation of DRR and CCA related activities at the community level. In order for MRC to be a key stakeholder and major partner in this area, Maldivian public as well as other organizations must recognize MRC. The aim of the output in this area is achieving recognition from both. One of the major lessons learned from Partner National Societies during the recovery from the 2004 Indian Ocean Tsunami was the importance of building good networks and coordination mechanisms with stakeholders. MRC is fortunate that the government recognizes it as a major partner. However, MRC has a long way to proceed to be active in this area. This project contains many activities such as attending multi stakeholder forums in DRR/CCA at national level annually, attending regular co-ordination meetings with NDMC to facilitate activities in DRR/CCA, and participating and supporting NDMC and other organizations in different DRR/CCA related activities.

- ✓ DM/DRR capacity building at the national society: Strengthened capacity of national society to sustain the delivery of DM/DRR programs;
  As MRC strives to establish itself in the area of DM/DRR, it aims to develop the required strategies, policies, procedures, and build the capacity of its staff to facilitate this process. MRC intends to build its capacity to sustain delivery of service for DM and DRR programs through this project. It will rely on the support of experienced 'movement' partners such as the CRC, South Asia Regional Delegation (SARD), and Asia Pacific Zone Office (Zone) in this endeavor. To date, MRC has made marked progress in developing DM/RR strategies, policies, and Standard Operating Procedures (SOP) as guidance to DM/DRR decision-making and implementation. This includes, the MRC Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) Strategy which was approved by the MRC Governing Board on June 2011. MRC has also approved an Emergency Response Mechanism and related SOPs and procedures in 2013. MRC will use these two strategic documents to implement the DRR/CCA Strategy and MRC Response Mechanism. MRC Headquarters and its branches will use the DRR/CCA strategy for annual planning. The MRC Response Mechanism will both inform the organizational disaster preparedness plan of MRC and assist in responding to emergencies.

- ✓ Community Immediate Disaster Management: Increased community ability to manage disasters including preparedness and response
  MRC has currently started the development of MRC Response Mechanism with the support of this project. The MRC Governing Board approved this effort in 2012. The Mechanism has

a strategy of establishing Emergency Response Teams (ERT) in all MRC Units and a National Emergency Response Team (NERT) at the national level. A comprehensive preparedness plan, which details the training, capacity building, and practice needed by these teams,will support the mechanism.

- ✓ Community Long Term Mitigation: Reduced underlying risk factors that affect communities

  Based on the Vulnerability and Capacity Assessments (VCA) conducted to date in target communities, MRC will be changing direction from using the traditional DRR model to using a resilience model for the implementation of DRR. MRC will use the existing VCAs compiled in 2010/2011 to factor in the resilience issues and priorities in communities, and to choose areas of interventions. MRC will then formulate awareness campaigns, both at public and community level to increase awareness on these issues. MRC will also help the target communities to develop community level Disaster Management plans.

Six communities initially took part in the event. However, two communities (highlighted in dark gray) are no longer in the project after an assessment in mid 2013.

Data Source:	**Census: Registered Population as of 4 July 2012**			**Census 2006**		**Council Office Data (Jan 2013)**
Island Name	**Total**	**Male**	**Female**	**Number of Households**	**Average Household size**	**Number of Houses**
HA. Hoarafushi	3,277	1,659	1,618	375	5.9	492
LH. Hinnavaru	4,676	2,404	2,272	482	6.3	498
K. Kaashidhoo	2,243	1,178	1,065	277	6.1	370
AA. Thoddoo	1,735	906	829	183	6.6	290
GDh. Gadhoo	2,953	1,514	1,439	328	4.4	360
S. Feydhoo	5,172	2,658	2,514	511	5.3	650

Figure 4: Islands where MRC conducted CBDRR programs

ii. Maldives National Defence Force:

The Maldives National Defence Force provides municipal fire fighting service in the country. Therefore, MNDF Fire and Rescue Service (FRS) conducts programs on fire awareness and helps formulate and practice evacuation drills for island communities, schools, and resorts. Furthermore, since the fire stations within the atolls are located in central locations within the atolls rather than every island (which is fiscally and physically improbable). As a result, firefighters cannot promptly respond to fire incidents in another island. MNDF Fire and Rescue Service started training volunteer firefighters in remote islands in order to integrate the community into firefighting as first responders until MNDF firefighters could get to the site.

Year	Island	Number of participants
2012	Sh. Feevaku	20
2013	HDh. Makunudhoo	20
2013	HA. Dhidhoo	40
2013	N. Velidhoo	23

Figure 5: Number of volunteer firefighters by islands

Thus far, MNDF has conducted the training at four islands. In a coordinated effort with nearby resorts along, MNDF has been able to acquire firefighting equipment for volunteer firefighters in Sh. Feevaku.[14] MNDF held the last program in N. Velidhoo and the graduates of the program signed an agreement stating that they would attend fire incidents in their community.[15]

iii. United Nations Development Program:

UNDP conducts CBDRM programs in collaboration with the government. UNDP provides the funding for the programs and coordinates with NDMC and local governments to conduct them. One of the recent CBDRM programs UNDP conducted was in Addu City in 2008. Over eight-thousand people participated in the program. Under this project, UNDP held a CBDRM facilitation workshop in each island. Participants from all stakeholder agencies participated in the workshop. Through the workshop, the participants trained to utilize CBDRM tools such as hazard mapping, Vulnerability Capacity Assessments (VCA), and collection of data for the planning process. Next, the participants worked to devise mitigation activities based on the VCAs and to formulate a response mechanism for disasters.[16]

NDMC recently started a two-year program with the UNDP; Enhance National Capacity for Disaster Risk Reduction and Management in Maldives. This project is worth 400,000 USD. The aim of this program is to assist the government of Maldives to strengthen its DRR and DM capacity, enhance national and local preparedness and reduce risks, and achieve its global commitment to the Hyogo Framework for Action (HFA) and the Millennium Development Goals (MDGs).[17] According to UNDP Maldives, this project will support:

- ✓ The establishment of the institutional and legal systems for DRR and effective DRR organizations/institutions;
- ✓ The strengthening of the end-to-end early warning systems and facilitate the implementation of public awareness campaigns and knowledge building on DRR and climate change adaptation.

[14] Rameez, Ahmed. Electronic conversation with the author. August 2013.
[15] News article on MNDF Website, http://www.mndf.gov.mv/mndf/News.php?newsid=864, accessed on November 15 2013.
[16] Fikry.
[17] *Enhance National Capacity for Disaster Risk Reduction and Management in Maldives*, (Male': UNDP, 2013).

- ✓ In increasing capacity of the community for disaster preparedness for effective response, and will entail a multi-hazard approach involving a multi-stakeholder engagement.
- ✓ The National Disaster Management Centre to be engaged as the primary implementing partner for the project to ensure sustainability and ownership. Assessing and strengthening the capacities of the NDMC as the lead national institution on Disaster Risk Reduction/Disaster Risk Management coordination, will also be a key component of this project.

d. Support from the central and local governments towards CBDRR

The Maldivian Red Crescent's main liaison from the central government is the Ministry of Health. However, MRC enjoys immense support from all the ministries in the government. As such, MRC is currently part of the National Technical Committee coordinated by NDMC. In addition to taking part in response efforts during disasters, MRC regularly participates, as observers, in evacuation drills conducted at schools in Male' City, and provides technical feedback. MRC has co-facilitated the trainings by Ministry of Education on School Emergency Operations Procedures for the managements of schools.[18] Likewise, the central government works closely with the UNDP in the implementation of such programs.[19] However, UNDP and MRC both have the freedom in conducting their programs. Unlike UNDP and MRC, the programs conducted by MNDF are independent.

At the local government level, every organization works closely with the island councils. For MRC's CBDRR projects, they hold focus group discussions with all key stakeholders at the local level. Island councils take part in all the local level committees and processes. This is true for UNDP sponsored programs and the programs by MNDF. The island councils help the facilitators to mobilize the community and arrange logistical arrangements for the conducting the programs.

Even though every council makes an effort to cooperate with the facilitators, some island councils have a lackluster attitude towards CBDRR. MRC has had varied responses from different councils, especially in the CBDRR Project. "We had to let go of two islands primarily due to a lack of support from the island councils and the communities," an official from MRC stated about the lack of cooperation from some island councils.[20] However, because of the hard work by MRC to create awareness on DRR and DM, a few island councils have requested for technical assistance in formulating their DM Plans and Contingency Plans.

In line with integrating CBDRR into the community, the CBDRR Project by MRC includes training on mainstreaming DRR and CCA into the development plans for governance (local councils) of the selected project islands. Their goal is to increase the understanding of the

[18] Rishana.
[19] Fikry.
[20] Rishana.

local community on the subject and integrate DRR and CCA into the developmental plans of the islands.

e. Feedback from the community and effectiveness of CBDRR programs

In general, the communities always welcome CBDRR programs. The public received UNDP's program in Addu City in 2008 with gratitude and appreciation. The community said that, "the process made them realize how vulnerable they are to hazards and the importance of risk reduction."[21] However, they were skeptical about a way forward because UNDP's program was not continuous and the government lacked any plans to carry on the project and support the community in its DRR initiatives.

The trend continues with programs conducted by MRC. The communities are appreciative of the CBDRR Project and the people feel that DRR and disaster preparedness activities are very important. Furthermore, since MRC works through volunteers, the communities feel that it helps in empowering the youth in the community.[22] Similarly, the turnout for programs conducted by MNDF gets a lot of support. These programs inculcate a sense of accomplishment and communal pride among the participants. Once again, many youth take part in these programs and it promises to foster a sense of resilience and personal responsibility among the islanders. One of the biggest achievements from fostering CBDRR among the communities is the ability for them to be safe during disasters and to find innovative solutions in DRR.

Every program is very effective as standalone programs. However, because of the government's inability to maintain continuity, most of the programs end up being awareness raising sessions. Thus, the communities were not able to sustain the knowledge and practice the skills they learned about CBDRR. One proof of this is that the workshops did not result in any written DM plans of the communities.[23]

In the projects conducted by MRC, the community conducted a VCA and led the development of a mitigation proposal for intervention in one of the problems prioritized by the community in their assessment. Volunteers developed the proposal with the guidance of a committee composed of people from stakeholders and the community. Even though only three islands were able to complete the proposals, albeit with a lot of support from the project staff, the exercise gave the community to take ownership of the project instead of making it something that MRC imposed upon them. Partly due to these programs, MRC volunteers have becomes assets in some of the islands and contribute to the awareness of the community and mitigation activities organized by partner institutions such as the Island Council or Health Centre. A true estimation of the success of this program at the community level will depend on the formulation

[21] Fikry.
[22] Rishana.
[23] Fikry, Rishana.

of a DRR Awareness Campaign for the four project islands and the finalization of the community's Mitigation Proposals within November, 2013.

f. Challenges faced in CBDRR in the Maldives

The geography of the country is the biggest challenge. Dispersed islands increases the costs of capacity-building programs as logistics cost almost two-third of the allotted funds.[24] The best way to overcome the fiscal burden is to train people within the community to promote CBDRR. As the author already covered in the previous chapters, major disasters occur rarely in the Maldives, and hence, DRR is not a priority for the communities and Maldives does not see the benefits of investing in DRR. MRC observes "a lack of awareness on how DRR can be integrated into normal activities and development plans" further compounds the lack of priority.[25] Another challenge is getting and retaining volunteers in some communities. As mentioned in the previous section, MRC stopped the project in two of the six communities due to a lack of support from the community and local governments.

As with the central government and the country as a whole, CBDRR is a foreign area for many communities. Few people have the education and the training in this area and due to the lack of the local government's willingness to be proactive, communities take part in CBDRR only when an organization runs a CBDRR project or during a disaster. This is evident during local emergencies such as floods, when the island councils would understand the importance of having local capacity to respond. However, they repeatedly fail to make CBDRR/DRR a priority in developmental planning or at the household level.

Lack of ownership and individual responsibility is one of the key issues that hinder CBDRR in the Maldives. One such example is the annual flooding in the southern atolls during the latter half of the year. Flooding occurs every year during the rainy season but the island communities fail to respond appropriately during the rainy season. There is minimal effort from the community to prepare for the rain and to establish simple DRR measures such as using sandbags to restrict water from entering the house. In addition to the lack of preventive measures, a few island communities take little to no action during flooding and leaves it for the response forces (in this case MNDF) to start work, and due to lack of laws in this area, the authorities are powerless to hold the people accountable for lack of preventive measures and the subsequent damages. However, there are a few communities that do take an active, if not a preventive, approach to respond to disasters. Mandating disaster insurance would be one way to remedy this.

Lack of continuity and commitment is another concern in CBDRR. Even though the turnout for training programs is high, the return investment from these projects is low. One such example was during the conduct of maintenance training of desalination plants. Following the 2004 Indian Ocean Tsunami, relief aid from the international community provided desalination plants for affected island. As part of the program, selected citizen from the community received

[24] FIkry.
[25] Rishana.

maintenance training. The participants earned a relatively good salary while the project was underway. However, after the training, the participants started getting other jobs that paid comparatively less. In the end, trained individuals never stay in the communities. Often times, they migrate within the country and their knowledge is lost. As a result, some of the desalination plants have been out of order, partly due to the lack of expertise in desalination plant maintenance, which often adds to the growing water shortage crisis.

Another major issue that concerns the MRC is the current political atmosphere. It is a distraction to the communities and it is difficult to make them focus on pressing issues. There is also the high possibility of politicizing any work by MRC or another organization, even though these organizations have to adhere to their fundamental principles and code of conduct, and the communities are not aware of it. Furthermore, the priorities of most local governments are the work of their respective political parties. Because of this, some councils deliberately delay developmental projects in the islands for political reasons.[26]

3. Summary of key findings in the Maldives

a. An infant institutional disaster management framework

Disaster management system in the Maldives is very new and CBDRR is an unfamiliar idea to majority of the population. The relief efforts after the 2004 Indian Ocean Tsunami established the National Disaster Management Centre but lack of proper legislation and governance hinders the DRR process at every level and fails to institutionalize the DM process. NDMC has been working hard to draft and ratify the Disaster Management Bill.

b. Lack of support from the grassroots level and the community

Disaster management is not a priority at the national level. The elected officials at the central government, local governments, and the Parliament lack knowledge on disaster management and disaster risk reduction, and hence, do not give DM a priority. This affects the national budget for DM, which currently has no funding for DRR activities. The trend continues to the community who are not aware of CBDRR efforts and the importance of CBDRR. Grassroots level sees any preemptive spending on DRR effort as unnecessary expenditure. In addition, since Maldives does not experience disasters often, the return of these investments is not immediately visible to policy makers and the community.

c. Excellent CBDRM/CBDRR projects albeit lack of continuity and coordination

National and other organizations conduct awareness programs and DRR programs for the community. UNDP, MRC, and MNDF conduct various CBDRM/CBDRR programs. NDMC, the

[26] Rishana.

national organization in charge of DM, has been unable to conduct any programs due to lack of funds. Similarly, the organizations that conduct these programs do not coordinate with each other. MRC coordinates with the Ministry of Health but does not liaise with NDMC when conducting programs. Likewise, when MNDF conducts a program, they are independent. The possible redundancies waste the few resources in the country.

Most the island councils mobilize the community and provide the support to conduct the programs and the participation of the community is excellent. The numbers of schools that take the initiative to formulate and practice evacuation plans and drills increase every day, under the observation of MNDF Fire and Rescue Service, MRC, and the Ministry of Education. If the relevant authorities were able to maintain continuity in the programs, the communities would benefit more in the long term.

d. CBDRR is the only solution

Given the economic status of the country, CBDRR is the only way to counter and minimize disasters. Long-term planning is necessary to build the physical infrastructure. Meanwhile, the communities should adopt the DRR effort and foster a culture of resilience. Maldives is a close-knit homogeneous society. This is the biggest strength of Maldives that could establish disaster resilient communities under proper guidance and holistic planning. At present, the organizations involved in DRR need to coordinate in a joint effort. If so, the current effort towards DRR would yield better results.

III. LITERATURE REVIEW AND FINDINGS - JAPAN

1. Institutionalization of community-based disaster risk reduction in Japan

a. Laws and regulations

The most important step in institutionalizing CBDRR is establishing the required legal framework. Following the disastrous Ise-Wan Typhoon in 1959, the Japanese government enacted Act number 223, the Disaster Counter Measures Basic Act, on November 15, 1961:

> "For the purpose of protecting the national territory, the life and limb of the citizens and their property, this Act shall have for its aim the establishment of a machinery working through the State and local governments and public corporations and the clarification of where responsibilities lie, and provide for the formulation of disaster prevention plans and basic policies relating to preventive and emergency measures and rehabilitation programs to deal with disaster, and other necessary measures as well as financial action, thus ensuring an effective and organized administration of comprehensive and systematic disaster prevention with a view toward the preservation of social order and the security of the public welfare."[27]

This Act remains the principle legislation that governs disaster management in Japan. Under this Act, prefectural and city governments established their own laws to govern their respective DM process. Chapter I, Article 5 - paragraph 2 defines the role of local governments in establishing community-based disaster response/prevention measures.

> "The mayor of the city or town or the head of the village shall, in order to fulfill responsibilities under the preceding paragraph, endeavor to employ to the highest degree all capacities of the city, town or village, by keeping the organization of fire fighting agencies, flood prevention units etc. in good condition, and by consolidating organizations related to disaster prevention of public groups within the area of the city, town or village and voluntary disaster prevention groups (referred to as "voluntary disaster prevention groups" in art. 8 para. 2) among the residents in a community spirit of mutual help."[28]

In addition to the local government, this Act covers every level of CBDRR. Chapter I, Article 6 covers the responsibilities of designated national and local public corporations during disasters. The next Article in the same chapter specifies the responsibilities of residents during disasters.

> "In addition to what is provided for in the preceding paragraph, residents of the area under local government are obligated to contribute toward the cause of disaster prevention by taking their own measures to prepare for disaster and by participating in voluntary disaster prevention groups etc."[29]

The above Articles enforce community-based effort towards DRR at every level and pave the way to make everyone involved accountable for their DRR effort or lack thereof. Ultimately, this Act is the mere backbone of the CBDRR effort in Japan. Based on this, Japanese citizens take CBDRR measures as a personal responsibility to the community.

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[27] Act No. 223 Disaster Countermeasures Basic Act, Provisional Translation by National Land Agency, June 1997, (Japan: November 15, 1961), Chapter I, Article 1.
[28] Ibid., Article 5, Paragraph 2.
[29] Ibid., Article 7, Paragraph 2.

b. National level organizations

Cabinet Office of Japan is the national agency that manages the DM/DRR programs in Japan and is the leading coordination body with all the other ministries in disaster related issues. Mr. Shinichiro Oe stated that Japan based DRR efforts on the principle of learning from the past.[30] Even though the Cabinet Office is not directly involved in the implementation of CBDRR projects, they coordinate at each level with other national organizations and local governments to ensure the projects go according to plan.

Another organization that plays an important role is the Japanese Meteorological Agency (JMA). JMA is in charge of the early warning systems. JMA along with its regional centers monitor and provide early warning for earthquakes, tsunamis, and volcanic activities. In order to do this, JMA and its regional centers have systems setup to monitor volcanic activities, and earthquakes twenty-four hours a day.[31] The main goal of the emergency operations is to issue tsunami warning, advisories, and earthquake information as accurately as possible in a short time.[32]

Several other national organizations contribute to DM/DRR in Japan. However, it is more important to note that the work at each level of the government complements the work of the corresponding organization in the other levels. This leads to better coordination between the different levels of the government and make a united effort towards DM/DRR.

c. Local governments

Local governments have the biggest stake in CBDRR as they have the reach to the communities and ultimately have the authority and tools to empower them. Each local government has their own laws and regulations to manage disasters. However, they all cover the basic fundamental principles as outlined in the Disaster Counter Measures Basic Act. Furthermore, local governments prepare the response plans and evacuation drills with input from the community. The central government provides general guidance for the plans. In Kobe City, the local government provided the location and voluntary disaster groups formulated the plan.

Apart from the DM/DRR plans, local governments also have monitoring systems. The Hyogo Disaster Management Center has an operation center that monitors the Hyogo Prefecture for any disasters twenty-four hours a day. Furthermore, Hyogo Disaster Management Center also had provisions for the staff such as accommodation and food for use during disasters as the center goes to full staffing during disasters.[33] Furthermore, the office also has a stockyard that

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[30] Shinichiro Oe, “Disaster Management of Japan” (lecture, Cabinet Office, Japan, Tokyo, October 3, 2013).
[31] Masaki Nakamura, Tanaka, "The Earthquake Early Warning System of the Japan Meteorological Agency" (lecture, Japan Meteorological Agency, Japan, Tokyo, October 3, 2013).
[32] Sayoko Furuta, "Earthquake Information and Tsunami Warning Service at Regional Center" (lecture, Seismological and Volcanological Division of Osaka District Meteorological Observatory, Japan, Osaka, September 5, 2013).
[33] Nishijima, "Recovery Efforts After the Great Hanshin-Awaji Earthquake" (lecture, Hyogo Disaster Management Center, Japan, Kobe, September 3).

contains a water reserve, fuel reserve, blankets, sleeping bags, and rice as emergency supplies during disasters.

Another interesting aspect of the local governments in CBDRR is hazard mapping. Local ward offices and disaster related offices all have hazard maps of their respective areas. These maps include evacuation areas and routes. In disaster prone areas, there are signs on the road that mark designated evacuation routes and the nearest evacuation area. In addition to hazard mapping, some of the best preventive measures found in Osaka from flooding are the floodgates and tidal gates. As some parts of Osaka are below the sea level, the best course of action without evacuating the populace is to engage these gates in conjunction with pumping stations.

One of the most striking features of the local governments is continuity of reconstruction plans. The Great East Japan Earthquake in 2011 affected Ishinomaki City, Miyagi Prefecture. In order to recover and get return the community back to normalcy, the city government has devised a reconstruction plan until 2020. It not only focuses on rebuilding the city, but also on building a more cohesive community.[34] Since this is a long-term recovery plan, the city government integrated the reconstruction plan into the developmental plan of the city in order to increase resilience of the community and better manage the finances involved.[35] Likewise, the Kobe City local government has continued to revise and reassess the recovery strategy since the 1995 Great Hanshin-Awaji Earthquake. After the initial recovery plan, Kobe City government conducted a comprehensive assessment in 2000 and expanded to promote the Kobe City Recovery Plan. The city government conducted another comprehensive assessment in 2003 and formulated a post-recovery plan.[36] The key component of this strategy is to work on social ties to make a 'new' Kobe. The key social ties identified in the strategy are self-governance and community solidarity based on the causal factors of self-sustainable individuals, mutual help, and establishment of attitude in social ties.[37] The main idea behind this is to involve the community beyond recovery and into developmental planning, disaster prevention, and disaster mitigation.

d. Research and development

One has to look around the communities in Japan to notice the development and DRR measures integrated within the infrastructure of Japan. This is because of the continuing research to develop preventive measures against disasters. During the Great Hanshin-Awaji Earthquake, seventy-three percent of the people died due to collapsing of houses and suffocation.[38] As earthquakes are one of the most frequent hazards in Japan, the government invested in establishing the Hyogo Earthquake Engineering Research Center or E-Defense. It is a three-dimensional earthquake testing facility and the largest of its kind in the world. The testing

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[34] Futakamai, Y, Endo, K, Interview by the author. Notes. Ishinomaki City, October 2, 2013.
[35] Hafriza, Interview by the author. Notes. Sendai, Tohoku, November 8, 2013.
[36] Comprehensive Strategy for Recovery from the Great Hanshin-Awaji Earthquake, (Tanaka Printing and Publishing: Kobe Institute of Urban Research, March 2010), Page 100.
[37] Ibid., 105.
[38] Ibid., 32-33.

facility conducts experiments on different kinds of building structures and building materials to determine the best and most cost-efficient structural designs to minimize damage.

Another disaster that occurs frequently in Japan is landslides. Studies at Kyoto University investigate slope failures and landslides using different types of soils. Through these experiments, the faculty are able to predict slope failure, and help in building counter landslide measures along the slopes.[39]

In addition to the two laboratories above, many more contribute to the research on DRR measures in Japan. This shows the willingness of the government to invest in DRR measures. Given the frequency of disasters in Japan, it is safe to state that the return in these investments is high. One of the best examples to see if DRR measures in Japan are working is to look at the Great East Japan Earthquake in 2011. With a magnitude of 9.0 on the Richter scale, it was the fourth largest earthquake recorded since 1900.[40] However, in terms of loss of life, it ranks at the twentieth place among the deadliest earthquakes since 1900.[41] Another point to note is that all the earthquakes except the 2004 Sumatra Earthquake had a smaller magnitude on the Richter scale compared to the Great East Japan Earthquake.

2. CBDRR through empowerment

Empowerment of the individual citizen is the imperative principle of CBDRR. In addition to providing the community with the responsibilities to contribute to DRR, it inculcates a sense of ownership and makes individuals accountable. Japan achieves this through two types of measures: materialistic and ideological. Physical preventive measures are the material structures and processes enacted to counter disasters at the community level. These measures provide the assistance communities need in order to save themselves from disasters and minimize the damage from disasters. Ideological measures are the intrinsic processes that accompany the physical measures. It involves participation of the community and plays the vital role of inculcating individual ownership in CBDRR efforts.

a. Physical preventive measures

The author already covered floodgates and tidal gates in Osaka in the previous chapter. The community operates these gates during times of disaster. This gives the responsibility of physically taking preventive action against disasters to the community. It also gives time for the citizens to evacuate high-risk areas. Likewise, ‘Sabo’ dams are another type of physical

[39] Professor Fukuoka, "Landslides" (lecture, Asian Disaster Reduction Centre, Japan, Kobe, October 22, 2013).
[40] Largest Earthquakes in the World Since 1900, United State Geological Service. http://earthquake.usgs.gov /earthquakes/world/10_largest_world.php, accesssed on November 15, 2013.
[41] Earthquake with more than 1000 deaths Since 1900, United State Geological Service. http://earthquake.usgs.gov earthquakes/world/world_deaths_sort.php, accesssed on November 15, 2013.

measures to prevent debris flow. Debris flow could be due to one of many reasons: heavy rain, volcanic activity, and seismic activity.

After the eruption of Mount Unzen in Nagasaki between 1990 and 1995, volcanic ash and mudflow buried the town of Mizunashi Honjin. This town is over seven kilometres southeast of Mount Unzen. Mount Unzen is still an active volcano and construction of Sabo dams is underway in the valley. One could see Sabo dams even in Mount Rokko in Kobe. In order to prevent landslides and debris flow, Rokko Sabo Office under the Ministry of Land, Infrastructure, Transport and Tourism, has a project to build dams in order to prevent debris flow and landslides. At present, Sabo Office has achieved a ratio of control of approximately fifty-seven percent of the total sediment.[42] During the 1995 Great Hanshin-Awaji Earthquake, approximately 770 locations on Mount Rokko collapsed. In order to prevent damage from slope failure during earthquakes, Sabo Office developed two types of measures: dams on slopes vulnerable to failure and hillside work.[43] While no amount of dams could stop debris flow, even a small delay could save lives by giving the community time to evacuate to a safe area.

Dissemination of information is another important measure that helps the community in communicating threats from disasters. The Cabinet Office established the J-Alert system: a nationwide automated early warning system. It has the capability to provide early warning to the central government within two seconds and the municipalities within five to twenty-three seconds.[44] The system buys time for communities to prepare, and evacuate if necessary. JMA uses television, radio, emergency messaging systems, and cell phones. Furthermore, JMA is able to estimate the maximum amplitude if a tsunami is imminent and estimate the wave velocity. The system disseminates this information to the public within three minutes.[45] At the national level, early warnings enable related authorities to control the trains, elevators, and factory lines. It also provides warning to workers performing hazardous tasks, schools, and most importantly, alerts the communities at home.[46] Early warning systems are not limited to earthquakes and tsunamis. The Sabo dams also have a monitoring system and provide early warning if a landslide is imminent or if a dam fails.[47]

If there is one thing that people carry on themselves, it is a cell phone. Therefore, the use of cell phones as an early warning device is very helpful, effective, and improves the reach of the early warning system. There are paid services that send messages to the user, issuing warnings advisories, and evacuation notifications. At the onset of an imminent disaster, the users will get messages warning and detailing the type of disaster. It also gives special notification for the elderly and the disabled during an evacuation.

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[42] Morihigashi, Sugiura, "Explanation of Outline of Work" (lecture, Rokko Sabo Office, Japan, Kobe, September 17, 2013).
[43] Ibid.
[44] Oe.
[45] Nakamura.
[46] Ibid.
[47] Morihigashi, Sugiura.

b. Ideological preventive measures

Developing a sense of belonging and taking ownership is the best way to integrate an idea in an individual. As such, almost all of the CBDRR efforts in Japan work at building a sense of ownership for individuals. The biggest project of this type is the volunteer fire fighting programs. These are usually retired firefighters. The city fire departments train them and coordinate closely in responding to fire incidents. The volunteer firefighters from Kobe operate from the outskirts of the towns as it takes time for the Kobe City Fire Department to reach the site. Therefore, the volunteer firefighters act as a supplementary first responder and enhance the capabilities of the city fire department. Furthermore, having volunteer firefighters helps raise awareness about fire incidents in the daily life of the communities and ensure that there is reach within the communities for the city fire department.

One could argue that everyone cannot be a firefighter and look at it as a lost opportunity when compared to the whole community. However, there are other programs equally important and beneficial. Town-watching is a participative opportunity for citizens to develop their own customized hazard maps. In comparison to hazard mapping by the local governments, this process provides another advantage. It forces individuals to think for themselves and come up with high-risk areas, possible evacuation routes, and evacuation areas. Nagasaki Prefecture Public Works Department works on building physical structures to mitigate disasters but these measures are costly and take a long time. It took the prefectural government twenty-two years to complete the dam and bypass on Nakashima River.[48] In addition, there are over eleven-thousand hazardous areas surveyed in the Nagasaki Prefecture. As a result, the prefectural government conducts concurrent town-watching programs for schools and the community, especially before the rainy season each year. This program enables, rather it forces, every individual to identify personally areas of concern. If the local governments merely handed hazard maps to every individual, hardly anyone would remember it or even look at it before a disaster strikes.

The main aim of empowering individuals is to give them ownership. The ‘Rokko Mountains Greenbelt Development Project’ by the Rokko Sabo Office stands as the best example that encompasses the physical and the ideological perspective of CBDRR. In this program, student from six Kobe municipal elementary schools pick acorns from nearby mountains and plant them in a pot at their schools. The children grow the seedlings for a few years. Students are responsible for their own plant and care for them throughout elementary school. The students go to Mount Rokko right before graduation and plant their acorn trees. This project embodies every principle of CBDRR and teaches the importance of contribution and personal accountability to the children.[49]

During the 2011 Great East Japan Earthquake, the city of Ishinomaki suffered great damage. However, the city officials claim that people were able to save themselves through ‘self

[48] Sugasaki. Interview by author, notes, Nagasaki Prefecture Public Works Department, November 5, 2013.
[49] Morihigashi, Sugiura.

protection groups' who were in charge of evacuation and managing evacuation centres.[50] Once again, this shows what happens when citizens are encouraged to make a difference and take initiative within the community.

3. Disaster education

One of the most noticeable things about Japan is that disaster education is a part of everyday life. Whether one goes to a government office or takes a walk in the town, posters, monuments, and memorials are everywhere. It plays an important role in educating about disasters. On a broader scale, there are three types of education for disasters: formal, non-formal, and informal. Formal education covers institutionalized learning, academia, and researches. Non-formal education includes disaster memorials, museums, and disaster drills. Finally, informal education covers educating through secondary mediums such as games, leaflets, and competitions.[51]

a. Formal education

Given that Japan is prone to disasters, disaster reduction is integral in the educational curriculum and is a wide field of study offered at the universities in Japan. The author had a chance to speak to students and professors from different universities in Japan. The education system in the colleges covered many different aspects of disaster reduction. There are faculties that specialize in landslides, business continuity management, flooding and inundation, earthquakes, and typhoons. Having such a vast field of study is vital in promoting DRR among the population.

b. Non-formal education

One can argue that every disaster struck site in Japan has a memorial. This serves two purposes. First, it provides a way for people to see the extent of the damage from the disaster. Secondly, it generates revenue in the shape of tourism. While 'disaster tourism' is somewhat unorthodox, it helps create awareness among the citizens and visitors about what occurred.[52] An interesting fact about these memorials and museums is that they offer a comprehensive overview of the related disaster. For example, the DRI Museum in Kobe City covers how earthquakes occur, with special focus on the 1995 Great Hanshin-Awaji Earthquake. Visitors also get a chance to experience earthquakes in a theatre or a simulator. Finally, visitors get a chance to look at pictures and displays from the disasters, and listen to testimonial from survivors. Nojima Fault Prevention Museum gives the chance for visitors to experience an earthquake while Mount

[50] Futakami and Endo.
[51] Glenn Fernandez, "Environment and Disaster Education Research at IEDM Laboratory" (lecture, Kyoto University, Japan, Kyoto, November 12, 2013).
[52] Ibid.

Unzen Disaster Memorial Hall gives the chance to experience volcanic eruptions. These places offer a free environment for everyone to appreciate and learn about disasters.

Another example of non-formal education is drills. Each city has mandatory disaster drills at different levels. In Kyoto City comprehensive disaster drill, members from the Self Defence Force, Japanese Red Cross, Firefighters, and Utilities companies take part in the event. Each service gives a demonstration on what they can do during a disaster. People might view these types of drills as a show for the public, but from the perspective of these services, they get a chance to coordinate with their fellow services and train to work together during disasters. In fact, it is unlikely that they get a chance to conduct joint training during their everyday work life.

Japan also conducts drills in which the community takes part in the training. The annual disaster drill in the district of Shinjuku in Metropolitan Tokyo is an example of the integration of the private sector and the community into the government's DRR efforts. Since Shinjuku is in metropolitan Tokyo, the area is full of private businesses and companies. As such, the private sector plays an important part in managing disasters in the area. One such example is Kogakuin University, a private institution, which accommodates the disaster drill for medical evacuation. The Japanese Red Cross (JRC) organize and conducts the drill, while doctors and individuals from the government and private sector participate in the drill. In addition, volunteers from JRC and the university, fire fighters from the Tokyo fire department also participate in the drill. The JRC staff teaches the participants on how to correctly dress a wound or carry a stretcher. JRC The drill is a success as a participative learning experience.

The second part of the disaster drill at Shinjuku is the evacuation drill that takes place in the office building of Sompo Japan, a Japanese insurance company. In addition to conducting the drill, Sompo Japan has an agreement, the first of its kind, with Tokyo Metropolitan Government to accommodate up to three-hundred stranded individuals during disasters.[53] In addition to the evacuees, the building would accommodate everyone who works in the building during a disaster and have the basic supplies required for the first sevent-two hours. Shinjuku disaster drill highlights the effectiveness of corporate social responsibility in the private sector.

It is noteworthy to mention that private companies conduct their own disaster drills. Mr. Shigemoto, head of factory of Nada Kobe Coop, holds full-scale disaster drills fourteen times a year at his factory. Even though his subordinates were sceptical at the start, he continued the program and made sure everyone was serious. He laughs today about how he would make people redo the drills because they did not take it seriously. This was before the 1995 Great Hanshin-Awaji Earthquake. He mentioned with pride that, from his five-hundred employees, only one suffered any injury during the earthquake. Everyone else managed to evacuate.[54] Through rigorous drills, Mr. Shigemoto was able to save the lives of everyone who worked at his factory.

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[53] Kojima, Tadashi. Interview by author, notes, Sompo Japan, November 7, 2013.
[54] Shigemoto, "Community-Based Disaster Risk Reduction" (lecture, Asian Disaster Reduction Center, Japan, Kobe, October 18, 2013).

This is quite an achievement given the fact that dissemination of information and DRR efforts was not the same standard as present day.

Another event that underlines the importance and success of evacuation drills is the infamous 'Miracle of Kamaishi'. After the 2011 Great East Japan Earthquake, the students of elementary and junior high school of Kamaishi City in Iwate Prefecture managed to evacuate successfully.

> "A prime example was the children in Unosumai, the hardest-hit district in the city. Immediately after the magnitude 9.0 earthquake struck that afternoon, the students of Kamaishi East Junior High School ran out of the school to higher ground. Their quick response prompted the children and teachers of the neighboring Unosumai Elementary School to follow, and consequently drew in many local residents. As they continued to run, older students supported the younger schoolchildren, and together they reached a safe location while behind them the mega-tsunami swallowed their schools and the town."[55]

This incident is an inspirational example of the success of disaster education. An animated cartoon depicting the event at Kamaishi City is now used as a disaster education tool. Moreover, this incident shows the power of empowerment and personal responsibility from disaster education, because teachers and children made the decision to evacuate even when the hazard maps showed the area was safe.

c. Informal education

The importance of informal education is that it is useful for building personal responsibility in children who are unlikely to pay attention when forced into something. Kiito, an NGO that uses art to educate on disasters holds an event known as the Kaeru Caravan. The event contains DRR-based games aimed at creating awareness among children. Participants win points when they do the specified activity at each stall and exchange the points for toys. One of the most interesting stalls at the event is the usage of a car jack to rescue someone under a collapsed house. It highlighted the importance of working with what one had. This project does not only educate children, it also heps get rid of unwanted toys.

Furthermore, informal education allows integrating disaster education into everyday activities. Mr. Hafriza is from Indonesia and he was in Banda Aceh when the 2004 Indian Ocean Tsunami occurred. He stated that many people did not know about a tsunami. However, as he was an avid reader of manga (Japanese comics), he had read about tsunamis and knew what was happening.[56] Even if manga included simple facts like this unintentionally, it is a smart way to reach the younger generations.

Success stories similar to above may not be many, but the truth of the matter is that education is the first step before enacting disaster preventive infrastructure. Even if the community has the latest technology in terms of seawalls, floodgates, and early warning systems,

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[55] Public Relations Office, Government of Japan. *The 'miracle of Kamaishi': How 3,000 students survived 3/11*. http://mnj.gov-online.go.jp/kamaishi.html Accessed on 19 November 2013.
[56] Hafriza.

education is what would enable them to learn what to do when disasters occur and helps maintain priority on DRR at all levels.

4. Culture/Society

Japan has had so many disasters that disasters are as much part of the Japanese culture as its cuisine or art. The main difference between Japan and other countries when it comes to disasters is that people are willing to learn and there is a sense of individual responsibility around every citizen. Furthermore, the culture of Japan is to embrace nature. The call by Mr. Hatakeyama, a survivor from the 2011 Great East Japan Earthquake, to use traditional means to recover and to be in harmony with nature underlines this culture. Instead of moving to a different area after the tsunami, he decided to stay back and recover his oyster farming business.[57]

Similarly, Japanese culture is about learning from experience and doing better next time. When a disaster occurs in Japan, officials and citizens would think about how they could have protected the disaster. This is evident by the discussions between the local governments and the communities to devise recovery plans. The citizens would never talk about the enormity of the disaster or blame the authorities.[58] This culture is conducive to establishing close ties within the community and maintaining good relations with the authorities.

An additional aspect of Japanese culture is the concept of mutual help. During the Great Hanshin-Awaji Earthquake, neighbors rescued the trapped individuals even before the help from authorities arrived.[59] Furthermore, the communities managed disaster preventive measures such as patrolling the forests under the guidance of the elders of the village or managing rivers.[60] This notion of volunteering and helping echoes in every conversation with anyone from Japan.

The turnout from the community and the private sector for disaster drills and such events show how well they embody the responsibilities of contributing back to the society. Add to this Japan's culture of building back better after a disaster, and the resulting efforts by the locals and the government is amazing.

Furthermore, the rehabilitation process after a disaster is just as commendable as the DRR efforts. The children's market in Ishinomaki City is one such event. The aim of the event is to improve livelihood within the community who were trying to get back to normal ways after the mega disaster in 2011. In this market, there were stalls set up by children that sold vegetables, coffee souvenirs, and other such things. A few children talked about what they did and each of them had come early morning to set up the stalls. Even though adults helped them, the effort of the children was evident. At the end of the market, the children dismantled the stalls and helped

[57] Kinagami, "JICA Reconstruction Assistance for the Great East Japan Earthquake" (lecture, JICA Tohoku, Japan, Sendai, November 8, 2013).
[58] Hafriza.
[59] Kojima and Shigemoto.
[60] Shigemoto.

the adults to load the trucks. Apart from revitalizing the community, such activities help rekindle the cooperation within the community and instil a sense of responsibility within the children.

Lastly, the willingness of the community to learn about disasters and involve their children is remarkable. Even at the Open Day event at Kyoto University, many parents go with their children and take part in some of the activities or just watch the presentations by the students of the university. Organizing such events and the support by the community helps in threefold. First, it allows the community to witness the progress made by the work on DRR. Second, it gives the students and faculty a chance to show what they have achieved to the community. Finally, it inspires children to develop a mindset towards such activities.

5. Challenges in CBDRR

a. A false sense of security

One of the biggest reasons for the high death toll and the damage from the tsunami during the Great East Japan Earthquake was that the authorities under estimated the extent of the disaster. Mr. Shinchiro Kurihara, a 73-year-old survivor from Higashimatsushima spoke about the night of the tsunami. He misjudged the height of the tsunami based on the information given by the authorities. By the time he realized the tsunami was bigger than he previously thought, it was too late and he sought refuge on the second floor with his disabled wife.[61] Every survivor and government official who spoke about the disaster mentioned this trend of false sense of security. Something similar happened in Onagawa City as well during the 2011 earthquake and tsunami. Everyone expected the tsunami to come from the sea whereas it came from the river. Some who climbed the nearby high ground to escape thought it was enough. However, the tsunami climbed the slope and some lost their lives. This over reliance on disaster mitigation efforts creates a false sense of security.

b. Declining economy and population

Even though Japan is one of the most developed countries, the economy is slowly declining. Even though Japan has the technology and projects, the fiscal challenge will be hard on the government.[62] Add to this the declining population and the country is facing many issues. The declining population is even more visible in remote disaster struck areas where the young leave the villages leaving behind an elderly community.[63]

c. Disjointed and traumatized communities

Even though victims of disasters get temporary housing, and eventually permanent housing, it disrupts the communities. Especially since the elderly remain in the local villages,

[61] Kurihara, Shinchiro. Interview by author, notes, Temporary Housing - Higashimatsushima, November 9, 2013.
[62] Kinagimi
[63] Kurihara

they have to reacquaint themselves with new neighbors and this has been one of the biggest challenges for the survivors.[64]

Another survivor, an elderly woman, stated that the youth have left and will not return because there no work available. Her forty-five-year-old son works in the city government. She said that her son saw the tsunami reached the third floor and she told us about his trauma following that: he refuses to acknowledge the incident, and has forbid the word 'tsunami' in the household. These are all causes for concern as unity and camaraderie is the biggest strength of the Japanese people. The failure to address this issue right now could lead to deterioration of values in the community.

6. Summary of key findings in Japan

a. A holistic approach to CBDRR

The CBDRR system in Japan aims to involve and empower the community. The laws mandate it upon individuals and the local governments. The local governments have a free role in implementing its DRR activities but do so based on the guidance from the central government and in close coordination with the community. Disaster education has been the key in empowering individuals. Furthermore, the societal values are biggest factor that makes CBDRR successful in Japan, where every organization from the government to the private sector and NGOs is involved in the CBDRR process. These organizations deal with CBDRR on all 'fronts' of the community.

b. Look-Learn-Participate

The key principle of Japan in disaster management is to accept that disasters occur, learn from the experience, and to practice better mitigation efforts. Participation of the citizens at every level of the DRR process makes it possible to establish a resilient community. Individuals take part in programs such as town-watching and have a sense of ownership to contribute to the community. Furthermore, local governments formulate recovery plans and integrate developmental plans within the recovery plans.

c. Continuity is vital for an effective CBDRR process

Japan manages to establish continuity in its DRR efforts by involving the community and the local governments. The local community is responsible for input and feedback for the DRR efforts and hence, even if the top-level leadership changes, the projects continue with work from the permanent cadre.

[64] Kuroda, Mieko. Interview by author, notes, Higashimatsushima, November 9, 2011.

IV. CONCLUSION

1. Discussions

Japan's biggest strength in having a comprehensive CBDRR system is the culture and the intrinsic nature of contribution by the community. Most importantly, disaster management is a priority at the grassroots level and the legal framework identifies and mandates stakeholder agencies to promote CBDRR. At the same time, local governments have better outreach to remote communities than the central government, and involve these communities in the DRR process. Lastly, the CBDRR effort in Japan relies on empowerment of the individual through coordinated efforts at every level of the government.

Maldives faces a tough battle in establishing a comprehensive CBDRR program. In order to accomplish this, the national government must start from the basics and establish a strong disaster management framework. At the same time, it must continue concurrent efforts to bring in relevant stakeholders at the national level and remove any redundancies in the mandates of different organizations (as it related to DM/DRR), while assigning relevant mandates to the ministries and national agencies that contribute and should contribute to disaster management. At the same time, local governments need to lay aside the political differences and proactively coordinate with the national government. Unless disaster management in the Maldives meets these basic requirements, it would be difficult to establish a comprehensive CBDRR system in the Maldives.

2. Recommendations

i. Maldives needs to enact the Disaster Management Act as soon as possible. In a passive community such as the Maldives, assigning legal mandates and responsibilities is the only way to institutionalize a comprehensive disaster management process.
ii. NDMC needs to lobby in the national government and make DM a priority by showing the fiscal advantages of a good DM system and efficient and effective DRR measures.
iii. Institutionalize evacuation drills and conduct island-wide evacuation drills that rely on using what is available on site.
iv. NDMC needs to take the lead and coordinate with the current organizations that conduct DRR projects to be on the same page.
v. Strengthen the continuity of ongoing programs like the volunteer firefighters program by MNDF and the CBDRR project by MRC.
vi. Conduct innovative programs for disaster education such as Kaeru Caravan that would leave a lasting impression on the participants.
vii. Find ways to make current disaster education programs empower individuals. One example is whenever there is a tree-planting program in the country; make the individuals grow a plant instead of picking a plant from somewhere else. This is similar to the project

by Rokko Sabo Office. This would give the participants a sense of accomplishment in addition to empowering them.

3. Further studies

i. This study focuses on the DM/DRR/CBDRR efforts in Japan. The next step would be to conduct a thorough research on the Maldives with special focus on the local governments.
ii. A research on how Japan set up its disaster management process would be of use to the Maldives and would help in establishing the system in the Maldives.
iii. Since climate change is a big issue in the Maldives, a study on how DRR measures are coordinated with climate adaptation measures in Japan would be another field of study that would benefit the Maldives.

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