Chapter 8

Community-Based Disaster Risk Reduction Education in Japan

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8.1 Introduction

Community-based disaster risk reduction (CBDRR) is considered to be the core of any risk reduction approach. CBDRR is defined as an approach that seeks to: (1) reduce the vulnerabilities and increase the capacities of vulnerable groups and communities to cope with, prevent, or minimize loss and damage to life, property, and the environment, (2) minimize human suffering, and (3) hasten recovery (Shaw 2016).

CBDRR has been emphasized from the beginning of the United Nations International Decade of Natural Disaster Reduction (1990–1999). From the 1994 Yokohama Plan of Action to the latest Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030, a massive change has occurred in the concepts, approaches, and methods used to reduce the impacts of disasters. In the 1990s, the focus was more on multi-stakeholder and local governance; however, since 2000, more risk-sensitive investment planning has been emphasized, and risk-informed decision-making has become the core of risk reduction (Shaw 2016). In relation to understanding risk, the SFDRR emphasizes that disaster risks have local and specific characteristics that must be understood to devise measures that reduce disaster risk. Since the scale and degree of a natural disaster depend on local conditions, each community needs to enhance its capacities (UNISDR 2015).

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In Japan, there are three types of help for disaster risk reduction (DRR): self-help, mutual help, and public help. Owing to the massive scale of the 2011 Great East Japan Earthquake (GEJE) and tsunami disaster, municipal governments were severely affected, and their ability to help people was paralyzed. In this situation, community residents were responsible for supporting each other's survival, such as through evacuating from tsunami-affected areas, operating evacuation shelters, and securing adequate supplies of food and water. In essence, communities became first responders. Due to the recognition of the limitations of public help after this calamity, the importance of self-help and cooperation within each community has been reemphasized. Since the GEJE, accurate risk assessment by the government and experts, as well as interactive risk communication among the government, experts, and community residents, has been reemphasized to gain a better understanding of local disaster risks and take appropriate action in times of emergency. Based on the 2011 disaster experience and the lessons learned from it, how to protect individual lives effectively and respond practically to catastrophic situations at the local level are key issues for enhancing community resilience (Sato et al. 2018).

Acknowledging such a trend in international strategies and national level policy arrangements in Japan, this chapter examines three Japanese case studies on CBDRR and DRR education—in Sendai and Ishinomaki Cities in Miyagi Prefecture and in Joso City in Ibaraki Prefecture (Fig. 8.1)—to extract some lessons learned that could apply to community-level adaptations to climate change in East and Southeast Asian countries.

Fig. 8.1 Location map of the three case studies

8.2 Development of Community-Based Human Resources for Disaster Risk Reduction (DRR)

8.2.1 Promoting Sustainable Community-Based Disaster Risk Reduction (CBDRR) in Community Development

In Japan, mutual help has been promoted through activities by community-based disaster management organizations (*jishu-bousai-soshiki* or *jishubo*), which are volunteer-based community governance units within neighborhood associations (*chonaikai*). Local government agencies make full use of these organizations to transmit information and instructions to neighborhood residents. Although neighborhood associations in Japan have long histories and deep roots in their communities, their capacities have been weakened, and they increasingly face the prospect of disappearing due to urbanization, the diversification of lifestyles, and the aging of the population. Therefore, although the *jishubo* to household ratio remains high, individuals are not necessarily motivated to volunteer, and the role of the *chonaikai* leader rotates among its members. Moreover, members have passive attitudes and lack a proactive approach toward promoting disaster preparedness in the community (Kuroda 1998). In this situation, DRR efforts represent an additional burden imposed on these neighborhood associations, on top of their regular daily activities, including neighborhood cleaning, garbage collection, and recycling, as well as organizing community activities such as athletic and cultural events (Sakurai and Sato 2017).

The case of Katahira district, Sendai City, Miyagi Prefecture is an example of an innovative approach to develop sustainable CBDRR. Katahira district has a long history of development with the castle town of Sendai Han (a feudal domain). The southwest side of the district is bordered by the meandering Hirose River, while the east side connects to the central business district of Sendai City, including Japan Rail Sendai Station. The major local disaster risks include earthquakes and flooding. The main body to promote DRR is the Katahira Community Development Association (KCDA), which was formed in 2013 as an organization to implement community development plans representing four major goals: establishing safety and security, energizing the community, conserving and making active use of history and the environment, and developing a sustainable community development system. Within the KCDA, the Katahira Union Neighborhood Association, a union of nine *chonaikai* in the district, plays a central role in aligning various related organizations.

The KCDA responded to the GEJE disaster by establishing and managing evacuation facilities in their district. Katahira-cho Elementary School was designated as an evacuation center by the city and opened as a shelter to accommodate about 1500 evacuees. The original capacity of the shelter, which was mainly for local residents, was 350 evacuees; however, 85% of all the evacuees, including tourists, business travelers, employees at neighboring businesses, and foreign students, were stranded. Having such experiences, since 2011, the KCDA has been working increasingly

harder on strengthening their DRR capacities by developing disaster response, disaster survival, and shelter management manuals, conducting emergency drills, and transmitting DRR information to local residents, including foreigners, in cooperation with related local stakeholders (Sato et al. 2018). These DRR activities were led by community disaster management leaders, called *Sendaishi-chiiki bosai leaders* (SBLs), who are trained and certified by the Sendai City government to serve their community's DRR activities. In addition to adult activities, school-aged children from elementary to high school formed a Katahira district community development team for children in 2015 under the KCDA to conduct community development activities.

As a model project under the fiscal year 2016 Cabinet Office Community Disaster Management Plan, the KCDA developed a CBDRR education activity that involved the entire community, called the “Disaster Risk Reduction X Treasure Hunting Game (DRRTHG)”, to foster human resources from the next generation. As a result, treasure hunting conducted by event planning firms and local municipalities to revitalize the community and attract tourists became a popular activity in Japan. In a basic procedure of the treasure hunting game, the participants follow a “treasure map” to explore the town and search on foot for a treasure chest hidden at a location in the town. The DRRTHG was developed by the KCDA as an application of a treasure hunting game for DRR. In the DRRTHG, the SBLs and KCDA members guide elementary and junior high school children across the district to explain the abundant nature, culture, and resources for DRR by walking around in the manner of a treasure hunting game. The “Crescent Corps” certificate, on which five rules to become a good community member are printed, is awarded to the children who participate in this activity and pass the evaluation test; these children are expected to become the local human resources for next-generation DRR. The “Crescent Corps” is named after the crescent that was decorated on the front side of *Masamune Date*, a founder of Sendai Han. These rules are fundamental to the concepts of self-help and mutual help, and to the spirit of incorporating DRR into community development planning.

The KCDA continued to implement the DRRTHG from 2016 to 2019 by changing the search area in the district. In the 2019 implementation, elementary school children who participated in the first DRRTHG became senior high school students and served as guides to the participants from local elementary and junior high schools. Fig. 8.2 shows the Katahira DRR survival map (left) and a photo of participants in the 2016 DRRTHG event (Sato et al. 2020).

Fig. 8.2 Examples of Katahira District's disaster risk reduction (DRR) activities

8.3 Understanding Local Disaster Risk by Utilizing Geographical Maps at School

The second case is a school-based DRR education program developed in Ishinomaki City, Miyagi Prefecture, one of the coastal municipalities most severely affected by the GEJE and tsunami. Ishinomaki City experienced the tragic Okawa Elementary School Incident, in which 74 of 108 pupils under school supervision, 10 teachers, and 175 local residents were lost as a result of the tsunami that came upstream along the Kitakami River. The Okawa Elementary School Incident resulted in a lawsuit in which the Sendai High Court ruled that the school had failed to meet their obligations to designate a third tsunami evacuation area and to clarify evacuation areas and routes in its risk management manual in advance, and was therefore guilty of negligence. This incident taught important lessons, such as that each school should foresee its own local disaster risk and that all schools should prepare for effective and practical school disaster safety based on the school district's risk assessment with the support of the municipal government and DRR experts (Sakurai 2021).

The Reconstruction and DRR Mapping Program (R-DRRMP) is a school-based DRR education program developed in Ishinomaki in 2012. The R-DRRMP consists of orientation, town-watching, map-making, and presentation of the produced maps. For the first 3 years of the implementation, it was aimed at recording the progress of reconstruction at one of the tsunami-affected schools in the coastal area. A survey was developed with the ninth-grade students at a junior high school in 2018 to follow up the fourth-grade pupils who conducted the Mapping Program in 2013. The results confirmed that they had more pride and affection and were more motivated to think about the future of their community's development than were students from the same grade who had not participated in the R-DRRMP (Sakurai et al. 2020).

A teachers' guidebook on the R-DRRMP published in 2016 helped schoolteachers localize the contents according to the geographical and socioeconomic characteristics of the school district (Tohoku University, 2018). This guidebook contains a teaching plan for incorporating the utilization of maps into town-watching and map-making activities. Based on the guidebook, a teacher training program on how to understand local disaster risks at school by utilizing topographical maps was started

Fig. 8.3 Sample maps at a school district in Ishinomaki City
 (Source: [Left] edited by authors based on a topographic classification map created by the Geospatial Information Authority of Japan; [Center left] edited by authors based on the Kitakami River inundation forecast map created by the Ministry of Land, Infrastructure, Transport and Tourism; [Center right] edited by authors based on a landslide hazard map created by the Ishinomaki City government; [Right] photo of a disaster risk reduction (DRR) map created by a junior high school in Ishinomaki City)

in 2019 (Sakurai et al. 2019). This training program aims at enhancing map-reading skills and fostering teachers' capacity to understand local disaster risks, even beyond those expected, through the reading of topographical and hazard maps. Teachers who participate in the training are expected to utilize these skills in their school's DRR education and improve their school disaster response manual.

Figure 8.3 shows a series of maps prepared for a school district located inland of Ishinomaki City nearby the Kitakami River. The far right panel shows a DRR map made by seventh-grade students in 2019. Students compared these maps in the classroom and conducted town-watching by interviewing local residents to determine the actual damage caused by Typhoon Hagibis in their school district in 2019. The red-colored area indicates the flooded area. The R-DRRMP in Ishinomaki City thus became one of the main approaches for teachers and students to gain a better understanding of their local disaster risks.

8.4 Local Social Networking Service (SNS) Broadcasting System for Facilitating Communication Among Local Residents and a Customized Evacuation Action Plan (“My-TimeLine”)

In September 2015, heavy rains in the Kanto and Tohoku regions caused massive flooding in Joso City, Ibaraki Prefecture. Vast fields occupy the area between the Kinugawa and Kokaigawa Rivers, and Mt. Tsukuba (877 m above sea level) can be seen in the distance. Ground level is lower than the river level in some places. Historically, flooding has occurred in this area many times. When the Kinugawa embankment broke during the rainfall of 2015, one-third of Joso City was inundated—even the first floor of the relatively new city hall was flooded. In addition, more than 5000 houses were completely or partially destroyed and more than 4200 people needed to be rescued.

Many residents of Neshinden district in Joso City were able to take refuge before the flooding and earlier than the residents in other areas. One of the reasons for the earlier evacuations in this district was the utilization of a local social networking service (SNS) broadcasting system, “Neshinden Hot Mail”, which has been in operation in the district since 2014. Before 2014, the leader of the *chonaikai* had to call each household individually (Wagamachi Neshinden (My hometown Neshinden) (n.d.)). The introduction of the “Neshinden Hot Mail” system allowed the local *chonaikai* leader to deliver short textual information to all local residents at the same time. The new system makes it possible to display textual information on mobile and smartphones through a single operation on a personal computer.

As the rainfall was becoming increasingly heavy, the local leader sent a series of short text messages informing residents of the Neshinden district about the flood stage of the Kinugawa River and issuing evacuation warnings. These SNS messages urged local residents to take early evacuation actions. The success of this system highlighted two main points:

1. Receiving information is possible with only a mobile phone

Even though the SNS broadcasting is only one-way communication, local residents, including older people, could receive information easily and instantly on their phones. As most of the older people in the area have simple mobile phones as opposed to high-performance smartphones, all they needed to do to be able to receive messages was register their phone number.

2. SNS is routinely used as a means of communication in the community

SNS has been used as a daily communication channel to share information about district events and condolences, so residents have become accustomed to using it. Therefore, it was a reliable communication tool during the emergency.

Although this idea is very simple, the “Nishiden Hot Mail” example shows the potential of SNS to become a powerful communication tool to facilitate CBDRR. As discussed earlier in the chapter, in Japan, the local community has been declining, and thus, the capacities of the *chonaikai* have been weakened. In addition, people are increasingly likely to not know their neighbors’ names or faces. The SNS broadcasting system does not allow two-way communication, but in the areas where there are still trusted local leaders, even one-way communication could help facilitate communication among the *chonaikai* networks. The SNS broadcasting system could have worked to disseminate risk and evacuation information during the emergency in Neshinden district to encourage “mutual help” in regard to CBDRR.

However, to introduce such a system, the following steps are required: (1) have a trusted local leader; (2) obtain the understanding of the residents to introduce it; and (3) be prepared for some required costs (e.g., contracts with a company that has a system for sending Hotmail).

In addition, in Joso City, another advanced example of CBDRR, called “My-TimeLine” (Fig. 8.4), was developed by the River Office of the Japanese Ministry of Land, Infrastructure, Transport and Tourism based on lessons learned from the 2015 disaster. “My-TimeLine” formulates evacuation action plans from

Fig. 8.4 Sample of “My-TimeLine” (Satomura et al. 2020)

3 days before a typhoon or when heavy rain is expected based on the local disaster risk of each household. When a typhoon is approaching, weather and evacuation information are released by the Japan Meteorological Agency and local governments, and people are expected to take appropriate action. However, even if people

receive evacuation information, they may be unsure about the timing of evacuations, how to avoid risks during evacuation, and who to evacuate with. For example, if a person with a disability is in the family, earlier evacuation actions will be required, and if a family member has a chronic disease, it will be necessary to secure medicine. The “My” in “My-TimeLine” implies that the information should be “customized for individual circumstances”.

The “My-TimeLine” tool was developed following the flood in Joso City. A version for children was also created, and this is used in disaster reduction classrooms in the area and disaster reduction education in schools. Piloted in Joso City, “My-TimeLine” now enjoys widespread use in Japan, where the risk of flood damage caused by powerful typhoons is increasing because of climate change. For more details on “My-TimeLine”, please refer to Satomura et al. (2020).

The combination of the SNS broadcasting system and “My-TimeLine” in Joso City could greatly contribute to enhancing CBDRR in Japan.

8.5 Lessons Learned

As discussed in the beginning of this chapter, CBDRR is thought to be the core of any risk reduction approach, and local disaster risks must be clearly understood to determine community countermeasures. In Japan, the expectation of enhancing

CBDRR has been emphasized because local communities have been weakened. The three cases in this chapter highlight some lessons learned that could enhance the adaptative capabilities of communities in East and Southeastern Asian countries.

First, the Katahira case described a model for developing sustainable CBDRR. This case positioned DRR activities as part of a community development plan that motivated children to participate in community activities by institutionalizing a children’s group in the community development structure, organizing ‘fun’ events for children, such as the DRRTHG, and demonstrating the devotion of local adults to their community. Fostering the next generation to work for community development is key to sustainable CBDRR.

Second, the case of Ishinomaki’s school-based DRR education program described one of the approaches being taken to understand local disaster risks. This program is composed of several steps, including strengthening map-reading skills, understanding the actual geography of the school district, comparing topographical and hazard maps of the school district, confirming local disaster risks by town-watching, and producing DRR maps to present the findings. These are useful steps for both children and adults to realize collaboration between schools and communities in examining local disaster risks and producing original DRR maps.

Third, the case in Joso City demonstrated the importance of facilitating daily communication within the community to ensure smooth communication in the event of a disaster. Although wide variation is seen in local communities among regions and countries, most have deteriorated along with modernization, as more people consider community ties to be annoying. However, in a world in which

climate change is accelerating and catastrophic disasters are expected to occur increasingly frequently, the local community is more important than ever. Of course, in that case, the local community is not simply a thing of the past; it is a hybrid type of community that includes, for example, encouraging intergenerational communication through various community development activities, facilitating mutual learning about the local community between local residents and schoolchildren, and building new communication networks via the use of SNS. Communities in different regions and countries should therefore pursue their ideal form according to actual local conditions.

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