Disaster Risk Reduction
Methods, Approaches and Practices

Koichi Shiwaku
Aiko Sakurai
Rajib Shaw *Editors*

Disaster Resilience of Education Systems

Experiences from Japan

Springer

Disaster Risk Reduction

Methods, Approaches and Practices

Series editor
Rajib Shaw, Kyoto University, Japan

About the Series

Scope of the Series

Disaster risk reduction is a process, which leads to the safety of community and nations. After the 2005 World Conference on Disaster Reduction, held in Kobe, Japan, the Hyogo Framework for Action [HFA] was adopted as a framework of risk reduction. The academic research and higher education in disaster risk reduction has made and is making the gradual shift from pure basic research to applied, implementation-oriented research. More emphasis is given on the multi-stakeholder collaboration and multidisciplinary research. Emerging university networks in Asia, Europe, Africa, and Americas have urged for the process-oriented research in disaster risk reduction field. Keeping this in mind, this new series will promote the outputs of action research on disaster risk reduction, which will be useful for a wider range of stakeholders including academicians, professionals, practitioners, and students and researchers in the related field. The series will focus on some of emerging needs in the risk reduction field, starting from climate change adaptation, urban ecosystem, coastal risk reduction, education for sustainable development, community-based practices, risk communication, human security, etc. Through academic review, this series will encourage young researchers and practitioners to analyze field practices and link it to theory and policies with logic, data, and evidences. Thus, the series emphasizes evidence-based risk reduction methods, approaches, and practices.

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Preface

The Hanshin-Awaji Earthquake in 1995 and the Great East Japan Earthquake and Tsunami in 2011 were recent catastrophic disasters in Japan the experiences of which resulted in significant suggestions for disaster risk reduction (DRR) in the world as well as in Japan. The Second and Third World Conference on Disaster Risk Reduction were held in Hyogo Prefecture in 2005 and in Sendai in 2015 and adopted the Hyogo Framework for Action 2005–2015 and the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030 respectively with an emphasis on education.

Disaster education has been regarded as one of the important factors for DRR by academicians, practitioners, government officers, and any DRR-related organizations and needs to be integrated into the strategic system in order to enhance the quality of education and to provide continuous education. But the purpose of ensuring the education system is not only sustaining provision of school education and disaster education but also providing safer circumstance to students, teachers, parents, and community members in normal and disaster situations. This indicates that the education system needs to be considered from both education governance and DRR governance. At the school level, DRR is considered as a part of school management, but many schools in Japan are designated as evacuation centers for disaster situations. School–community linkage is also necessary to be included in the system. In addition, Board of Education and DRR-related departments are requested to work in cooperation for DRR in schools and community. Thus, the education system needs to be considered comprehensively at the national, local, school, and community level.

This book includes a collection of 14 case studies and practices on education related to DRR in Japan provided by academic institutes, local government, higher education institutes, NGOs, and the private sector to consider the education system and its disaster resilience comprehensively from the experiences in Japan. In this way, disaster resilience of the education system can be enhanced in Japan and overseas and SFDRR priorities are achieved though mainstreaming DRR in education sectors.

This book is written for students, researchers, and practitioners in the fields of DRR. We hope they will find it useful and relevant to their work.

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Miyagi, Japan — Aiko Sakurai
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Koichi Shiwaku is a researcher in the Graduate School of Global Environmental Studies of Kyoto University, Japan. He has been working with central and local governments, NGOs, school teachers and students, and local communities in Japan and overseas countries. His recent works are enhancing school disaster resilience and capacity development of officers of the board of education in the area affected by the 2011 Great East Japan Earthquake. His research interests are disaster education, community-based disaster risk management, governance for disaster education, school safety, and capacity development of local government.

Aiko Sakurai is an associate professor in the International Research Institute of Disaster Science (IRIDeS), Tohoku University, Japan. She has worked in international educational development in Yemen and Vietnam and started to be involved in a field of disaster education since the 2011 Great East Japan Earthquake. Her recent work is developing a school-based disaster education model at post-disaster phase in Asian countries. Her research interests include comprehensive school safety, education recovery from disaster, and school-based disaster management and education.

Rajib Shaw was Professor in the Graduate School of Global Environmental Studies of Kyoto University, Japan. He worked closely with the local communities, NGOs, governments and international organization, including United Nations, especially in the Asian countries. He is currently the Co-chair of the United Nations Asia Science Technology Academia Advisory Group (ASTAAG) and the President of Asian University Network of Environment and Disaster Management (AUEDM). His research interests are community-based disaster risk management, climate change adaptation, urban risk management and disaster and environmental education. He has published several books in the field of disaster and environmental management. He is also the Chief Editor of *Asian Journal of Environment and Disaster Management*.

Chapter 1
Introduction: Disaster Risk Reduction and Education System

Koichi Shiwaku and Rajib Shaw

Abstract In the last two decades, the two devastating disasters occurred in Japan. One is the Great Hanshin-Awaji Earthquake in 1995, and the other is the East Japan Earthquake and Tsunami in 2011. This chapter as the first chapter of the book on disaster education and disaster risk reduction in education sectors and its governance and management system focuses on the lessons of these disasters, explains disaster resilience of education system referring to the past researches, and considers education perspectives in Hyogo Framework for Action (HFA) 2005–2015 and Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030. Through experiencing the past disasters, education governance and education contents and approaches have been emphasized in Japan. Educational resilience includes student resilience, teacher resilience, and school resilience, which are transition pathways from individual resilience to system resilience. Through the review of HFA and SFDRR, it was identified that HFA directly focused on education in its Priority 3, and education was considered in all four priorities in SFDRR. It can be concluded that education is a significant crosscutting issue for the priorities of SFDRR which can contribute to achievement of the priorities.

Keywords Disaster education • Education system • Education resilience • Hyogo framework for action • Sendai framework for disaster risk reduction

1.1 Introduction: From Hyogo to Tohoku in Education

In the last two decades, the two devastated disasters occurred in Japan. One is the Great Hanshin-Awaji Earthquake in 1995, and the other is the East Japan Earthquake and Tsunami (EJET) in 2011. The Great Hanshin-Awaji Earthquake was a significant transitional event to many issues in Japan (Shaw 2015). Kameda and Okada (2001) suggested the five lessons learned from the earthquake as below:

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- Disaster has aspect of both phenomenon of natural science and phenomenon of social science.
- For disaster reduction, pre-disaster measures and post-measures are equally important.
- The core of disaster management is information processing.
- We should have philosophy of disaster management.
- Disaster management is one of the social functions.

Kameda and Okada (2001) pointed out importance of consensus in a society and implementation of disaster measures in community level because it is difficult for government to undertake all measures. Therefore, community participation and disaster education need to be conducted so that people will take actions for disaster management. Shaw (2015) pointed out that education had changed from engineer-based to social-based solutions due to the Great Hanshin-Awaji Earthquake. One of the lessons of the Great Hanshin-Awaji Earthquake is importance of combination among public help, mutual help, and self-help, especially importance of mutual help, which has needed social-based contents and approach in education as mentioned before.

Takeuchi et al. (2011) focused on family and community in Japan and suggested social situations should be considered in disaster education for promotion of mutual help. Shiwaku and Fernandez (2011) showed case examples on school-community linkage in Japanese disaster education. Shaw et al. (2011) emphasized, as a key of disaster education, "tsunagaru" which was a Japanese word meaning the link. Shaw et al. (2011) suggested the linkage between school and community, between community and family, between different disciplines, between different stakeholders, between nature and human, between past and future, and so on. In Hyogo Prefecture, the Environment and Disaster Mitigation Course at Maiko High School was established in 2002. This course is the first course for disaster management in high school level. Disaster education at this course provides innovative programs, and students can learn the relationship with a society and how to act in a society based on the lessons of the Great Hanshin-Awaji Earthquake (Shiwaku 2004).

The EJET impacted the eastern part of Japan and caused more than 19,000 deaths. On the other hand, this catastrophic disaster gave breakthrough ideas and suggestions for future disaster risk reduction. The significant lesson of the EJET is the importance of governance and coordination. Takeuchi and Shaw (2014) pointed out effectiveness of governance and coordination among schools and community, students and teachers, and parents and community residents, which can contribute to trust building, appropriate actions for evacuation, trouble-free life in evacuation centers, and quick recovery of school facilities. Matsuura and Shaw (2014) introduced the concept "school-centered community building" for school recovery proposed by the Ministry of Education, Culture, Sports, Science, and Technology, Japan. The four main pillars are (1) securing safety of schools and relocating them to safe areas as necessary, (2) retrofitting schools to improve their functions as evacuation center and hub for disaster management, (3) making

school building eco-friendly, and (4) making school's multifunctional public facilities to become the center of communities. Kesennuma City, Miyagi Prefecture, which is one of the worst affected cities by the EJET, has continued the education researcher system for nearly 50 years. In this system, selected school teachers have researched the ongoing school subjects to enhance qualities and approaches. After the EJET, the Board of Education of Kesennuma City established the teacher group to research disaster risk reduction in this system and developed disaster education material for teacher use with the help of a university and an NPO. This evidence pointed out importance of educational governance and external help.

Thus, in Japan, the thought-provoking lessons have been accumulated through the disasters, and it was identified that education should be considered from not only education contents and approaches but also various aspects. Therefore, it is significant to review disaster education and its system in Japan and give comprehensive systematized suggestions and lessons to share with other countries. This book focuses on disaster education and its governance and management system in Japan from related various aspects and finally suggests future perspectives of education system for enhancing its resilience in other countries as well as Japan.

This chapter at first explains importance of education system and the concept of resilience of education system and reviews the trend of education in the strategy developed in the world, especially in HFA and SFDRR. Finally, this chapter introduces each chapter of this book.

1.2 Education System and Disaster Resilience

1.2.1 Importance of Education System

In Japan, the Great Hanshin-Awaji Earthquake with more than 6400 deaths was the turning point to consider disaster education. Before the earthquake in 1995, disaster education was a part of safety education and the main content was evacuation drills. Shiwaku (2004) surveyed disaster education in several schools in Japan including Hyogo Prefecture, which was affected by the earthquake in 1995, and identified disaster education at most schools was evacuation drills against earthquake and/or fire even then. Hyogo Prefectural Government realized the necessity of the new type of disaster education which was not a part of safety education and established the Environment and Disaster Mitigation Course at Maiko High School, which is mentioned in this book. This course prepared disaster education curriculum in one-third of school hours and provided active learning with the lessons of the Great Hanshin-Awaji Earthquake. The learning programs were identified to contribute to behavioral changes in students as well as awareness changes (Shiwaku 2004). The lesson learned from Maiko High School is the importance of learning

from the past and comprehensive disaster education curriculum and event-based learning program.

The EJET also gave significant lessons for the future disaster risk reduction. Kamaishi City, Iwate Prefecture, was devastated with more than 1000 deaths and missing persons. The famous story of this city in the EJET is the miracle of Kamaishi that 99.8 % of students in elementary and junior high schools in the city survived in the EJET. In the city, evacuation drills were conducted in all elementary and junior high schools with emphasis of increasing students' imagination with the support of Japanese university for 8 years before the EJET. Therefore, students could make decision to evacuate to much higher places through helping each other. This fact suggests importance of culture of safety in the city level and importance of external help before disasters.

The other miracle was seen in Kesennuma City, Miyagi Prefecture. Kesennuma City was also affected seriously and had more than 1300 losses including missing persons. Kesennuma City is the famous city for Education for Sustainable Development (ESD), and all schools in the city have been registered as a UNESCO school network (ASPnet, Associated Schools Project Network) with strong initiatives taken by Board of Education. Disaster management is a part of sustainable development as well known, but many schools did not focus on disaster education as ESD. However, one of the effects of ESD is to strengthen community linkage. The strong linkage between schools and community helped students to evacuate to safer places in the EJET. According to Oikawa (2014), all students who were under the supervision of schools survived. This fact gave us the lessons on necessity of education to make school-community linkage and necessity of strong initiative of government. These are just a part of the facts and lessons learned from the EJET but remind us of necessity of education system and of importance on comprehensive education system.

1.2.2 Disaster Resilience of Education System

The concepts of resilience are seen in different fields including hazards, ecology, psychology, sociology, public health, and others. Resilience as a concept is more widely used in the field of ecology than in any other field and yet is finding significant role in other disciplines and areas of research, including the broader hazards and disaster field to address the abilities of social systems and the biophysical systems upon which they depend, to resist the impacts of natural disasters and bounce back (Mayunga and Peacock 2010). Maguire and Hagan (2007) introduced the three dimensions of disaster resilience which consist of resistance, recovery, and creativity. In their study, the resistance is the distance between the community's pre-disaster level of functioning, and recovery is the time taken by a community to recover from disruption. Creativity was summarized as achievement of higher level of functioning by adapting to new circumstances and learning from the disaster experience.

Mayunga and Peacock (2010) reviewed many researches on resilience and adopted the dimensions of disaster resilience consisting of robustness, rapidity, and enhancement. Robustness is a system's ability to absorb and resist the impacts of a hazard. Rapidity is the ability to bounce back quickly; reaching restoration levels and enhancement is the capacities enhanced by improving mitigation status, reducing preexisting vulnerabilities, and improving sustainability in recovery process. Tong (2014) also summarized the characteristics of disaster education as follows:

- The speed of recovery at which a system can recover after disaster
- The magnitude of an event relative to a threshold that can be absorbed before a system changes its structure by changing the processes and variables that control it
- The capacity to learn from and to create new things from disaster and to transform

These three concepts of disaster resilience are similar. Therefore, it can be concluded that it is necessary to reduce the impacts of hazards, to reduce the time for recovery, and to enhance the capacity level, compared to the level before disaster, in order to enhance disaster resilience.

Tong (2014) suggested the concept of educational resilience. In this concept, educational resilience includes student resilience, teacher resilience, and school resilience, which are transition pathways from individual resilience to system resilience.

1.3 Education in HFA and SFDRR

1.3.1 Link Between Education and Key Issues in HFA

As known broadly, HFA was adopted in the World Conference on Disaster Risk Reduction held in 2005 in Kobe, Japan, and the five priorities for action were set as below (UNISDR 2005):

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

The third priority is related to education directly, and 16 key activities in the four areas (information management and exchange, education and training, research, and public awareness) were suggested. Under this priority, HFA emphasized youth,

women, and vulnerable groups as the targets and formal and informal, higher education, and integration with ESD as education channels. Education can contribute to the resilience at all levels. But the resilience of education providers which mean governments in case of school education was not described clearly in HFA. In HFA, education and training is one of the approaches for building resilience and sustainability, and improvement of the system of education and training was not mentioned clearly.

1.3.2 Link Between Education and Key Issues in SFDRR

In the last year of HFA, the World Conference on Disaster Risk Reduction was held in Sendai, Japan, in 2015, and it adopted the Sendai Framework for Disaster Risk Reduction with the seven global targets as below (UNISDR 2015):

- Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020 and 2030 compared to 2005–2015
- Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020 and 2030 compared to 2005–2015
- Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030
- Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them are health and educational facilities, including through developing their resilience by 2030
- Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020
- Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030
- Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030

In the target, educational facilities were mentioned as one of the critical infrastructures. The following are the four priority actions in SFDRR:

- Understanding disaster risk
- Strengthening disaster risk governance to manage disaster risk
- Investing in disaster risk reduction for resilience
- Enhancing disaster preparedness for effective response and to “build back better” in recovery, rehabilitation, and reconstruction

Table 1.1 Key issues of the priorities in HFA and SFDRR

Priority	HFA	SFDRR
Priority 1	Importance of disaster risk reduction	Understanding disaster risk
Priority 2	Disaster risk and early warning	Governance
Priority 3	Education	Investment
Priority 4	Underlying risk factors	Response and recovery
Priority 5	Response	–

Although HFA focused education as one of the priorities for action, SFDRR does not include education directly in the priorities for action. It is expected that education is crosscutting issue for disaster risk reduction at the end of HFA duration, and the detail review is done in the next section.

1.3.3 Comparison Between HFA and SFDRR in Education

This section conducts the comparative analysis between HFA and SFDRR in education. Table 1.1 shows the key issues of the priorities in HFA and SFDRR.

More specific issues like early warning and education were emphasized in HFA. It is considered that SFDRR focused on more strategic issues for proper implementation and was paying an attention to recovery as well as response. As mentioned before, education issue can be seen in Priority 3 of HFA but is not clearly mentioned in priorities of SFDRR.

Table 1.2 shows the results of detail review to compare between the two disaster risk reduction frameworks.

One of the significant differences between HFA and SFDRR is focus of education in the objectives of both frameworks. HFA mentions education but SFDRR does not in the objective. In the expected outcome, both do not have clear description of educational issues, which is considered that education is a tool or process to achieve objectives and outcomes in these frameworks. In the priorities, HFA Priority 3 focuses on educational issues directly, but any priorities of SFDRR are not related to education directly. But education-related descriptions are included in the four priorities of SFDRR and especially Priority 1 emphasizes educational issues. It can be concluded that education is significant crosscutting issue for the priorities of SFDRR which can contribute to achievement of the priorities rather than one of the main focuses for disaster risk reduction.

Table 1.2 Comparative analysis of HFA and SFDRR in education

Contents of the framework	HFA	SFDRR
Objectives	Sharing good practices and lessons, increasing awareness of the importance of disaster reduction policies, and increasing the reliability and availability of appropriate disaster-related information are related to education issue	Objectives are not mentioned
Expected outcome	There is no direct description on education	There is no direct description on education
Strategic goals (goal)	Enhancing capacities is focused	Necessity of educational measures is mentioned
Priority 1	Capacity development of human resources is mentioned	The following education issues are focused:
		Promoting investments in innovation and technology development for educational challenges
		Formal and nonformal education, civic education, and professional education and training
		Promoting national strategies to strengthen public education and awareness
		Developing effective global and regional campaigns as instruments for public awareness and education
Priority 2	Training and technical capacity building for risk assessment, monitoring, and early warning are mentioned	Education issues are not mentioned clearly, but importance of public awareness raising and training initiatives in national and local framework is focused
Priority 3	Priority 3 is directly related to education. Information management and exchange, education and training, and public awareness are suggested as the main focuses related to education. These three focuses cover 14 key activities out of 16	It is emphasized to strengthen the design and implementation of inclusive policies and social safety-net mechanisms through integration with education
Priority 4	Sharing of expertise, knowledge, and lessons learned in recovery and rehabilitation processes is emphasized	Promoting the resilience of educational facilities is mentioned
Priority 5	Knowledge and capacities are emphasized to reduce impacts and losses	–

1.4 About the Book

This book consists of 14 chapters including this chapter. The four chapters from Chaps. 2, 3, 4, 5, and 6 are related to policy, system, and framework for educational governance in Japan. Chapter 2 explains disaster risk governance of education sector in Japan in an international framework of disaster risk governance, introducing the disaster governance structure and plan on promoting school safety in the national level. Chapter 3 introduces the education system in Japan and discusses the governance system of education sector in prefectures and municipalities in Japan with the two case studies in order to suggest improve school disaster education. Chapter 4 reviews disaster education in school curricula and its transition in recent years, reflecting the lessons of the 1995 Great Hanshin-Awaji Earthquake, the 2011 EJET, and other disasters in Japan. Chapter 5 outlines recent changes on teacher training in disaster risk reduction and identifies the future challenges on teacher training in Japan with the lesson of the EJET.

Chapters 6, 7, 8, and 9 are the specific practices on disaster resilience of education system. Chapter 6 focuses on graduates of the Environment and Disaster Mitigation Course at Maiko High School in Hyogo Prefecture, Japan, which is the first course for disaster management in high school level, and examines the relationship between disaster education and graduates' involvement in disaster risk management. Chapter 7 describes community linkages for disaster risk reduction education with case studies of three cities in Japan, which were affected by different kinds of disasters, respectively. Chapter 8 introduces a tool for school disaster resilience assessment and explains the process of its application in a kind of teacher training system in the EJET-affected area. Chapter 9 shows the efforts of high education institute for regional rehabilitation in EJET-affected area and introduces training project to raise human resources to contribute to the society.

Chapters 10, 11, 12, and 13 are related to international cooperation. Chapter 10 discusses the trend at post-2015 on Education for Sustainable Development (ESD) and disaster risk reduction in international level, reviewing the UNESCO ESD World Conference and the World Conference on Disaster Risk Reduction. Chapter 11 shows the education sector recovery from the EJET and its relationship with international organizations and suggests roles of international NGOs to strengthen the governance and resilience of the Japanese education sector. Chapter 12 shows how the lessons of Japanese disaster education are transferred to Turkey, which is one of the earthquake-prone countries in the world, and suggests how international cooperation on disaster education can be conducted. Chapter 13 focuses on a grassroots project on disaster education through technical transfer to the governments in Vietnam and discusses the network among teachers, educational officials, and NGOs for the sustainability of DRR education.

Chapter 14, the final chapter of this book, summarizes the key messages of each chapter of this book and gives suggestions to enhance governance of education sector and resilience of education system and to transfer Japanese lessons to other countries in the world.

For this book, the authors were selected from various organizations including education administration, higher education, consulting company, and NGO as well as universities in order to consider disaster resilience of education system broadly because educational resilience is an important issue for disaster risk reduction under SFDRR.

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Chapter 2
Governance of the Education Sector and Disaster Risk Reduction

Aiko Sakurai

Abstract Japanese disaster risk governance is integral to the education sector. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) is 1 of 24 ministries and agencies that compose the Central Disaster Management Council. The MEXT promotes disaster risk governance in the education sector through policy guidance and financial support. Compared to international arguments on strengthening disaster risk governance related to adoption of the Sendai Framework for Disaster Risk Reduction 2015–2030, the Japanese disaster risk governance in the education sector provides outputs and normative aspects of governance, such as policies, laws and regulations, financing, and institutional structure that are more advanced. In addition, Japanese disaster risk governance has evolved based on lessons learnt from past disaster experiences such as the 1995 Hanshin-Awaji Earthquake and the 2011 Great East Japan Earthquake and Tsunami. These context-specific revisions of the governance contribute to the reduction of risk for future disasters. A major issue found from the analyses is the lack of a school-community partnership for disaster risk reduction. While Japanese disaster risk governance in the education sector has strong leadership via the central government, a partnership with other actors at the school level is relatively weak. This is not only an issue for disaster risk governance but overall Japanese education governance. In the current educational reform, the MEXT promotes establishment of a collaborative platform between schools and communities. This could lead to enhancement of a collaborative relationship for disaster risk reduction. Under the newly adopted SFDRR, Japan and the international community could learn from each other to strengthen disaster risk governance in the education sector through international cooperation.

Keywords Governance • Education sector • Disaster risk reduction • Japan

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2.1 Governance and Disaster Risk Reduction

Governance is broader than government, as found in many literatures. Salamon argued that new governance is a way of thinking about how government and public administration meet the diverse needs of society. While earlier government activity focused on direct delivery of goods and services, new governance leverages third parties and seeks to network their capabilities to create solutions to an increasing array of public problems. It means "fundamental transformation not just in the scope and scale of government action, but in its basic forms" (Salamon 2000). According to the United Nations Development Programme (1997), which is the leading UN agency on governance issues, "governance" is defined as "the exercise of economic, political, and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes, and institutions, through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations, and mediate their differences." Governance is the umbrella under which disaster risk reduction takes place (UNDP 2010). Disaster risk governance defined is "the way in which the public authorities, civil servants, media, private sector, and civil society coordinate at community, national, and regional levels in order to manage and reduce disaster and climate related risks" (Aysan and Lavell 2014). In the international field of disaster risk reduction, disaster risk governance emphasizes multi-stakeholders' involvement at multiple layers of sectors and fields.

Although the Hyogo Framework for Action (HFA) did implicitly incorporate the importance of governance under priority of Action 1 and Action 5 (UNISDR 2005), the importance of governance to manage disaster risk is now a pressing priority. The Sendai Framework for Disaster Risk Reduction (as SFDRR hereafter) 2015–2030, the newly adopted international strategy for disaster risk reduction introduced at the Third UN World Conference on Disaster Risk Reduction in Sendai in 2015, sets "strengthening disaster risk governance to manage disaster risk" as a priority action within and across sectors by states at local, national, regional, and global levels in pursuance of the expected outcome and goals. These are for the substantial reduction of disaster risk and loss of lives, livelihoods, and health and in the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries (UNISDR 2015a).

This chapter reviews disaster risk governance of the Japanese education sector in an international framework of disaster risk governance. It attempts to verify advantages and issues on disaster risk governance in the Japanese education sector for identifying fields of international cooperation to enhance resilience of the education system in developing countries.

2.2 Disaster Risk Governance in the Japanese Education Sector

Japan has extensive experience with disaster risk reduction in the education sector at the national, local, and school levels. At the national level, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) leads policy and vision and implements them at schools with support and guidance from the local boards of education. These disaster risk reduction policies and practices, especially after the 1995 Hanshin-Awaji Earthquake, progressed and evolved by reflecting on lessons learnt from disaster experiences (Toda 2015).

2.2.1 MEXT in the National Disaster Governance Structure

Under the national DRR governance structure, the MEXT is 1 of 24 ministerial agencies in the Central Disaster Management Council. To ensure the safety and security of schoolchildren against disasters, the MEXT also formulated its own Disaster Management Operation Plan of 2008 based on the Disaster Countermeasures Basic Act and National Basic Disaster Management Plan (Fig. 2.1). It specifies the MEXT's designated duties in a disaster management cycle and promotes comprehensive and systematic disaster management administration in the education sector. The MEXT's initiatives include promoting accident prevention by improving disaster education and strengthening disaster prevention functions of school facilities, promoting emergency disaster control measures, and promoting research and development in respect to disaster prevention and support for disaster recovery. The MEXT also supports strengthening school disaster management systems based on local disaster management plans at prefectural and municipal levels.

The MEXT's Disaster Management Operation Plan has had occasional revision. The latest plan of 2012 has nine sections, which include general rules and disaster countermeasures by hazard types, including earthquake, tsunami, and nuclear and large-scale accidents, and by specific expected large-scale earthquake disasters. Each hazard countermeasure includes disaster mitigation, emergency response, recovery and reconstruction, and support of preparing a regional disaster management plan according to a disaster management cycle. In the 2012 revision after the Great East Japan Earthquake, the tsunami disaster chapter was added, and roles and responsibilities of designated evacuation shelters were specified in accordance with revision of the National Disaster Management Basic Plan in 2014.

For example, in response to the 2011 GEJET disaster, the MEXT took immediate action to support early resumption of education in disaster-affected areas, which entailed bearing the cost of building temporary classrooms and reconstructing damaged school facilities. In addition, the MEXT secured educational opportunities for affected students by distributing free textbooks, accepting affected students in

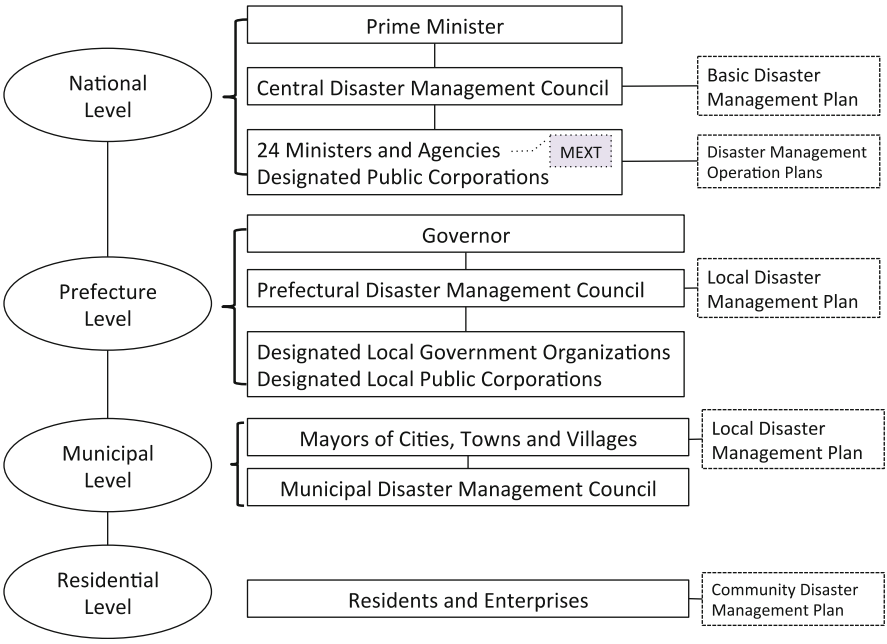

Fig. 2.1 Outlines of disaster management structure in Japan (Cabinet Office 2015)

resettled or evacuated areas, providing economic assistance to affected students, allocating additional teachers to schools in tsunami-affected areas, and dispatching school counselors for children's mental care. These MEXT actions are based on the MEXT's Disaster Management Operation Plan.

For mainstreaming disaster risk reduction (DRR), all actors involved in disaster risk reduction need to understand the importance of proactively implementing comprehensive risk reduction and preparedness initiatives in order to reduce the damage caused by natural hazards. As seen in Fig. 2.1, it is critical that government prioritizes DRR in the country's policy and that MEXT, as a government ministry, incorporates DRR in its strategies, plans, and policies at the national level.

2.2.2 School Safety in the National Education Strategy

The Ministry of Education and Science Establishment Act (No. 96, July 1999) defines 97 designated duties of the MEXT in Article 4 of Chap. 1, among which school safety along with health, school nutrition, and mutual aid disaster insurance is followed by related duties on educational reform, continuous education, local education offices, elementary and secondary education, and textbook authorization.

In 2006, the Basic Act on Education revision, for the first time in 60 years, reflected changes in society toward the promotion of education reform. To promote

the education reform described in the Basic Act, the MEXT formulated the Basic Plan for Promotion of Education in 2008. They activated the second phase of the Basic Plan (2013–2017). It shows four basic directions of education reform: (i) fostering survival abilities of children in a diversified and changing society, (ii) fostering human resources to lead Japan by creating new values, (iii) establishing a safety net of learning opportunities for everyone, and (iv) formulating tight-knit and vital community networks. One of the eight missions in the second plan relates to building a safety net of learning opportunities to ensure a safe and secure educational and research environment.

The mission of a safe educational environment specifies realizing safe and secure school facilities and promoting school safety as concrete actions based on the Five-Year (2012–2016) Plan on Promotion of School Safety (MEXT 2012). The target is for completion of all quake-resistant construction at all the public elementary and secondary school facilities by the end of fiscal year 2015. The plan also promotes countermeasures for nonstructured materials at schools, introduction of evacuation routes during tsunamis, and reinforcement of disaster prevention functions of schools. The primary goals are promotion of school safety, enrichment of disaster education and methodology for fostering children's attitudes toward independent thinking, and contributing to a safe and secure society.

2.2.3 Institutional Arrangement of School Safety in Japan

Under the order for the organization of the MEXT, the School Health Education Division under the Sports and Youth Bureau is responsible for school safety along with school health and school nutrition policy. However, with the establishment of the Sports Agency set for October 2015, a current consideration is having the School Health Education Unit run by the Elementary and Secondary Education Bureau. The Department of Facilities Planning and Administration under the minister's secretariat is responsible for the safety of school facilities.

In Japan, school safety against disaster lies within the framework of school safety, which also includes traffic safety and household safety (Fig. 2.2). Promotion of national disaster safety in Japan occurs within such legislative frameworks.

The School Health and Safety Act, which describes the division of responsibilities among educational administration for school safety, was enacted in 2009 by substantial revision of the School Health Act of 1958 after half a century of operation. In particular, it greatly expanded the content of school safety from the previous School Health Act, which led to changing the name of the law. It specifies the obligation of the national government, local authorities, and schools in school health and school safety (Takayama 2010).

Article 1 of the Act specifies that national and local governments should collaborate to implement school safety efforts at the school level and provide financial support and other necessary assistances based on the latest knowledge and information on DRR. The Act also stipulates that the national government shall

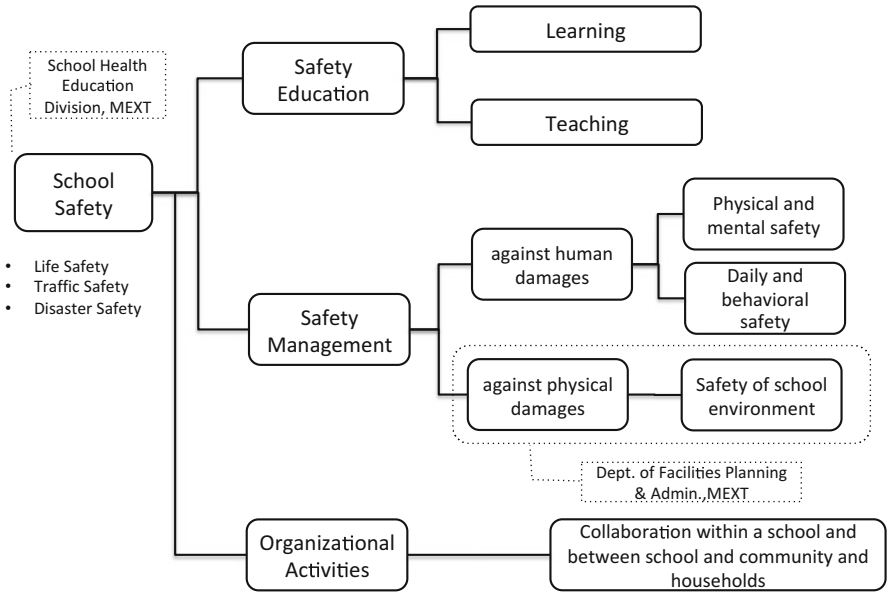

Fig. 2.2 Structure of school safety in Japan (MEXT 2013)

formulate a school safety plan that promotes school safety efforts and that the local government should follow the national government's guidelines. Article 3 specifies issues on school safety and articulates roles and responsibilities of a school including preparing a school safety plan, ensuring a safe school environment, creating a crisis management manual, and promoting collaboration between the school and communities. A school safety plan was formulated at 92.3 % of schools in 2012, crisis management manuals were prepared at 97.8 % of schools, and 91.0 % of schools implemented school safety inspections (MEXT 2012).

This clear definition of roles and responsibilities among authorities in educational governance helps to mainstream DRR within the education sector. In the vertical structure of the Japanese educational governance from MEXT to prefectural boards of education and municipal boards of education and schools, each level promotes school disaster safety. Mainstreaming DRR in the vertical educational governance structure supports schools that have the prime responsibility to secure children's safety.

2.2.4 Plan on Promoting School Safety

The School Safety Division of the Central Education Council formulated the "Five-Year (2012–2016) Plan on Promotion of School Safety" based on the School Health and Safety Act of 2009 and the lessons learned from the Great East Japan

Earthquake and Tsunami (GEJET). The plan aims to promote practical and comprehensive school safety measures by building a culture of safety and reducing injuries with the goal of zero deaths due to accidents and disasters at a school. The plan articulates concrete measures for the next 5 years regarding (i) safety education, (ii) safe school facilities, (iii) safety management at schools, and (iv) collaboration among schools, local communities, and households to further promote school safety.

The plan stresses promotion of further collaboration among safety-related agencies in the government and among multi-stakeholders. The plan also emphasizes that all students should receive a certain level of guidance on safety issues at schools throughout Japan through established teaching methodologies regardless of who teaches safety education.

2.2.5 Budget and Financing

Prior to the 2011 GEJET, promotion of reinforcement of public school facilities existed based on the Basic Plan for Improving Public Compulsory School Facilities 2006–2016 (MEXT announcement No. 62). Figure 2.3 indicates such trends. Since 2006, supplemental budgets have been added for improving school facilities. Responding to the 2011 GEJET and the Revision of the Act on Special Measures against Earthquake Disaster Prevention, the MEXT further revised the Basic Plan for Improving Public Compulsory School Facilities (MEXT announcement No. 90). The revision included reinforcing quake resistance of nonstructural materials at schools, tsunami countermeasures, school disaster preparedness as an

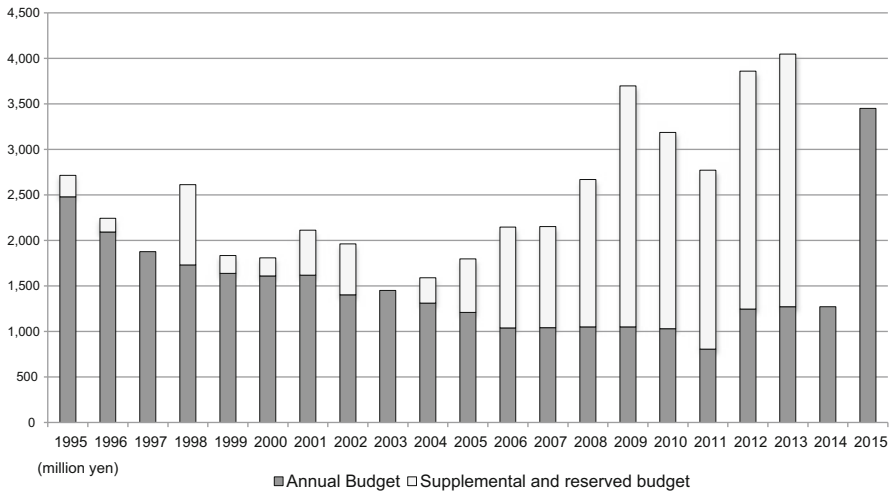

Fig. 2.3 Budget for improving public school facilities (FY 1995–2015) (Based on MEXT 2014)

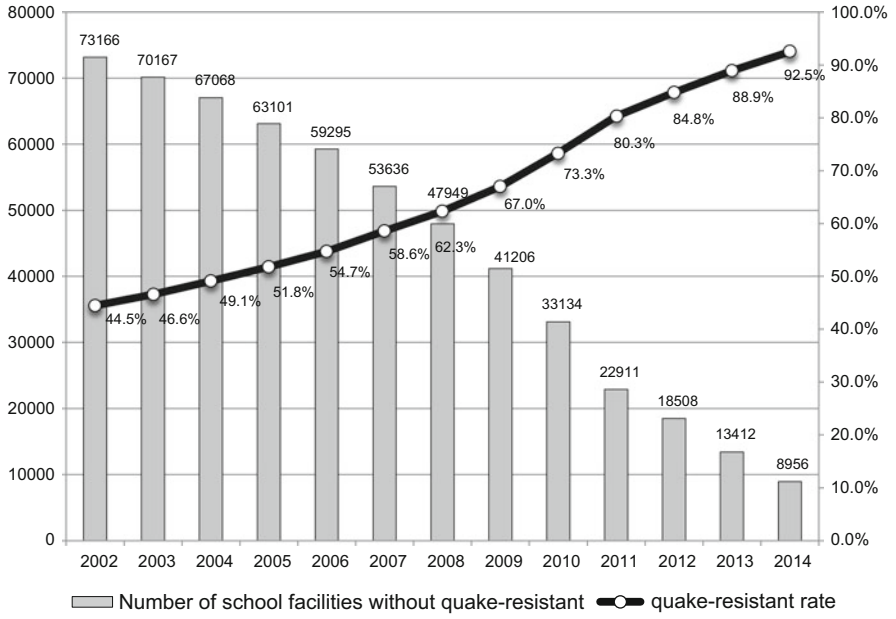

Fig. 2.4 Quake-resistant schools among compulsory public schools in Japan (Based on MEXT 2014)

evacuation shelter, renovation of deteriorated school facilities, and accelerating completion of quake-resistance facilities. The quake-resistance rate among public elementary and junior high schools in Japan improved from 73.3 % as of April 2010 to 92.5 % as of April 2014 (Fig. 2.4). To further accelerate the quake-resistance rate among public schools, the MEXT established a new subsidy for improving school facilities and expanded coverage of subsidies for the quake-resistance project. At the same time, the MEXT also secured a budget for recovery and reconstruction of damaged school facilities, including relocation of schools from coastal areas to higher places demolished by the 2011 Great East Japan Earthquake. The MEXT expects to complete 99 % of the planned reconstruction project and achieve 100 % completion of quake resistance of school facilities by the end of fiscal year 2015. This is supported by an increase of the 2015 budget request 2.7 times that of the previous year.

Although the budget for disaster education is far smaller than reinforcement of school buildings, Table 2.1 shows that the MEXT put emphasis on promoting disaster education by securing the budget after the 2011 GEJET. In the 2011 budget of the School Health Education Division, there was no independent “disaster education”-related budget item. However, starting from the third supplemental budget of 2011, promoting disaster education was included as a budget item. The establishment of the “Practical Disaster Education Support Project,” implemented in 2012 for 3 years, was to develop and disseminate educational methods and

Table 2.1 The MEXT's budget on child safety education (2011–2015) (Unit: thousand yen)

Budget item	2011	2012	2013	2014	2015
School safety education project	–	52,279	203,807	102,003	62,773
Disaster education project	–	62,639	139,702	135,333	211,666
Child safety project total	96,550	114,918	345,509	237,336	274,439

approaches to disaster education based on lessons learnt from the GEJET. It is now the "Practical School Safety Support Project," as of 2015, and also based on the Five-Year Safety Promotion Plan.

2.3 Discussion and Conclusion

2.3.1 Sendai Framework for Disaster Risk Reduction

As seen from the previous section, disaster risk governance has gained importance in the recent Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030, and priority 2 of the SFDRR covers strengthening disaster risk governance to manage disaster risk (section 26 of the SFDRR).

> Disaster risk governance at the national, regional and global levels is of great importance for an effective and efficient management of disaster risk. Clear vision, plans, competence, guidance, and coordination within and across sectors as well as participation of relevant stakeholders are needed. Strengthening disaster risk governance for prevention, mitigation preparedness, response, recovery, and rehabilitation is therefore necessary and fosters collaboration and partnership across mechanisms and institutions for the implementation of instruments relevant to disaster risk reduction and sustainable development.

Guiding principles of the SFDRR also emphasize that disaster risk reduction requires that central governments, relevant national authorities, sectors, and stakeholders, as appropriate to their national circumstances and system of governance, share responsibilities.

Prior to the SFDRR, the HFA review process found that continuing efforts are necessary to strengthen good governance (e.g., transparency and low levels of corruption, accountability, participation, efficiency in government, etc.) in disaster risk reduction at the national, regional, and global levels. Importantly, the UNDP thematic review report points out that disaster risk governance was predominantly perceived in terms of outputs and normative aspects of governance (policies and laws, financing, institutional structure, decentralization, and platforms) rather than as a complex web of context-specific processes and interactions of various aspects, institutions, and actors. In addition, it mentions that the transformation of outputs into disaster risk reduction outcomes (i.e., reduced disaster impacts or vulnerability) was not adequately considered.

At the Third UN World Conference on Disaster Risk Reduction, 16 governments engaged as "School Safe Country Leaders" and announced commitment to the Worldwide Initiative for Safe Schools (WISS). These 16 governments committed to allocation of national budgets for school safety, development of national strategies for school safety as a part of national disaster risk reduction strategies, assessment of the status of school safety implementation at the country level, and sharing of experiences and good practices in school safety implementation (UNISDR 2014). They held a working session on education and knowledge in building a culture of resilience (HFA priority 3) at the third conference. These working session discussions revealed challenges related to disaster risk governance: insufficient integration of disaster risk reduction in national development policies and education plans, a lack of coordination across ministries and institutions and between different stakeholders, and too few implementations of a holistic approach to school safety such as the three pillars of school safety (i.e., safe learning facilities, school disaster management, and disaster education) (UNISDR 2015b, c).

With an understanding of such international arguments on how to strengthen disaster risk governance, this section analyzes disaster risk governance in the Japanese education sector.

2.3.2 Advantage of Disaster Risk Governance in the Japanese Education Sector

The responsibilities of Japan's MEXT include giving required instructions and advising and assisting local and municipal governments on education, including school safety issues, although educational administration reform has been under pressure to transfer more power and authority to schools. Clear vision, plans, and competencies related to disaster risk governance under the name of school safety are all made legally, institutionally, at the national level, and incorporated into the national disaster risk reduction strategy. These are delivered to municipal and local education authorities and schools with guidance and financial support, which is a major strength of disaster risk governance in the Japanese education sector.

Among the health and educational facilities in the SFDRR, securing safe learning facilities (i.e., disaster-resilient infrastructure) receives more attention related to the newly introduced target to measure substantial reduction of disaster damage to critical infrastructure and disruption of basic services. As seen from the previous analysis, building safe learning facilities requires a large investment compared to disaster education. Even though Japan did not participate in the WISS, the Japanese government could be a front-runner in safe school initiatives in the world because the Japanese government has taken initiatives to support local and municipal governments financially through provision of additional subsidies, which results in acceleration of completing quake-resistant school facilities.

Another strength of the Japanese disaster risk governance in the education sector is evolution of their governance based on actual disaster experiences. The lessons learned from the 1995 Hanshin-Awaji Earthquake provided a basic policy framework on school safety against disaster, which was established at a national level and revised based on lessons learnt from the 2011 Great East Japan Earthquake. Based on actual experiences, Japanese disaster risk governance is up-to-date and fully upgraded to reduce disaster risk at schools. Therefore, Japanese governance is outcome-oriented and evolves in the Japanese context.

The MEXT took a series of actions within a year of the 2011 GEJET to examine the damages and draw lessons learnt. These lessons included revised and enhanced school safety policies and disaster risk governance, as discussed in the previous sections. The other major revision included publication of a "Guidance on How to Prepare a School Disaster Management Manual" (March 2012) and "Revision of Reference Materials on School Disaster Management: Expansion of Disaster Education for Fostering Children's Capability for a 'Zest for Living'" (March 2012). These revisions are also included in the national education strategies and a 5-year (2012–2106) plan on school safety promotion (April 2012); notably, the revisions continue. In 2014, a report by a working group discussing disaster-resilient school facilities (March 2014) and a report by a working group on school safety under the Central Council on Education (November 2014) were publicized, recommending concrete actions on further strengthening school safety in terms of learning environment and educational methodologies and contents about disaster risk reduction. The Japanese disaster risk governance in education sector has seen constant evolution through a plan-do-check-act (PDCA) cycle in the disaster management framework.

2.3.3 Issues in Disaster Risk Governance in the Japanese Education Sector

A major challenge in disaster risk governance in the Japanese education sector is collaboration and partnership between schools and communities as well as among multi-stakeholders at each school district, which are identified in the HFA review in priority 3. The government is aware of these issues and specifies them as priorities in their 5-year plan for promoting school safety. The plan says that close collaboration between schools, parents, and community residents should be developed to formulate emergency response procedures related to handing over children to parents and opening and operating a school evacuation shelter. Regular meetings should be held among schools, disaster-related divisions of municipal government, and local disaster response organizations to discuss procedures for evacuation shelter operation and management and to conduct joint evacuation drills.

While this might oppose a strong national leadership structured in governance, the MEXT invites experts from various fields of study, including education,

engineering, architecture, etc., and relevant stakeholders from various areas as members of working groups and advisory committees in reviewing their policies. However, at a school level, schools are not good at building cooperative relationships with their community. This is not only limited to disaster risk reduction but also a common feature in Japanese educational administration.

The revised Basic Education Act of 2006 added an article on partnership and cooperation among schools, families, and local residents. Article 13 of the Act says that schools, families, and local residents shall be aware of their respective roles and responsibilities regarding education and endeavor to develop partnership and cooperation. The Basic Plan for Promotion of Education Phase II also points out that due to the progress of urbanization, depopulation, changes of family form, diversification of value, and lifestyle, community networks and the safety net function of society have deteriorated, especially in urban areas of Japan. Rebooting a vigorous community with a virtuous cycle where the community supports the people's learning, the people getting through their lives, and the people's learning supporting revitalization of their community, the plan emphasizes the role of schools, linking the community's educational resources to school through establishment of a collaborative platform between the school and community, and expansion of a community school in up to 10 % of all the primary and junior high schools.

This reform trend in the Japanese education sector perfectly matches enhancing community resilience against disaster through education. Because hazard and risks against disaster differ per each community's geographical, social, economic, and historical backgrounds, effective disaster risk governance in the education sector should leverage third parties, including the community's resources and educational authorities, to network their capabilities and create localized solutions and preparedness for disaster risk reduction. Collaboration and partnerships between schools and communities could also lead to enhancing resilience of the community against disaster.

After the 2011 Great East Japan Earthquake and Tsunami, the Japanese government reviewed its DRR policies and strategies assuming of the largest predicted scale mega-earthquakes and tsunami at Tokai, Tonankai, and Nankai Troughs by utilizing the latest technology and knowledge. The special Act on Earthquake Disaster Countermeasure Promotion regarding the Nankai Trough earthquake specifies that the government could designate high-risk regions that require tsunami countermeasures and financially support relocation of residential areas and public facilities such as hospitals and schools to higher ground in the region. This new policy indicates a new challenge of further coordination and collaboration beyond the education sector, because DRR efforts also extended to land-use planning.

Substantially enhancing international cooperation in developing countries is a major goal of the SFDRR. As seen from the discussion, Japan has accumulated extensive experience in disasters and evolved their disaster risk governance in the education sector. Developing countries can learn from them, not only from a context of disaster management but also from improving educational governance and capacity development. Conversely, Japan could also learn from other countries' experiences on how to facilitate collaboration between schools and communities.

This will further promote international cooperation with disaster risk governance in the education sector between Japan and other countries for global disaster risk reduction and enhance the disaster resilience of each country.

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Chapter 3
Local Governance and School Disaster Education

Koichi Shiwaku and Rajib Shaw

Abstract Governance of education sector, especially the board of education, plays important roles for promotion of school disaster education. In Japan, education governance is considered in prefectures and municipalities. This chapter highlights (1) to introduce the overview of education governance and administration in Japan and (2) to discuss and conclude the direction of governance in local level. This chapter reviewed the cases of Hyogo Prefecture and Kesennuma City, Miyagi Prefecture, which are disaster-affected areas. In Japanese system, standardized education materials and programs can be provided because of governance of the board of education of prefectures. In other words, municipality governments have difficulty to express originality in their disaster education if they follow the direction of prefecture governments. This chapter concludes municipality governments need to develop their own concept of disaster education and its implementation system with collaboration of resource persons/organization like NGOS and universities.

Keywords Governance • Board of education • Prefecture • Municipality • School disaster education

3.1 Introduction

Since the adoption of Hyogo Framework for Action in 2005, the importance of schools for disaster risk reduction including disaster education has been widely agreed. The Sendai Framework for Disaster Risk Reduction was adopted in the Third World Conference on Disaster Risk Reduction, held on 14–18 March 2015 in Sendai City, Miyagi Prefecture, Japan. This framework pointed out strengthening disaster risk governance to manage disaster risk as one of priorities for action out of the four priorities (UNISDR 2015). Thus, it can be said governance is one of the key issues for disaster risk reduction.

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In Japan, the Great Hanshin-Awaji Earthquake was the turning point in the history of school disaster education and school disaster management in Japan. After this earthquake, many good practices on school disaster education have been developed. Shiwaku (2004) identified the effectiveness of experience-based disaster education programs provided in a public high school in Hyogo Prefecture, which are the main prefecture affected by the Great Hanshin-Awaji Earthquake. Shiwaku (2014) also introduced EARTH (Emergency And Rescue Team by school staff in Hyogo), which is the system led by Hyogo Prefecture government in order to promote school disaster education and improve school disaster management through training professional teachers and staff. Thus, the efforts by local government contributed to enhancing school disaster education and disaster management. In other words, governance plays important roles to transfer the lessons and experiences of good practices in school level and municipality level and reflect them to policies.

Japan is divided into 47 prefectures and has 1,718 municipalities (city, 790; town, 745; and village, 183) under the prefectures as of 5 April 2014 (Ministry of Internal Affairs and Communications 2014). Twenty cities out of 790 are government-designated cities which have more than 500,000 population and are designated in government ordinance according to Local Authority Act. Government-designated city offices conduct a part of administration works including education governance instead of prefecture governments. Hence, this chapter focuses on prefecture governments and municipality governments not including the designated city government since the conditions between the municipality and government-designated city are quite different and the number of the government-designated city is limited in comparison to the number of non-designated cities.

This chapter identifies the roles of prefecture and municipality governments in education administration and reviews the efforts by prefecture and municipality governments for promotion of school disaster education.

The first part of this chapter introduces the overview of education governance and administration in Japan. At prefecture level, Hyogo Prefecture is studied. Hyogo Prefecture is an earthquake-affected area as mentioned before and is considered as one of leading prefectures for disaster management. For education governance in municipality, Kesennuma City, Miyagi Prefecture was reviewed where the EJET struck in 2011. Kesennuma City has promoted Education for Sustainable Development (ESD) since before the EJET and has developed ESD-based disaster risk reduction education after the EJET. This city's effort is also considered as a good practice in municipality level. Finally, this chapter discusses and concludes the direction of governance in local level.

3.2 Overview of Education Governance in Local Level in Japan

3.2.1 Education System

As indicated in Fig. 3.1, education in Japan is divided into four levels: preschool education, elementary education, secondary education, and higher education. Secondary school education is divided into lower secondary department and upper secondary department. In Japan, compulsory education is provided for children between 6 and 15 years of age (total 9 years).

According to the Statistics Bureau, Ministry of Internal Affairs and Communications (2013), the number of elementary schools is 21,131 (national, 74; public, 20,836; private, 221), and the number of lower secondary school is 10,628 (national, 73; public, 9,784; private, 771). In addition, 50 secondary schools which cover both lower and upper secondary departments have been established. As for upper secondary school, there are 15 national, 3,646 public, and 1,320

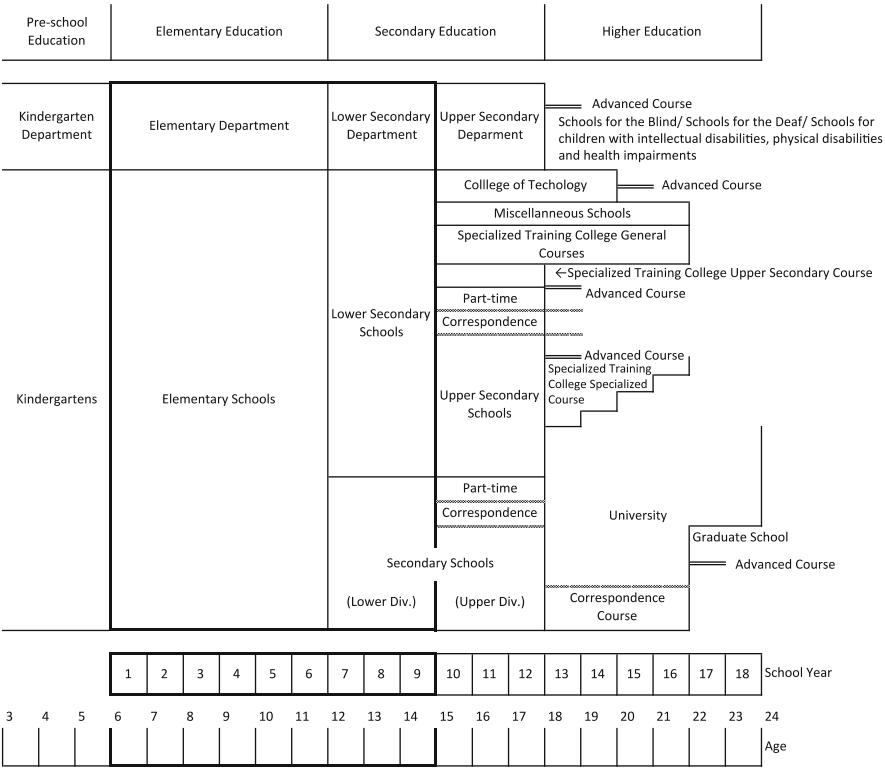

Fig. 3.1 Japanese school system chart (Source: MEXT 2005)

private schools in Japan. Thus, it was found in elementary and secondary education that most of the schools are public schools.

The local government controls public school directly. Elementary schools/lower secondary schools and upper secondary school are mainly managed by municipality governments and prefecture governments, respectively. More than 1,300 of miscellaneous schools under upper secondary department, for instance, international schools, are in Japan, but most of them are private schools, and the number of students is less compared to the number of students in lower and secondary schools. This chapter focuses on public elementary, lower secondary, and upper secondary schools in order to consider the majority governed by prefecture and municipality governments. In this chapter, lower secondary schools and upper secondary schools are called as junior high schools and high schools, respectively.

3.2.2 Education Administration: Roles of the Ministry, Board of Education, and Education Office

Organizations in charge of education administration are the Ministry of Education, Culture, Sports and Technology (MEXT) in the national level and the board of education in the local level (Koyama 2008). The board of education needs to be set in prefecture and municipality governments by the Act Concerning Organization and Operation of Regional Educational Administration. The board of education is an administration committee independently from local chief executive like prefecture governors and city mayors for ensuring political neutrality, ensuring sustainability and stability, and reflecting intentions of communities and citizens (MEXT 2013). The number of board members is five as a general rule, and one of them is a superintendent of schools who is on behalf of the board of education.

Table 3.1 shows roles of the national government, prefecture governments, and municipality governments for the administration of compulsory education (elementary school and junior high school education). Municipality governments play crucial roles for implementation of compulsory education with support of upper level of governments. In case of high school education, prefecture governments are responsible organizations and play the roles similar to those of municipal governments in Table 3.1.

Thus, the three levels (national, prefecture, and municipal governments) for compulsory education and the two levels (national and prefecture) for high school education are the basic structures for education administration in Japan. However, for actual operations of education administration, education offices are established in many prefectures. In each prefecture, several education offices are established to cover smaller regions in a prefecture. Education offices are local agencies of the board of education of prefectures and play the roles to give guidance, advices, and support to the board of education of municipalities in order to complement administrative works to be done by the board of education of municipalities. Education

Table 3.1 Roles of the national, prefecture, and municipality governments in educational administration in the case of compulsory education (Source: MEXT 2013)

Type	Roles
National government	Formulation of a framework of a basic system on school system. For example, formulation of school education system, formulation of regional education administration system, formulation of system of government authorization of textbooks, and formulation of teacher's license system
	Setting up standards in the nation. For example, setting up standards of installation of elementary schools and junior high schools, setting up standards of curriculum, and setting up standards of class organization and fixed number of teachers/staff
	Provision of financial support for improvement of education environment in prefectures and municipalities. For example, state contribution for salaries of teachers/staff in municipal elementary schools and junior high schools, construction of school building, and provision of textbooks without charge
	Giving guidance, advices, and support. For example, giving guidance, advices, and support on education contents and school management
Prefecture governments	Conducting education works for wide range handling. For example, appointing teachers/staff in municipal elementary schools and junior high schools
	Provision of financial support or improvement of education environment in municipalities. For example, provision of salary of teachers/staff in municipal elementary schools and junior high schools
	Giving guidance, advices, and support. For example, giving guidance, advices, and support on education contents and school management
Municipal governments/ School	Conducting school installation management. For example, conducting management on installation of municipal elementary schools and junior high schools
	Implementation of education

offices have precedence of the board of education of municipalities in the hierarchy of education administration, but they do not give guidance, advices, and support to schools because the board of education of municipalities is in charge of compulsory education. Mitsushima (2014) pointed out education offices play the roles for school visit rather than the board of education of prefectures/municipalities and suggested education offices to cope with (1) improvement of education ability in responsible areas, (2) diversified educational subject, and (3) decentralization, for the aim that schools can provide education which are more suitable for their own area.

Authority on personnel issues is important for education administration. For high school level, the prefecture government is in charge of personnel issues including teacher training because high schools are under the prefecture government. However, the prefecture government also has responsibility on personnel issues for elementary schools and junior high school in municipalities except for bigger cities because the prefecture government provides salary of teachers,

although compulsory municipality governments directly manage education. This means the prefecture government is in charge of teacher training for elementary, junior high, and high schools, and governments of small- or medium-size municipalities do not have duty on teacher training.

3.3 Governance in Prefecture: Case Example of Hyogo Prefecture

The size of Hyogo Prefecture is 8,400.90 km^2 (12th largest prefecture in Japan), and the population size is more than 5,500,000 that is the seventh largest prefecture (Hyogo Prefecture 2015). It can be said that Hyogo Prefecture is one of bigger prefectures in size and population. Hyogo Prefecture consists of 41 municipalities (29 cities and 12 towns), and its prefectural capital is Kobe City, which is one of the government-designated cities in Japan. Six education offices are in Hyogo Prefecture. There are around 800 elementary schools with around 300,000 students, around 400 junior high schools with around 160,000 students, and more than 200 high schools with around 150,000 students.

The Great Hanshin-Awaji Earthquake attacked Hyogo Prefecture in 1995 with more than 6,000 deaths, and it was a turning point of disaster management as well as disaster education. Before the earthquake, school disaster education was evacuation drills in many schools. Many cases of school disaster education were conducted as a part of safety education. After the earthquake, the Board of Education of Hyogo Prefecture (henceforth Hyogo BOE) has promoted "New Disaster Education" with the following concept in addition to traditional type of safety education according to the suggestions from the Disaster Education Exploratory Committee established by the Hyogo BOE (Hyogo BOE 2013) as follows:

- Students understand the importance of cooperation and living together.
- Students consider how they live in societies.
- Schools provide psychological care for students affected by disasters.

In 1997, the Hyogo BOE developed and published the side reader for disaster education "Asu ni ikiru (Live for tomorrow)" based on the lessons of the earthquake, in which there are three kinds of publications for elementary school, junior high school, and high school students, respectively. This side reader has been revised to reflect the lessons of disasters in Japan and overseas countries after the earthquake of 1995.

In addition, the Hyogo BOE established EARTH in 2000 in order to promote school disaster management (Education Board of Hyogo Prefecture 2006). EARTH consists of the five groups: school education, psychological care, evacuation place management, school meals, and research and planning. The members of four groups other than research and planning group are trained teachers. According to

Shiwaku (2014), the role of EARTH members is to support their own and other surrounding schools for disaster management and disaster education.

In 2002, the Hyogo BOE established innovative school course for disaster management named as Environment and Disaster Mitigation Course at Maiko High School. This course is the first case in the world that the school has disaster management special course and provides disaster education in school curriculum. Shiwaku (2004) introduced disaster education programs of this course and identified active learning under the programs contributed to taking actions for disaster management.

To promote school disaster education, the Disaster Education Promotion Liaison Conference (DEPLC) plays the important roles, which consists of the Hyogo Prefecture BOE, Department of Disaster Management of Hyogo Prefecture, board of education of municipalities, school principals, and others. At the beginning of school year which starts in April in Japan, DEPLC reviews implementation conditions of school disaster education in previous year and considers major goals in current year. In the regional level covered by each education office, the Regional Liaison Conference is held with the education office, Department on Citizens, board of education of municipalities, school teachers/staff, EARTH members, and others in order to crystallize the discussion in DEPLC through sharing problems on school disaster education. After these conferences, the conferences are held in each municipality and each school. The city-level conference is done for improvement of disaster management system and for promotion of school disaster education in each municipality. The purposes of school level are to confirm school conditions as designated evacuation center and to coordinate disaster management training (refer to Fig. 3.2).

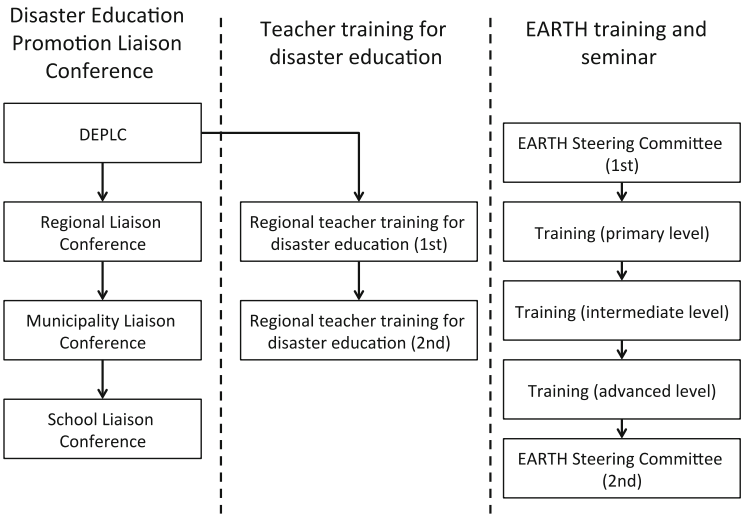

Fig. 3.2 Disaster education promotion system in Hyogo Prefecture

As mentioned in Fig. 3.2, teacher training for promotion of school disaster education is conducted in the regional level under the responsibility of each education office in order for the school teachers to utilize side readers and cooperate with community for disaster management. In parallel with regional teacher training, the EARTH teacher training is also conducted by the Hyogo BOE to train leaders who can implement school disaster management activities and instruct other teachers (Shiwaku 2014). At the end of school year, the survey is conducted to public schools (elementary, junior high, and high schools) to understand the conditions of implementation of school disaster education, and the results can be used in DEPLC for the next school year.

As mentioned in the beginning part of this section, Hyogo Prefecture is one of bigger Prefectures in Japan with many public schools. Therefore, the Hyogo BOE cannot manage school disaster education and related training effectively by itself. Education offices play the roles to connect the prefecture and the municipalities.

3.4 Governance in Municipality: Case Example of Kesennuma City, Miyagi Prefecture

Kesennuma City is one of municipalities of Miyagi Prefecture, located in the northeastern part of the prefecture, and one of the worst affected municipalities by the EJET. 1,353 people lost their lives and 8,483 houses collapsed completely (Kesennuma City Government 2014; Disaster Countermeasure Headquarter of Fire and Disaster Management Agency 2014). Kesennuma City is facing the Pacific Ocean and is famous for fishing ports. This city is the first city in Japan to declare itself as "Slow Food City."

Since 2002, Kesennuma City has been promoting the Education for Sustainable Development (ESD) by utilizing the rich environment and cooperation of local communities (Oikawa 2014). Currently, all elementary and junior high schools, which are managed by the Board of Education of Kesennuma City (henceforth Kesennuma BOE), have been registered as UNESCO schools. To review and promote ESD conducted in schools in Kesennuma, Kesennuma ESD/RCE (Regional Centre of Expertise) Round Table Conference has been organized once a year by Kesennuma BOE, Miyagi University of Education, Greater Sendai ESD/RCE Steering Committee, and other relevant organizations.

Kesennuma BOE has continued the Education Researcher System for around 50 years. In this system, teachers are selected by the board of education to be education researcher. Education researchers whose main subject is the same study and research their subjects in order to improve their teaching methods and subject contents through the meeting called Education Researcher Meeting. This system has worked well to improve qualities of general subjects. After the EJET, disaster management became one of the subjects for the Education Researcher System since 2012. In the fiscal year 2012 and 2013, education researchers on disaster

management were divided into two teams: disaster management planning team and disaster education team (SEEDS Asia 2014). In 2014, two groups were combined as disaster management team. Under this system, "DRR (disaster risk reduction) learning sheets" was developed by education researchers and Kesennuma BOE with assists of an international NGO and Kyoto University (henceforth, the university). DRR learning sheets are the official materials for schools in Kesennuma City and provide ESD-based DRR learning programs which consider connection with existing subjects so that school teachers can provide disaster education effectively. During the development process, Education researchers and Kesennuma BOE with cooperation of the NGO and the university visited other cities in Japan to understand the situations of other cities. They also joined the workshop and discussed the problems and solutions with the university. Another innovative activity under the Education Researcher System was application of SDRA (School Disaster Resilience Assessment) developed by the university as a comprehensive tool for assessment of school disaster resilience. SDRA consists of five dimensions of physical conditions, human resources, institutional issues, external relationships, and natural conditions. Each dimension has three parameters and each parameter has five variables. There are 75 variables in SDRA in total. These variables are useful for local governments as well as each school to understand the current resilience and consider future measures, strategies, and policies for enhancing school disaster resilience. Preparation for the SDRA survey was done by the university, the NGO, education researchers, and Kesennuma BOE. Analysis was done by the university and education researchers, and Kesennuma BOE with the help of the university discussed necessary activities for each school (18 elementary schools and 13 junior high schools) based on the SDRA results and the current conditions of each school. The Education Researcher System on disaster management after the EJET produced two achievements. One is contribution to capacity development for education researchers (selected school teachers) and officials of Kesennuma BOE. Through the process of development of DRR learning sheets and SDRA application, they had deep understanding on disaster management and disaster education. The other is preparation of the standards of school disaster education and school disaster management in the city with utilization of developed teacher's material and assessment tool. Figure 3.3 shows the relationship among players under the Education Research System on disaster management. It is considered that human resources for disaster education in Kesennuma City office are not enough because Kesennuma City is not a big city. The Education Researcher System is a kind of training for teachers, but it is regarded as a part of development works together with Kesennuma BOE and school teachers. In addition, NGO and university contribute to disaster education in Kesennuma City through provision of financial and technical supports.

In 2012, Miyagi Prefecture had deployed two types of teachers in charge of disaster management. One is senior teacher for disaster management that each school has this type of teacher, and the other type is chief teacher on disaster management who supports several schools surrounding their own school. Table 3.2 shows the roles of these two types of teachers.

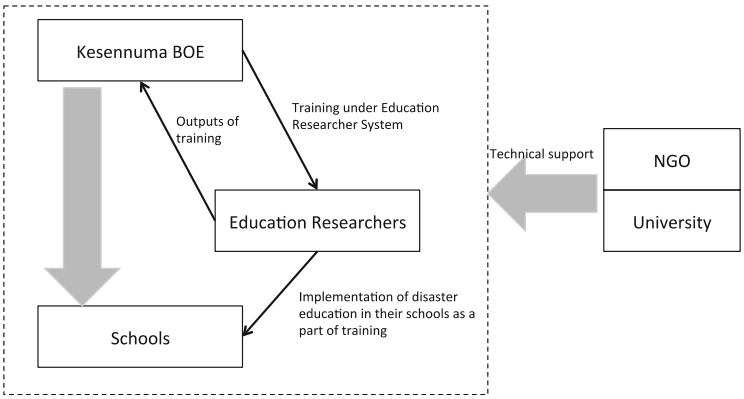

Fig. 3.3 Relationship among Kesennuma BOE, education researchers, schools, the university, and the NGO

Table 3.2 Deployment and roles of teachers related to disaster management (MEXT 2015)

	Senior teachers		Chief teachers
Deployment	705 teachers in public schools		80 teachers in elementary and junior high schools which can be a hub in community
Roles	Inside schools	Outside schools	Same roles as senior teachers
	Disaster education planning	Disaster management training in community	Cohering senior teachers in community
	Disaster management training	Cooperation with surrounding schools	Cooperation with surrounding schools, board of education, and relevant department of municipality government
	Teacher training inside school	Cooperation with relevant organizations	Collection of innovative disaster education practices
	Disaster management planning		Awareness raising
	Disaster management manual		Sharing and providing information

Kesennuma City follows this system and has seven chief teachers. Two teachers out of seven were education researchers in 2014. The Education Researcher System was closed in the end of school year 2014. In 2015, Kesennuma BOE emphasizes senior and chief teachers for school disaster education and disaster management in the city and started training for them instead of teacher training under the Education Researcher System.

The Miyagi Prefecture government has developed disaster education materials. The government designated several schools in the city to test the materials in schools. One such school is in Kesennuma City.

Thus, in municipality level, prefecture government and municipality government are making efforts for the same purposes.

3.5 Future Direction of Education Governance

This chapter introduced education system in Japan and reviewed education administration in prefectures and municipalities through case examples of Hyogo Prefecture and Kesennuma City, which were affected by the recent mega disasters. They have worked based on the lessons of the past disasters in order to improve school disaster education. Table 3.3 indicates strength and weakness in education administration for school disaster education in prefectures and municipalities, considering from the case examples.

Matsuura (2015) proposed development of new training program for school teachers, revision of guideline to enhance school disaster risk reduction planning, and assignment of disaster risk reduction coordinators (teachers) as the roles of the prefecture government. Matsuura also suggested, as the roles of prefecture BOE in emergency situations, administrative support for municipality BOE, managing

Table 3.3 Strength and weakness in education administration in prefectures and municipalities

	Strength	Weakness
Prefecture	All public schools can be covered	It is difficult to integrate policies and intentions of each municipality to prefecture policy
	Materials can be standardized	It is difficult to propose disaster education that is suitable for environment of each municipality
	Teachers' capacity can be enhanced systematically	It is necessary to provide standardized materials or programs for schools in prefecture
	There are more human resources than municipalities	
Municipality	Local conditions can be considered in the policy of municipalities	Human resources may not be enough
	More suitable materials can be developed	Fund may not be enough
	External help (e.g., NGO, university) can be utilized directly for elementary and junior high school education	There are materials from both prefecture and municipality
	Teacher training program can be developed more flexibly	Teachers may take similar kind of training from prefecture and municipality government
		Resource persons may be lacked

dispatching of BOE staff to disaster-affected municipalities and support to resume education activities including budget support. Thus, prefecture government BOEs are requested to support schools and municipality BOEs which are related to strengths of prefecture BOE mentioned in Table 3.3.

On the other hand, disaster education needs to be suitable for local context although standardized education programs are as well important. The Environment and Disaster Mitigation Course at Maiko High School in Hyogo Prefecture has provided innovative disaster education programs based on the lessons of the Great Hanshin-Awaji Earthquake. Shiwaku and Shaw (2008) introduced 11 types of education programs and pointed out importance of combination of natural and built environment. In case of Kesennuma City, Oikawa (2014) explained, as good practices, disaster education with community with utilization of local contexts and the lessons of the EJET. Saijo City, Ehime Prefecture, has conducted a "12-year-old education" which targets all sixth grade students in elementary schools in the city. This education program is conducted as the program of the city with budget. This is also a good practice led by the municipality government. Thus, to achieve disaster education that is suitable for local contexts, it is suggested to emphasize school- and municipality-level administration because prefecture governments have some limitation as Table 3.3 indicated.

Kesennuma City is a small city but Kesennuma BOE developed the education materials and conducted training to selected teachers under the Education Researcher System. The key issue is that Kesennuma BOE has utilized N-help ("N" of N-help means new, network, and NPO/NGOs) suggested by Oikawa (2014) as a new concept of help through collaboration with the NGO and the university. This collaboration can contribute to reducing the weakness in municipality level.

It is difficult for other municipalities to work like Kesennuma BOE because of several problems and limitations, especially lack of clear concept of disaster education, resource persons, and/or fund. For compulsory education in such municipalities, education administration by prefecture government is considered to work well for promoting school disaster education and enhancing teachers' capacity.

This chapter suggests prefecture government to emphasize originalities and uniqueness of municipality governments and schools. Prefecture governments need to provide standardized disaster education programs and to support municipalities with some limitation. Municipality governments also need to emphasize originality and uniqueness of each school. In addition, municipality governments need to develop their own concept of disaster education and implementation system, if necessary, with collaboration with resource persons/organization like NGOs and universities. The efforts and experiences of municipalities can be utilized for improvement of school disaster education in other municipalities in same prefecture with assist of the prefecture government.

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Chapter 4
Disaster Prevention Education in the Japanese School Curricula in Recent Years: Current Status and Future Challenges

Tatsuya Fujioka

Abstract The 2011 Great East Japan Earthquake and Tsunami (GEJET) reminded us of the harsh realities of the natural environment in the Japanese archipelago and the importance of crisis management systems. However, the treatment of natural disasters has not been neglected in Japan, where natural disasters have historically occurred. In Japan, here are two separate approaches to handling natural disasters in formal education. The first is learning within specific subject areas, particularly social studies and science. The second is educational activities that take place outside subject teaching hours. Although natural disasters are common in the Japanese archipelago, this arc-shaped string of islands, surrounded by the ocean and possessing a rich natural landscape, has greatly influenced Japanese culture, science and technology, and education. The Pacific Ocean coastline of the Tohoku region has been frequently hit in recent years by large killer waves (tsunami) that have repeatedly resulted in serious damage. The main difference between the 2011 GEJET and the previous tsunamis that hit the region is the accident that occurred at the Fukushima I Nuclear Power Plant. Because the perspective of understanding science and technology from a social context is closely related to issues in education today, these themes are touched on in this chapter.

Keywords The 2011 Great East Japan Earthquake and Tsunami (GEJET) • Disaster prevention education • Japanese school curricula • Education for Sustainable Development (ESD)

4.1 Urgent Issues in School Disaster Safety and Education for Disaster Risk Reduction to the Present

The 2011 GEJET reminded us of the harsh realities of the natural environment in the Japanese archipelago and the importance of crisis management systems. However, the treatment of natural disasters has not been neglected in Japan, a country

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where natural disasters have historically occurred frequently. Indeed, the study of natural disasters has been covered in formal education since the introduction of the Meiji period school system, although treatment lagged slightly behind that of modern flood controls introduced by foreign advisors (Fujioka et al. 1999). Recently, following the 1995 Great Hanshin-Awaji Earthquake, the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) reexamined school disaster safety, produced supplementary materials on natural disasters and disaster-prevention education, and conducted teacher training courses focusing on the affected areas in the Hanshin region.

Between the 1995 Great Hanshin-Awaji Earthquake and the 2011 GEJET, there were seven earthquakes named by the Japan Meteorological Agency, including the 2004 Chuetsu Earthquake and the 2007 Chuetsu-oki Earthquake. When a large-scale natural disaster occurs in Japan, a name is assigned to that disaster with the expectation that valuable lessons and experiences learned from it will be passed down to future generations and that relevant bodies will smoothly conduct emergency response and reconstruction activities after the disaster. In addition, there were 18 earthquakes with seismic intensity of just less than 6.0. Furthermore, a large number of weather-related disasters named by the Japan Meteorological Agency have occurred, such as the torrential rains in Niigata and Fukushima in 2004 and 2011 and rain events in northern Kyushu in 2012. In 2014, the Cabinet Office Central Disaster Prevention Council set up a working group on landslide damage following the landslides that occurred in Hiroshima Prefecture that year and the frequent occurrence of landslides in other vulnerable areas. The working group reported its findings the following year, pointing out the importance of disaster-prevention training in schools as well as in traditional areas.

There are two separate approaches to handling natural disasters in formal education in Japan. The first is learning within specific subject areas, particularly social studies and science that deals with the formation of the natural landscape, causes of natural disasters, and the effects of natural disasters on people. The second is educational activities that take place outside subject teaching hours, such as disaster drills and the creation of manuals for disaster prevention. Regarding the former approach, despite the need for a cross-curricular approach, the topic of natural disasters is still dealt with in the confines of individual subject areas. That is, the natural environment and the social environment are covered separately in science education and social studies education, respectively. Because of the different goals and characteristics of these two subject areas, natural disasters have not been comprehensively covered. On the other hand, activities outside of formal teaching have placed a greater emphasis on hands-on activities than on the scientific understanding of the causes of natural disasters. For example, there has been a tendency to concentrate more on what to do during and after a natural disaster through, for example, lifesaving techniques and evacuation training. Because of differences among the departments responsible for these activities, from the Ministry of Education to the boards of education in Japan's administrative districts, each of these activities is independently treated. Accordingly, it is hard to say that they are linked. In this chapter, these problems are specifically considered in an investigation of the school curricula.

Although natural disasters are common in the Japanese archipelago, this arc-shaped string of islands, surrounded by the ocean and possessing a rich natural landscape, has greatly influenced Japanese culture, science and technology, and education. Changes in the earth's crust that induce earthquakes and volcanic activity also yield mineral resources and landscapes that are attractive to tourists, and stormy weather and flood damage give rise to rich water resources. When we consider the relationship between the natural environment and human activities, we cannot disregard either natural disasters or the richness of nature (Fujioka 2006).

The Pacific Ocean coastline of the Tohoku region has been frequently hit in recent years by large killer waves (tsunami) that have repeatedly resulted in serious damage. The main difference between the 2011 GEJET and the previous tsunamis that hit the region is the accident that occurred at the Fukushima I Nuclear Power Plant. Because the perspective of understanding science and technology from a social context is closely related to issues in education today, these themes are touched on in this chapter.

Based on a discussion of the challenges faced by the education in Japan at different periods, this chapter examines the overall ways that disaster-prevention education related to natural disasters in school education has changed and the developments that will be necessary in the future.

4.2 Treatment of Natural Disasters in the School Curricula

During the first half of the twentieth century, the treatment of natural disasters in science education had an important significance because of the occurrence of major earthquakes in the Japanese archipelago. After the war, the subject area of "earth sciences" emerged in high school science curricula. Geography, which in Europe combines science and the humanities, was divided in Japan during the postwar occupation, with the human geography content in "human geography" (currently "geography") as part of "social studies" and the physical geography content in "earth sciences" as part of "science." In this process, the influence of the "earth sciences" cannot be ignored which was starting to gain prominence in the United States at the time. Because of subsequent problems, including low enrollment rates, and despite the fact that the topic of abolishing high school earth sciences was raised on several occasions, earth science has remained an established subject taught in high schools. One reason for this may be the continuous occurrence of natural disasters in the Japanese archipelago (Fujioka et al. 1999).

Following the 2008 and 2009 revisions to the school curricular guidelines, science education in Japan was divided into the four domains of physics, chemistry, biology, and earth sciences to provide continuity from elementary school to senior high school. It can be argued that some improvements resulted from the revisions to the compulsory high school subject of science in the current school curricular guidelines. However, enrollment in high school earth sciences remains low compared to the other three domains. Moreover, the number of examinees taking the

Table 4.1 Rates of adoption of types of science textbooks, 2014

Subject	Number of textbooks	Selection rate (%)
Science and human life	428,312	9.5
Basic physics	735,868	16.4
Basic chemistry	1,030,895	22.9
Basic biology	1,085,117	24.1
Basic earth sciences	316,600	7.0
Physics	235,510	5.2
Chemistry	347,361	7.7
Biology	303,137	6.7
Earth sciences	16,350	0.4
Total	4,499,150	100.0

university entrance examinations in earth sciences offered by the National Center for University Admissions is low. Table 4.1 shows the rates of adoption of high school science textbooks in the 2014 school year.

The explanation for the low level of enrollment in earth sciences in high school is not limited to the relatively late establishment of the domain compared to other subjects, evidenced by its arrival to the school curricula in the postwar period. Earth science encompasses a wide range of specialized fields, not just subjects related to the physical world, such as geology, petrology, seismology, and volcanology, but also meteorology and astronomy. Accordingly, one explanation for the low rates of enrollment in earth sciences is the shortage, even among science faculties, of teachers qualified to teach the subject. Furthermore, although Japan's curricular guidelines are applied in a uniform manner throughout the whole country, because the Japanese archipelago stretches from subarctic regions in the north to the subtropical zone in the south, there are huge regional variations in weather, climate, geological features, and topography. For these reasons, the consistent treatment of earth sciences in school education is more challenging than other science subjects, such as physics or chemistry.

Unlike the first half of the century, the second half of the twentieth century experienced relatively few major earthquakes. As a result, although developments in science, technology, and society progressed, people's awareness of earthquake disasters waned. Instead, there was an emphasis on flood control measures, based on the lessons learned from the enormous damage inflicted on the Japanese archipelago by the 1959 Ise Bay typhoon, which caused more than 5,000 deaths. A great deal of energy and financial resources were consistently invested in flood prevention projects in the postwar period in response to the frequent flooding of rivers and flood damage caused by torrential rains and typhoons. Therefore, flood damage declined and the flood control measures are considered a success. However, as Japanese school children began having less personal experience of flood damage, their awareness of the risks of flood damage from rivers dropped. This change was demonstrated by the results of the 3rd administration of the Trends in International Mathematics and Science Study (TIMSS), an international comparative assessment

that measures trends in mathematics and science education (National Institute of Education 1998).

Since the Meiji period, the textbooks used in compulsory education in Japan have traditionally included teaching materials related to rivers. However, recent school curricular guidelines have focused on the sand, gravel, and mud that comprise rivers' alluvial materials and that cause flood damage. Nevertheless, coverage of alluvial materials has been reduced in each revision of the national curricula since the postwar period. There also is some indication that there has been a decline in the number of questions on flood damage in international assessments (Fujioka 1999).

In 1998, in the wake of the 1995 Great Hanshin-Awaji Earthquake, which claimed more than 6000 lives and was Japan's worst earthquake disaster in the postwar period, revised curricular guidelines were announced. Reflecting the influence of the earthquake, the guidelines included a significant focus on natural disasters in the content of each subject, particularly science and social studies. Furthermore, these guidelines contained the first mention of fostering "the zest for living" in education. This idea relates to providing a balanced education comprised of the three pillars of knowledge, morality, and physical strength to create healthy, well-rounded individuals with sound academic abilities and moral values who function well in a changing society. Since these revisions to the curricular guidelines, "periods for integrated study" have been incorporated into the curricula from elementary through high school.

Following the 1995 Great Hanshin-Awaji Earthquake, supplementary teaching materials covering the disaster were produced by the boards of education of two of the affected areas: Kobe City and Hyogo Prefecture. These teaching materials were used mostly in the periods for integrated study mentioned above. The environment, international understanding, ICT, and health and welfare are examples of the content in integrated study periods. However, no specific mention is made in these materials of topics such as safety or disaster prevention. Nevertheless, it is clear that disaster prevention is not unrelated to the content listed in the examples.

4.3 Formal Education and the School Curricula in Japan After the Great East Japan Earthquake

The 2011 GEJET inflicted enormous damage on school children, school staffs, and facilities. More than 600 students and school staff died in the disaster. All of these losses resulted from the tsunami that followed the earthquake. Thanks in part to the improvements made to earthquake-resistant construction since the Great Hanshin-Awaji Earthquake, there were no confirmed deaths of students resulting from the collapse of school buildings. Furthermore, Kazumi (2013) reported that, because the disaster occurred during school hours, the number of casualties among students was, relative to the size of the population, much lower than in the rest of society.

Following the 2011 GEJET, MEXT quickly convened a committee of experts to determine the lessons to be learned from the earthquake in terms of disaster education and crisis management. The committee published an interim report in September of that year and released its final report in July of the next year. Based on its discussions, the committee made recommendations for disaster education that would be appropriate for the stage of development students had reached after a disaster. These recommendations were published in March of 2013 as a school disaster-prevention reference material, entitled "The zest for living: Disaster Prevention Education," which was distributed to every school in the country. In addition, 1 year after the 2011 GEJET, MEXT published "A Guide to Compiling School Disaster Prevention Manuals (Earthquakes/Tsunami)," which led schools across the country to review their existing disaster-prevention manuals. Subsequently, each administrative division of Japan received support through MEXT's "Practical Disaster Prevention Education Support Project," conducted numerous teacher training courses, and addressed issues in supplementary readers on disaster education.

However, the issue of school safety had been raised before the 2011 GEJET. The School Health and Safety Act had been in force since April of 2009, and there had been a demand for the enhancement of school safety through the formulation of a comprehensive school safety plan. The factors behind this demand included the school invasion and massacre at Ikeda Elementary School (an elementary school affiliated with Osaka Kyoiku University), accidents in which students fell from school buildings, and traffic accidents outside schools. These incidents led to calls for an urgent response regarding daily safety (including crime prevention), road safety, and disaster safety (synonymous with disaster prevention). During the disasters mentioned above (the Great Hanshin-Awaji Earthquake of 1995, the subsequent Chuetsu Earthquake in 2004, the Chuetsu-oki Earthquake in 2007, and torrential rain in Niigata and Fukushima in 2004), schools were used as refuges, and teachers were compelled to provide support based on their experiences as the schools moved toward post-disaster reopening. Based on these experiences, the need to try to improve school safety regarding a variety of natural disasters was recognized.

After the 2011 GEJET, MEXT published its Plan on the Promotion of School Safety (in April of 2012) with the intention of further promoting, rather than revising, the School Health and Safety Act. This plan emphasized the acquisition of knowledge about safety and the nurturing of abilities to take action. However, issues were soon raised about the organization of the content to be taught and the feasibility of securing time in which to teach it.

In addition, disaster-prevention education was positioned as one area in the wider field of school safety. The MEXT section that was responsible was the Sports and Youth Bureau. The bureau became responsible for the implementation of disaster-prevention education in addition to the aforementioned aspects of school safety, which it had traditionally dealt with. (It is expected that the Sports and Youth Bureau will be reorganized into an independent sports agency.) However, the Elementary and Secondary Education Bureau is the MEXT section responsible for

the curricula in formal education and for revisions to the curricular guidelines. The 2011 GEJET, immediately before educational activities based on the 2008 version of the curricular guidelines, were due to be sequentially implemented in elementary schools. The revisions incorporated into the current curricular guidelines, which apply to the elementary through the high school levels and are based on the new Fundamental Law on Education of 2006, continue to emphasize the concept of cultivating "the zest for living" among students.

Education following curricular guidelines extolling the concept of "the zest for living," which had been mentioned at the time of the previous revisions in 1998, is sometimes referred to as the third educational reform. Indeed, values presented in conjunction with the 2008 version of the curricular guidelines, such as "the ability to respond to changing times, compassion for others, and the ability to cooperate," were exactly those values that were required of the students and other children who went through the experience of the earthquake and displayed a "resolute the zest for living."

The current curricular guidelines list environmental education, safety education, information education, career education, and consumer education as important items. These are closely connected to the idea of a future "the zest for living." It can be argued that the contents should include properly acquired knowledge and skills that are reflected by real life and the items are interlinked in some areas. Moreover, there are significant connections with cross-curricular and integrated disaster-prevention education.

4.4 Japan's Educational Reform and the Cultivation of "The Zest for Living"

Some scholars have argued that educational reform in Japan up to this point resulted from strong influences in the international community (external pressures). Indeed, this seems undeniable with respect to the Meiji educational system and the first and second educational reforms that occurred under postwar democracy. It also seems possible that the stimulus for the third educational reform came from abroad. For example, the results of international assessments, such as the Trends in International Mathematics and Science Study (TIMSS) and the OECD Programme for International Student Assessment (PISA), are reflected in subsequent curricular guidelines, and their influence on the educational world in Japan is difficult to ignore. In addition, the importance of education providing a response to external pressures, such as those resulting from the Trans-Pacific Partnership (TPP), is often pointed out in the business community.

At this point, in addition to the motivating factors of the external community, internal pressures are considered in terms of the nation's response to major earthquake disasters. As previously explained, the term, "the zest for living," first appeared in the 1998 curricular guidelines following the 1995 Great Hanshin-

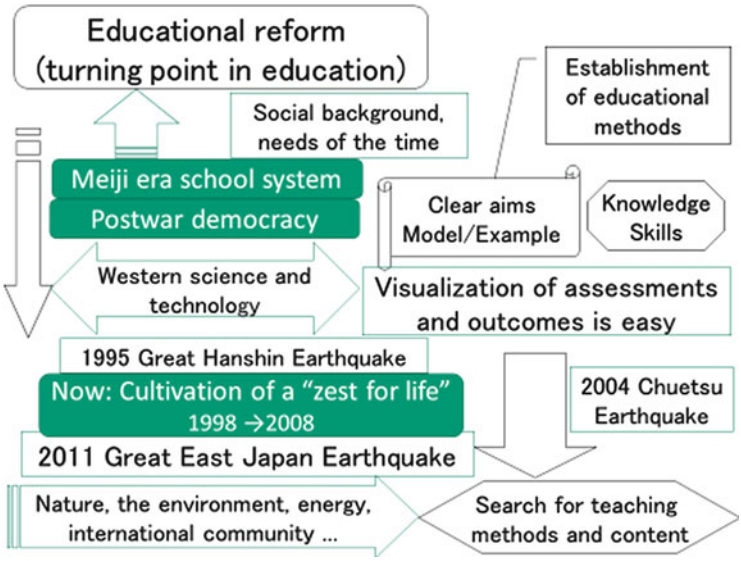

Fig. 4.1 The third educational reform and the Great East Japan Earthquake

Awaji Earthquake. In that year, MEXT published "The zest for living: Disaster Prevention Education." A revised version was issued in March of 2013 and distributed to every school.

Unlike the first and second educational reforms, the third educational reform did not rely on a model or template from other countries. In the past, the goal was to create an educational system that enabled students to efficiently acquire skills and knowledge in fields, such as science and technology, in which the West had advanced beyond Japan. Now, however, something different was required of Japan's educational system, and there was confusion among the schools and the teachers about exactly what to teach in the future and how to teach it.

The cultivation of "the zest for living," which is emphasized in education in Japan today, comprises relationships with nature; science, technology, and energy; the environment; and the international community, areas to which education will be required to respond in the near future (Fig. 4.1).

In response to the large-scale damage caused by the Great East Japan Earthquake disaster, including the earthquake, the tsunami, and the radiation, educators in Fukushima Prefecture grappled with reconstruction education, disaster-prevention education, and even radiation education. These efforts represent a method that embodies expectations for education aimed at fostering "the zest for living" (Fukushima Prefecture Board of Education 2014).

4.5 Challenges Facing Disaster-Prevention Education in Japanese Education

4.5.1 Challenges for Education in Japan from an International Comparative Perspective

Since 2000, the OECD has conducted a comparative survey every 3 years of international educational outcomes, known as the Programme for International Student Assessment (PISA). National Institute for Educational Policy Research (2001) describes the concept behind the assessments as follows:

> PISA emphasizes the importance of basing the acquisition of knowledge on a broad range of concepts and abilities, and aims to measure the extent to which individuals can adapt to various situations and challenges facing society. In terms of scientific literacy, the ability to understand a broad range of concepts and topics including scientific issues that are widely debated in today's society such as energy consumption, biological diversity and human health is important.

At present and since the accident at the Fukushima I Nuclear Power Plant that followed the 2011 GEJET, we should consider once again the relationships among science, technology, and society (Fujioka 2015). This is significant, particularly in Japan, where conservation education and pollution education are included in environmental education.

Since 1990, there has been an emphasis on environmental education in the Japanese curricula. Internationally, environmental education and education for sustainable development (ESD) came to be understood as equivalent to each other after the Thessaloniki Conference of 1997. However, in Japan, the idea that environmental education should emphasize environmental protection continued. Although some teaching materials on environmental education published by MEXT since the 1990s were revised in 2007 and 2014 to reflect the ESD perspective, these revisions were limited to materials for elementary schools. Teaching materials for junior high and high schools have not yet been revised. The difficulty of implementing environmental education in secondary schools in Japan underlies this distinction.

One PISA report states the following:

> Today, regardless of their country of origin or culture, there is a broad range of comprehensive skills that students should acquire. These include communication skills, interpersonal skills, adaptability, flexibility, problem-solving skills, and the ability to utilize information and communication technology.

These skills, along with "the zest for living," which must be nurtured in future generations that must go beyond the domestic sphere to the global level, are the same as those demanded by ESD. The following skills have been suggested by Japan UNESCO Committee in 2014 as desirable strengths to cultivate through ESD: (1) values related to sustainable development, including respect for fellow human beings, respect for diversity, inclusivity, equal opportunities, and respect for

Table 4.2 Results of student survey on the applicability of science lessons in the PISA of 2006 for Japan, Taiwan, the United States, and Finland

Percentage of students who answered, "The statement applies to most or all lessons"					
	A	B	C	D	E
OECD mean	59	46	38	34	30
Japan	26	19	12	16	11
Taiwan	59	56	35	44	26
United States	68	57	58	50	50
Finland	61	41	31	20	25

A: The teacher explains how concepts studied in science can be applied to a number of different phenomena (e.g., the movement of objects, substances with similar properties)
B: The teacher clearly explains the relevance to our lives of concepts studied in science
C: The teacher uses science to help students understand the world outside school
D: The teacher uses examples of technological application to show how they are relevant to society
E: Students are required to apply the concepts studied in science to issues in real life

the environment; (2) systematic thinking as understanding the background of a problem or phenomenon and taking a multifaceted and holistic view of things; (3) the ability to think of alternatives (i.e., critical thinking); (4) the ability to analyze data and information; (5) communication abilities; and (6) strong leadership abilities.

At this point, we will investigate issues in Japanese education by examining the results of studies on scientific literacy. The Programme for International Student Assessment (PISA) test is administered every 3 years, and each assessment has a detailed focus on reading comprehension, mathematical literacy, or scientific literacy. In 2006, the focus was scientific literacy, and the results of the student question paper survey on the applicability of science lessons are shown in Table 4.2. These results paint a stark picture of the current state of science education in Japan and the challenges that it faces. In addition to the overall OECD average and the results on Japanese students, the results of some other countries are presented in the table: (1) Taiwan, a country that followed the Japanese curricular model in the postwar years, has had unique struggles in recent years and constantly achieves top-ranking results; (2) the United States, which strives to be at the cutting edge of science and technology; and (3) Finland, which was the highest-performing country in the 2006 assessment. The results of this survey show that science lessons in Japan are disconnected from real life or society compared to those in other countries (Fujioka 2011).

Japanese elementary and junior high school students always achieve high grades in science on the TIMSS and PISA assessments. As a result, it is not necessarily the case that there is something wrong with Japanese science education, which has treated natural phenomena and other matters in a systematic way. Moreover, even though the United States boasts the world's highest number of Nobel Prize winners and science lessons there link science with every day and social problems, it does not immediately follow that those lessons are superior. Naturally, there are also differences resulting from the economic circumstances of the student's family or

region. Nevertheless, it is certainly not the case that the results of international assessments suggest that there is no need to reexamine the future direction of science education in Japan.

4.5.2 *Challenges Faced by Science Education in Japan Clarified After the Great East Japan Earthquake*

The necessity to reflect once again on the development of scientific literacy was brought home following the accident at Fukushima I Power Plant caused by the Great East Japan Earthquake. As Torahiko Terada (1934) stated in his work, *Natural Disaster and National Defence*, "The more civilization advances, the greater the devastation which nature's tyranny brings about." The history of earthquakes and tsunamis in the Tohoku region bears out this statement. For instance, both the 1896 and 1933 Sanriku earthquakes and tsunamis caused enormous damage to the region. However, the tsunami resulting from the Great East Japan Earthquake caused never before seen damage in the form of the Fukushima nuclear power plant accident.

Developments in science and technology, and expectations for more such developments, undoubtedly have a profound influence on the development of society and people's demands. To move toward solutions to future problems of disaster prevention and mitigation, energy and resource problems, and environmental problems, it is important that the mutual relationships among science, technology, and society should be considered in the near future.

We also must deal with the relationships among these fields in education (see Fig. 4.2 below). Disaster prevention and environmental education are unlike other subjects taught in schools up to now in that they require a combination of the acquisition of knowledge, technical skills, and behavior. For example, safety education, including disaster prevention, is meaningful particularly because students must act based on their own estimations and judgments of particular conditions and circumstances. Moreover, in this type of learning, there is not necessarily a correct answer. Cases in which a teacher leading a class and experts in the field are unsure of an answer are common.

Regardless of the extent of knowledge that an individual accumulates, he or she cannot state for sure that knowledge alone will solve a problem, and often it does not. This leaves us with the increasingly perplexing question of what type of decision-making we should adopt, at all levels, from the individual to the national level.

The expression, "informed consent," is widely used in medical circles. It refers to a patient agreeing to a procedure after having listened to and been convinced by an explanation given by a specialist of that procedure's risks and possible benefits. Since the 2011 GEJET, there has been a wide-ranging debate regarding energy in Japan. Even when it comes to energy consumption, it is important to fully

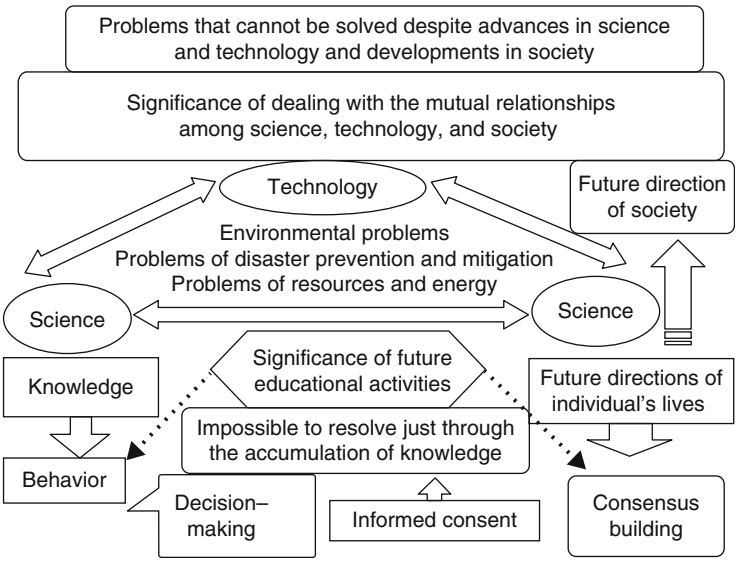

Fig. 4.2 Significance of dealing with the mutual relationships among science, technology, and society

understand and be convinced of the advantages and risks involved in different ways to use energy.

In any case, it is safe to say that, to this point, students have studied the topics covered in Japanese formal education with the assumption that there is an answer written down somewhere. However, from this point, students will need to search for and ask their own questions, and they must have an attitude of trying to find the answers themselves. Furthermore, students will be required to study about the ways that consensus can be built on a variety of topics regarding people and society.

4.6 Conclusion and Future Topics

It has been discussed the development of science education and environmental education in terms of the recent trends in Japanese education and regarding education directly related to natural disasters. The third session of the United Nations World Conference on Disaster Reduction was held in fiscal year 2014, which was 20 years after the Great Hanshin-Awaji Earthquake, 50 years after the Niigata Earthquake, 10 years after the Chuetsu Earthquake, and 10 years after the Sumatra Earthquake. Furthermore, 4 years had passed since the 2011 GEJET, and, whereas attention was focused on the importance of disaster-prevention education, landslides in Hiroshima Prefecture in August and the eruption of Mount Ontakesan in September caused many casualties. The year provided many opportunities to

rethink the interrelationship between the natural environment and human activities and the connections between nature and humankind as well as those within society.

If environmental education, ESD, and disaster-prevention education are ignored, a sustainable society cannot be hoped to build. The ESD perspective is that integrated efforts in numerous connected fields are required to achieve the construction of a sustainable society. In the sphere of learning, examples of these fields include international understanding, the environment, world heritage, and local cultural assets, and, in recent years, biodiversity and climate change can be added as well as disaster prevention to that list. These fields clearly demonstrate the strong connections between content and cultivation of the strengths required to achieve the goals of disaster-prevention education. Furthermore, safety education, including environmental education and disaster-prevention education, presents important challenges to the future of Japan that must be carefully considered, including challenges from a human resource development perspective regarding teacher development and training.

It has been pointed out that many students do not understand how the knowledge they possess relates to their everyday lives or their futures. The challenge of education in Japan that demands cultivation of "the zest for living" continues to be revealed from the results of comparative international assessments such as TIMSS and PISA. Moreover, since the 2011 GEJET, the desire has grown for new educational content and methods considering the international trends. Currently, there is a demand to move toward instruction that differs from that employed up until now and that advances educational development. Active learning, in which students actively engage in and advance their own studies, is one such method that has been recently gaining attention.

Last, the significance of what can be learned from the duality of the natural world, which provides the blessings of the natural environment as well as the terrible natural disasters, is something that education should engage with and something that Japan can communicate to the international community. Japan has been successful to this point at incorporating activities into education by which students learn from their experiences with nature. Educational activities that encourage reverence toward nature and a desire to preserve it not only help to improve academic achievement; they have value in their own right.

A variety of problems are rising on Japan's educational scene today, including bullying, truancy, difficulties raising achievement levels, and problems related to English and ICT education. As a result, it is difficult to maintain the attitude that can be pursued solutions to these problems while simultaneously looking to the future and preparing for disasters that could happen at any time. Nevertheless, efforts in disaster-prevention education, which are linked to environmental education and ESD, can help us to find solutions to the challenges that faced in education. In other words, disaster-prevention education can be perceived as a tangible teaching method that can help to cultivate the skills that future generations will need. Furthermore, schools alone cannot resolve the issues discussed above. Cooperation between entities, such as educational administrations and research institutions, is essential for the construction of a new educational system.

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Chapter 5
Schools, Teachers, and Training in Risk Reduction After the 2011 Tohoku Disaster

Takashi Oda

Abstract This study examines recent changes to training teachers in disaster risk reduction in school settings and changes in preservice and in-service teacher training between the 1995 Kobe disaster and the 2011 Great East Japan Earthquake and Tsunami and after the 2011 disaster. Evidence from the 2011 disaster suggests that schools are important to disaster risk reduction education, community-based disaster preparedness, and as emergency shelters during disasters. Based on lessons from the 2011 disaster, Japanese policymakers and educators are focusing on the numerous roles that schools could fulfill and calling for preservice and in-service training in disaster risk reduction. This study outlines the policy changes related to training teachers at schools, students in teacher-training programs, and future orientation toward more institutionalized training programs.

Keywords Teacher training • Disaster risk reduction • In-service training • Teacher training • Japan

5.1 Introduction

Despite the growing number of disaster risk reduction (DRR) educational programs that have been conducted in elementary and junior high schools since the 1995 Great Hanshin-Awaji Earthquake (Kobe), programs specifically designed to provide preservice (future) and in-service teachers with DRR and management education are still limited in Japanese schools. The programs are particularly limited at the undergraduate level of teacher training. While some pioneering practices have recently been presented at academic conferences, DRR programs for educators are in their early stages of development and implementation.

As was demonstrated in the aftermath of the March 11, 2011, earthquake, tsunami, and nuclear reactor disaster (hereafter referred to as the 3.11 disaster), schools are places that educate students about natural disasters and their prevention

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and places that actually mitigate the effects of these disasters by providing shelter and serving as recovery headquarters that receive and disburse aid. For example, about 320 evacuees, including many from the local community, spent up to 2 days at the Sendai Arahama Elementary School.

Japan's experience of the 3.11 disaster and projections that future powerful earthquakes will hit the Tokyo metropolitan area and Tokai and Tonankai in western Japan have increased the prevalence of school- and community-based DRR education in collaboration with local schools. Studies of several pioneering programs for DRR education have been published in journals such as the Japanese Journal of Safety Education. In addition, the Ministry of Education (MEXT),[1] prefectural and municipal boards of education,[2] and some nongovernmental organizations have published teaching materials. The universities and faculties of education responsible for teacher training in Japan have introduced pilot DRR programs into teacher-training curricula for both preservice and in-service teachers.

Smawfield (2013) argued that "the capture of knowledge on how schools have been able to respond to real-life disaster" is one of the most underrepresented areas in education and natural disaster literatures. Since the 1995 Kobe disaster in Japan and the world conference in 2005 in Kobe, in response to the 2005 Hyogo Framework for Action that identified education as an important factor for achieving its five priorities for action, growing international attention has been given to disaster-related studies in school settings, including increasing teachers' knowledge about DRR.

During these years in Japan, implementation of some practices resulting from DRR studies has occurred at some pioneering schools, suggesting growing interest in DRR education. Shiwaku and Fernandez (2011) detailed the post-Kobe curricula and programs at Maiko High School related to disasters, discussed the functions of schools for DRR education, and considered the ways that schools can move forward with DRR programs. Shiwaku and Fernandez (2011) is an example of studies that describe implementations in the field.

However, few studies have focused on what was different after the 2011 disaster, particularly regarding the contents of preservice and in-service teacher-training programs that reflect the new post-disaster reality. Part of the reason for a lack of research is that few programs are available and specifically designed to train teachers in disaster preparedness. In the Sri Lankan context, Donga and Bitter (2008) suggested a "new syllabus for preservice teacher training" that incorporates disaster safety education as an important milestone for Sri Lanka's school disaster risk management. Designed in cooperation with Indian experts, it is implemented in the country's National Institute of Education and 17 National Colleges of Education. Following the declaration of the UN Decade of Education for Sustainable

[1] MEXT has published several guidebooks and materials related to DRR, which have been distributed to public schools nationwide.

[2] Supplementary reading materials have been published by the Kochi, Miyagi, and other prefectural boards of education and by municipal boards of education, such as Sendai.

Development in March of 2005, UNESCO, as a leading promoter of Education for Sustainable Development, published teaching and learning materials to teach sustainable development. Its volume, *Reorienting Teacher Education to Address Sustainable Development*: *Guidelines and Tools*, deals with scientific literacy and natural disaster preparedness (Heng 2010). These materials are intended for teachers to use as DRR teaching tools in the field as well as learning tools to improve their personal familiarity with disaster science, management, and sustainability.

To disseminate the good practices of DRR education at the local level in the aftermath of disasters, teachers' capacities for development are important. To design better programs, Japan first needs to understand the functions that schools actually can and do perform during disasters and the types of institutional changes that should be made to support those functions during large-scale disasters. Thus, this chapter examines the preservice and in-service teacher training for DRR in Japanese teacher-training institutions after the 3.11 disaster. By analyzing pilot studies presented to the Japanese Association of Safety Education and ongoing curricular development in which the author is directly involved, this chapter provides a comprehensive view of the changing state of and challenges faced by Japanese DRR programs in teacher training.

5.2 Roles of Schools and Teachers During the Disaster

The 3.11 disaster began with an earthquake at a magnitude of 9.0 on the Richter scale. It caused more than 20,000 casualties in a country with a relatively strong system of natural disaster preparedness. For example, Japanese schools are internationally known for their high levels of preparedness to counter natural disasters. Schools are public entities with a relatively equal geographic distribution within communities compared to municipal offices, have large open spaces, and have higher building code standards than private properties. Elementary and junior high schools' characteristics often designate them as primary evacuation sites and secondary shelters (often in the gymnasiums). Indeed, many schools and teachers were vital to saving lives in Tohoku on March 11, 2011.

Students, teachers, and evacuees to the Kadonowaki Elementary School building survived, thanks to a swift evacuation to the top of the backyard hill, despite the tsunami and subsequent fire that hit the building (Fig. 5.1).

Among the more than 20,000 casualties of the 3.11 disaster, 617 schoolchildren were lost (Kazumi 2013) and many teachers were killed. Among the 7,988 schools in 22 prefectures that were reportedly damaged by the 3.11 disaster, 193 schools suffered severe damage that required either complete rebuilding or major restorations. A total of 131 schools were inundated by the tsunami, including 113 schools in which students were present when the tsunami hit. The tsunami inundation zone included 53 of these schools on the government's hazard map, although 69 inundated schools were not included in this zone. According to one survey, 35 % of

Fig. 5.1 Kadonowaki Elementary School, Ishinomaki, Miyagi (2011) (Source: Courtesy Photo of Professor Shigeru Nakai, Miyagi University of Education (April 15, 2015))

schools evacuated children to an upper floor or school roof, 32 % evacuated to a backyard hill, and 31 % moved the children to designated evacuation centers (National Institute for Educational Policy Research 2012).

Japanese schools contributed to saving many lives during the 3.11 disaster, with 622 school facilities serving as evacuation shelters at the peak of rescue operations on March 17, 2011. However, tragedies involving schools, children, and teachers occurred as well. One of the most troubling incidents, which later led to calls for increased teacher training, occurred at Okawa Elementary School in Ishinomaki City, Miyagi Prefecture.

5.2.1 Okawa Elementary School Incident

Okawa Elementary School was designated as a local evacuation site under the jurisdiction of the City of Ishinomaki Board of Education, and it experienced the worst 3.11 disaster casualties in a school environment, including the deaths of 74 pupils, 10 teachers, and numerous local people. The principal of the elementary school was off-duty on March 11, and the vice principal was the decision-maker in charge of the evacuation of students. After evacuating all of the students onto the school grounds, the teachers reportedly argued with some local people about where they should have evacuated, delaying evacuation. The tsunami then hit the evacuees as they proceeded toward a nearby riverbank bridge.

A third-party investigational board report indicated multiple problems related to the teachers' actions and decision-making on the day of the accident and regarding school administrators' and local authorities' insufficient steps taken and education provided before and after the incident (Okawa Elementary School Accident Investigation Board 2014). Based on analyses conducted by ten investigating committee members, comprising 108 interviews of 196 persons involved in the incident

(including survivors), 24 recommendations were put forth as proposals for future disaster preparedness. The first three of these proposals specifically urged the development and provision of (1) preservice teacher training, (2) in-service professional development programs, and (3) specific emergency management programs as a part of ongoing teacher development.

Although schools and school staff saved many lives, and schools and teachers were recognized as important resources for local communities in times of crisis,[3] the Okawa incident was so catastrophic that the recommendations that emerged should strongly influence DRR policymaking and practices. Moreover, although the so-called successes or failures of school evacuations are distinct from each other, a thorough examination of the school evacuations suggests that many so-called successes were uncomfortably close to being failures (Seo 2014). For example, in one case, a school's roof was only a few meters above the inundation line and the entire structure could easily have been flooded in a slightly more severe tsunami. These examinations emphasized the need to establish systemic DRR programs for teachers who could be called upon to make crucial life-and-death decisions during future disasters.

The investigational board recommended that MEXT and teacher-training universities require DRR education for all teaching students. The board further recommended that MEXT and the boards of education conduct substantial training sessions to protect children from disasters and raise awareness of DRR and emergency risk management, followed by more specific training based on crew resource management, a system originally designed for airline pilots that can be adapted for future use in schools. These recommendations were published in February 2014, and wide-ranging adoption of them has yet to occur, although several pioneering practices have been established at some universities, as discussed in the following section.

5.3 Changing Policies and Practices After the 3.11 Disaster

5.3.1 National Government

The Okawa incident and the highly criticized post-disaster responses by city authorities prompted victims' families to bring a lawsuit and a third-party investigation into the causes of the tragedy and its management by the relevant authorities. The third-party investigation resulted in the recommendations discussed in Sect. 5.2.1. As shown in Table 5.1, after the Kobe disaster, other domestic and foreign disasters and incidents occurred in the school environment, and there was a series of international agreements on the environment, sustainability, and

[3] Among other successful evacuation stories, the most well known is "the miracle of Kamaishi," which emphasized the role of preparedness in saving children's and local residents' lives.

Table 5.1 Chronology of school safety and DRR (compiled by Takashi Oda)

	Event	Implemented systems and policies	International agreements and policies
			International Decade for Natural Disaster Reduction (1990–1999)
			United Nations World Conference on Disaster Risk Reduction (Yokohama Strategy and Plan of Action for a Safer World)
1995	Great Hanshin earthquake		
1996			
1997			The United Nations Climate Change Conference, COP3 (Kyoto Protocol)
1998		Operation of the Law to Promote Specified Nonprofit Activities	
1999			
2000		Inauguration of the Japanese Association of Safety Education	United Nations Millennium Summit (Millennium Development Goals (MDGs))
2001	Osaka school massacre, the September 11 attacks		September 11 attacks
2002		Establishment of environment and disaster mitigation course at Hyogo Prefectural Maiko High School	Johannesburg Summit
2003			
2004	Sumatra–Andaman earthquake, Niigata–Chuetsu earthquake		UN Decade of Education for Sustainable Development (2005–2014)
2005	Hurricane Katrina		The Second United Nation World Conference on Disaster Risk Reduction (Hyogo Framework for Action 2005–2015)
2006		Revision of the Fundamental Law of Education: requested for promotion of "Partnership and Cooperation among Schools, Families, and Local Residents"	
2007	Nigataken Chuetsu-oki earthquake		
2008	Great Sichuan earthquake	Revision of the act on special measures concerning earthquake disaster management:	

(continued)

Table 5.1 (continued)

	Event	Implemented systems and policies	International agreements and policies
		promotion improvement in earthquake resistance of public school facilities	
		Launch of professional graduate school of education to strengthen teachers' expertise, implementation of the teacher license renewal system	
	The Iwate–Miyagi Nairiku earthquake	Central Council for Education report "Measures to Protect Children's Mind and Body and to Promote the School–Wide Actions for Securing Safety"	
2009		Implementation of safety management regulations in School Health and Safety Act for all schools to adopt	
2010	Haiti earthquake	Publication of "School Safety Education to Develop Students' Zest for Life", reference of school safety by the MEXT	
2011	The Great East Japan Earthquake	March 11 – the Great East Japan Earthquake and Tsunami, followed by Fukushima Nuclear Disaster	
		Interim report by the "Expert Committee on DRR Education and Disaster Management Based on Great East Japan Earthquake"	
2012		February – foundation of "DRR Head Teacher" system in Miyagi Prefecture: all schools are obligated to assign one teacher as DRR head teacher beginning in April	United Nations Conference on Sustainable Development (Rio+20)
		March – "Guidelines on How to Create School Manual on Disaster Prevention for Earthquake and Tsunami Disaster" issued by MEXT	
		March – Central Council for Education report "Plan on the Promotion of School Safety (Draft)"	
		April – "Plan on the Promotion of School Safety" drawn by the	

(continued)

Table 5.1 (continued)

	Event	Implemented systems and policies	International agreements and policies
		MEXT and approved by the Cabinet	
		July – final report by the "Expert Committee on DRR Education and Disaster Management Based on Great East Japan Earthquake"	
2013	Tropical Storm Sendong	Publication of "Zest for Life: Disaster Prevention Education", reference of school safety by the MEXT	
2014		February – "Okawa Elementary School Accident Verification Report" by the accident investigation committee stated 24 recommendations	UNESCO World Conference on Education for Sustainable Development "Aichi-Nagoya Declaration on Education for Sustainable Development", GAP
		November – summary of "Enhancement of Safety Education at Schools" by Central Council for Education and School Safety Task Force	
2015	Nepal earthquake	A section from "Sendai Declaration" concerning DRR education	The Third United Nations World Conference on Disaster Risk Reduction (Sendai Framework for Disaster Risk Reduction 2015–2030), Seventh Pacific Islands Leaders Meeting (Fukushima Iwaki Declaration)
2016		Establishment of Disaster Science Course at Miyagi Prefectural Tagajo High School	

development. Moreover, there were numerous policies and guidelines set forth by the national educational administrators. In particular, the 3.11 disaster stimulated numerous policy discussions on school safety and training intended to strengthen educators' capacities to respond in the field.

Following the Central Education Council report issued on March 21, 2012, the Cabinet resolved "the plan to promote school safety" on April 27, 2012, stating that safety education should be present in teacher-training programs. Furthermore, MEXT[4] created a working committee of the Central Education Council to address

[4] The Sports and Youth Bureau's School Health Education Division administers the working group; the report is important to national policymaking for DRR education.

school safety. This Council's discussions, led by scholars, policymakers, and practitioners, stressed the need for formal DRR education programs at two levels: during teacher training and for educators already in service who did not receive specialized DRR education during their training (examined below in Sect. 5.4, for more detailed information on educational governance, see Chap. 2 in this volume).

The proposals regarding training were summarized and published on November 19, 2014. The summary (School Safety Working Group 2014) concluded that knowledge about school safety is mostly disseminated as part of subject specialty courses or as teacher-training specialty courses. The working group proposed the development of national and local programs aimed at training management-level teachers and teachers in leadership positions in school safety. Moreover, the summary recommended further improvements, stating that,

> Further consideration is necessary in the national teacher training policy discussion on how school safety is dealt with at each level of teacher training because even a freshman teacher has responsibility to secure safety of the students under school control from the day one. (Quotation translated from Japanese)

Referring to the Council's recommendations, the government will formulate the relevant policies and programs. Although specific recommendations have yet to be submitted at the time of this writing, several universities and schools of education have taken it upon themselves to design and implement training programs.[5]

5.3.2 *Local Institutional Response in Miyagi Prefecture*

About 1 year after the 3.11 disaster, in February of 2012, Miyagi Prefecture, for the first time in Japan, created a system that designates one *Bosai Shunin* (DRR head teacher) to be responsible for DRR in each school across all of the public elementary schools, junior high schools, high schools, and special needs' schools in Miyagi. In addition, *Bosai Shukan Kyoyu* (senior teachers responsible for DRR) were appointed in 80 schools in Miyagi, based on geographic location.

Table 5.2 presents the numbers of these designated teachers across time. According to the Miyagi Prefectural Board of Education, designated teachers were expected to: (1) play central parts in promoting DRR education, (2) develop the DRR primary functions by drafting annual plans and in-school trainings at the schools, and (3), outside school, coordinate school–community partnerships and promote collaborations among family (guardian), community, and the municipalities responsible for DRR. A Bosai Shunin receives a daily allowance around 1.6 USD (25 USD per month); the funding currently comes from the recovery budget

[5] Several of the practices presented here have appeared in the proceedings of the Japanese Association of Safety Education annual meeting and workshop held in Sendai, Miyagi, on September 13–15, 2014.

Table 5.2 Numbers of schools, DRR head teachers, and senior teachers responsible for DRR in Miyagi in fiscal years (FY) 2012, 2013, 2014, and 2015

	2012	2013	2014	2015
DRR head teachers	740	717	705	679
Senior teachers responsible for DRR	25	60	80	80
Number of schools	729	706	694	684

Source: Miyagi Prefectural Board of Education as of May 1, 2015

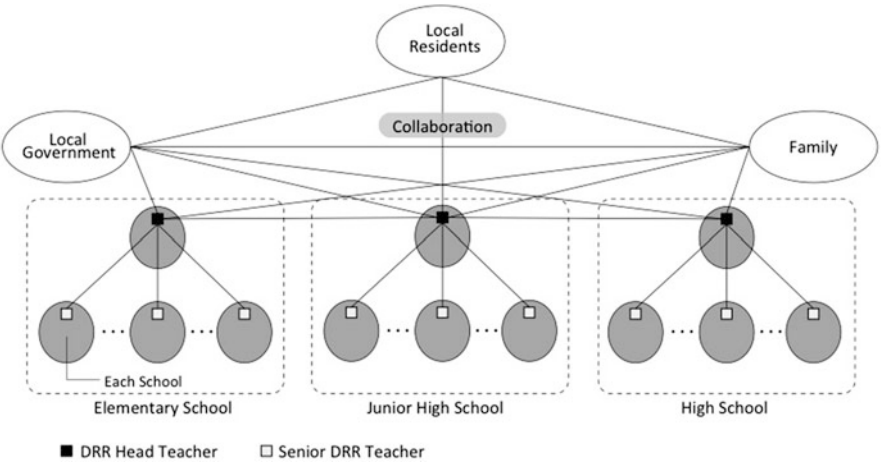

Fig. 5.2 Conceptual rendering of DRR head teachers, senior teachers responsible for DRR, and collaboration (Source: Modified from Miyagi Prefectural Board of Education)

appropriated from the central government. *Bosai Shukan* are leaders at the regional level and have opportunities for more training at prefectural training facility, whereas supervising *Bosai Shunin* are at the district level and work closely with municipal boards of education and municipal offices responsible for DRR (Fig. 5.2). Other local level response includes the development of teaching materials and textbook supplements to teach DRR across a variety of subjects. For more detailed information on curriculum development in response to the 3.11 disaster, see Fujioka (2016).

5.4 Development of DRR: Preservice Training and Teacher-Training Institutions

Since the 1995 Kobe earthquake, which caused the deaths of over 6,000 people on Jan 17, 1995, DRR in the educational sector has been a subject of interest among scholars who conduct interdisciplinary DRR studies. Their work has primarily focused on DRR educational practices in K–12. As DRR education has increased,

the need for training teachers in DRR has increased apace. The Japanese Association of Safety Education, established in 2000, is one of the major academic organizations to promote DRR education, and much of its focus has been on DRR education in the field. These scholars, as university researchers, served as advisors and/or actual practitioners of the good practices in the DRR education that they studied.

However, little attention has been given to the DRR in undergraduate, graduate, or teacher-training programs, with some exceptions, discussed in this section. Teacher training in Japan is mostly provided by national universities of education and faculties of education within national universities, all of which are designed to train and license teachers to teach anywhere in Japan. Several private universities also offer programs that meet the national criteria for teacher licensing in specific subjects. Physical education teacher training often considers matters of school safety, including DRR, but a systematic curriculum has not been developed to cover the full range of DRR topics from the earth science mechanisms of natural hazards, including geography, to first aid, mental health issues, and community-based DRR.

In-service training of existing teachers usually involves the use of prefectural or municipal training centers, which provide 1st-year (essentially newly hired) and 11th-year (with 10 years of experience) teachers with the legally required training, management-level on-the-job training (OJT), and other training opportunities. DRR education is not emphasized in this training system; the topic is structured within the overall school safety content that covers the wide range of issues related to education.[6] The safety of the children, teachers, and staff and the protection of the children are often stressed in school safety training, although the weight given to the topics is decided by the local boards of education.

Furthermore, the national teacher-training institutions in Japan have undergone significant reforms during the past decade, including conversion of the national universities into independent administrative entities in 2004, changes to teacher license renewal, and the 2008 establishment of professional graduate schools for education at the master's level. These reforms do not necessarily consider DRR education to be a vital topic.

Although the 1995 Kobe earthquake may be the starting point of DRR education in schools, preservice and in-service teacher training did not receive much attention until after the 3.11 disaster. Investigations that compared before to after the 3.11 disaster suggested that DRR programs were not sufficiently provided in national teacher-training programs until after the 2011 disaster, as discussed. Although MEXT had cosponsored school safety trainings and published DRR teaching materials before the 3.11 disaster, only about 12 % of schools in the deeply hit Iwate, Miyagi, and Fukushima prefectures had employed these materials beforehand. The tragic incident at Okawa Elementary School and problems at other

[6] Law for Special Regulations Concerning Educational Public Service Personnel stipulates these two mandatory trainings for all public school teachers in Japan.

schools caused many casualties and raised an alarm regarding the challenge of DRR teacher training.

The teacher-training institutions of Hokkaido, Aichi, Tokyo, and Osaka (HATO) have collaborated in the HATO project, led by Osaka Kyoiku University, to develop programs for safety and DRR education. In Tokushima, a coastal prefecture on Shikoku Island where the Nankai Trough represents a serious earthquake risk, a variety of DRR programs are currently underway. Tokushima University has mobilized its science education programs to join with local partners for a special DRR and emergency management program. The curriculum, designed for master's students, includes risk management for educational institutions and educational continuity planning; graduates of the program are awarded a certificate of completion. As this program continues, Tokushima's next step is to involve those students who are in teacher-training programs, such as those at the Naruto University of Education (Nakano et al. 2014).

5.4.1 DRR Education at College Level: A Case from Miyagi University of Education

In this section, the ongoing development of DRR education in teacher training in post-3.11 Tohoku is examined. Many people in Tohoku who experienced the 3.11 disaster in school settings are practicing a new type of disaster education. Major disasters require long-term recovery periods, as is the case in Tohoku. However, another earthquake, tsunami, storm, or landslide may occur at any time before recovery is complete. Although special attention must be given to survivors who may suffer psychological effects from DRR education, preservice students at a teacher-training institution in Sendai with firsthand disaster experience, including those who lost friends and family, have expressed strong interest in DRR programs. About 90 % of the students at Miyagi University of Education (MUE) are from the Tohoku area; among them, 70 % are from Iwate, Miyagi, and Fukushima, the prefectures most affected by the 3.11 disaster. Through such involvement, as well as other activities, such as designing teaching materials and DRR manuals, teachers have opportunities to train themselves about DRR. Some students lost immediate family members and others faced economic hardships due to parental unemployment, housing damage, and evacuation from the nuclear accident security zone. About 70 % of the freshmen at MUE aim to become teachers (Miyagi University of Education 2014). Upon assuming teaching positions (often in Tohoku), they are highly likely to become involved in the ongoing recovery process and school-based DRR management and education Thus, we can use Tohoku's teacher-training programs as an example, explained below.

One program that grew out of the volunteer efforts of MUE students in the affected area is now being considered for development as a sustainable service-learning program. This volunteer program engages education to students, including

Fig. 5.3 Volunteer students on the roof of Sendai's Arahama Elementary School learn about the 3.11 evacuation from then-principal Takao Kawamura, shown pointing away from the sea (Source: Center for Disaster Education & Recovery Assistance, Miyagi University of Education (September 26, 2012))

visitors from other teacher-training programs across Japan, in tutoring at elementary and junior high schools in the areas hit by the 3.11 disaster. Some of the participating schools had been closed or relocated because of the disaster, and some of the students had lived in temporary housing. The student participants visit the severely affected coastal areas to listen as then-principals and teachers of schools that were damaged or served as emergency shelters during the disaster share their experiences and decision-making processes during the crisis (Fig. 5.3).

This volunteer program assists affected schools and provides essential DRR learning experiences to future professional educators. MUE is the only national teacher-training college in Tohoku, and it values the positive educational effects of this program for students and visitors. The university is considering ways that this service-learning experience can best be merged into a larger DRR educational program to provide a more sustainable teacher-training environment. This program could become an essential part of DRR education at disaster-hit universities, utilizing their adjacency to actual recovery sites and supporting the professionals who experienced 3.11 firsthand (Oda 2014, 2015).

An essential challenge to the success of comprehensive DRR education for preservice and in-service teachers that must be overcome is the need to link empirical field programs with classroom studies that teach broad DRR concepts, such as basic natural hazards, community-based preparedness, first aid, and resource management.

The process of curriculum reform often hinders the implementation of changes. One way to facilitate change may be to teach DRR concepts within the existing programs as a useful first step. A team of MUE scholars has already conducted a faculty survey across its departments and centers regarding DRR education's presence in existing syllabi. The results of the preliminary data analysis suggest

that a diversity of DRR topics, ranging from heath, food, and first aid to geology, geography, climate, and nuclear science, are currently included in introductory and specialty courses in pedagogical methodologies and fieldwork. Furthermore, MUE is reorganizing its "Studies on Contemporary Issue Electives," created nearly a decade ago, into "Renaissance Studies," which are courses in which students can learn about post-3.11 society and challenges, including broad coverage of DRR and disaster recovery. A special taskforce, of which this author is a member, has been formed at MUE to discuss the ways that existing classes can be utilized to teach DRR and the types of DRR knowledge and experience best suited for future educators. Based on this, MUE intends to offer a course in the near future that its students can use to gain certifications as school DRR experts.

5.4.2 In-Service Training

Programs available for in-service teachers vary. Selected teachers can take courses offered by graduate programs at local teacher-training universities, there are required regular training sessions that may provide some DRR resources, and there are some programs provided at national, prefectural, or municipal training facilities. However, these ad hoc programs are not mandatory. For example, the national training program at the National Center for Teachers' Development in Tsukuba City, Ibaraki Prefecture, has expanded post-3.11. This 4-day course is part of the larger health education leadership training course that specifically focuses on school safety. Recent programs have required all participants to become directly involved in a specific DRR exercise (Fujioka 2014).

Among professional graduate schools of education, including Yamagata University, where many students are from areas affected by the 3.11 disaster, programs have provided DRR courses. In 2008, the Teaching Profession Graduate School System was introduced as a professional graduate school intended to provide specialized knowledge and skills to educators. After being introduced to this program, some teachers have taken leave to obtain master's degrees. A survey conducted among students in the elementary level teacher-training program at Yamagata found that a significantly low percentage had taken geoscience or geography classes in high school, so many of them entered the university program as arts oriented rather than science oriented. To supplement their lack of knowledge (and perhaps interest) in geoscience and its importance in understanding natural hazards, Yamagata University plans to expand from the in-service graduate program to a required undergraduate course entitled "Basic School DRR for Future Teachers" beginning in April 2015 (Murayama 2014).

An increasing number of prefectural or municipal training centers are providing DRR training and research programs in Tohoku. Several teachers who were assigned to the training center researched and developed computer-based DRR teaching materials under the supervision of university scholars. The 2012 School DRR Education Start Pack and the 2013 Training Pack contain digital materials,

Fig. 5.4 In-service graduate students discuss evacuation plan in a workshop provided by local weather service official (Source: photographed by Takashi Oda (December 1, 2014))

such as slides and documents that can be adapted to school settings, to conduct DRR education in the contexts of a variety of subject matter. The data package is available online and a variety of versions have been developed to a range of grade levels and types of hazards (Miyagi Prefectural Board of Education 2012). Teachers in training in Miyagi regularly participate in DRR study sessions conducted by local university scholars.

At MUE's professional graduate school, a DRR and DRR education course replaced the "School Education and Teaching Study" in October of 2014. The program has enrolled about 20 preservice master's students and in-service teachers to learn specific topics on DRR in schools. The students attended omnibus lectures on national policies on school safety, international framework development for DRR, and emergency shelter management by a guest lecturer who actually managed a shelter at school in Rikuzentakata, Iwate. In addition, scientists from a local meteorological observatory and firefighters gave special lectures and workshops on natural hazard such as earthquake, tsunami and typhoon, and first aid response, specifically designed for the teaching based on specific lessons learned from the 3.11 disaster (Fig. 5.4).

5.5 Discussion

Although teacher-training programs in Tohoku enroll many students with personal experience in disasters, training efforts represent only the beginning of DRR programs, which likely will require some trial and error adjustments. Since the 1995 Kobe earthquake, DRR programs have been increasingly implemented at schools, more so after the 3.11 disaster in Tohoku, and, particularly, in Miyagi, where the Okawa Elementary incident revealed an urgent need for DRR at the schools. The majority of the current programs, however, are not compulsory in the curricula and

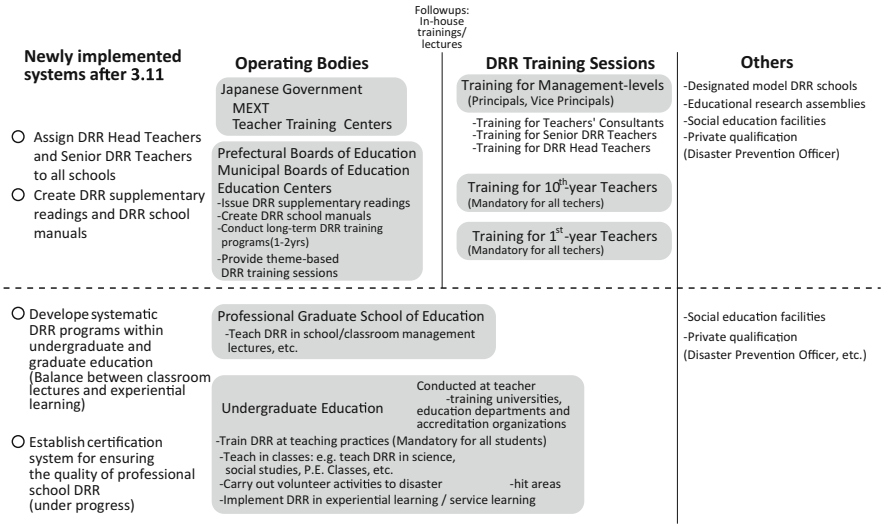

Fig. 5.5 Teacher-training system and DRR training opportunities for teachers in Japan

they are mostly designed and conducted by motivated teachers who either taught themselves about DRR or participated in ad hoc trainings as part of OJT in-service requirements. A gap between teachers' motivations to be involved and the extent of their learning about DRR exists because the current programs tend to be sporadically available and unsustainable. Figure 5.5 shows the current Japanese teacher-training system from the preservice level to the in-service career development level. Some of the programs are mandated by law, including the 3-week practicum at preservice licensing and first-year and tenth-year OJT. If a teacher desires to learn and DRR topics are offered in her or his training, she or he can learn about DRR through the opportunities. In places such as Miyagi where DRR teachers in charge are designated, a special training lecture may be provided for them.

A further barrier to DRR training is that Japanese public school teachers' posts are moved every few years within their municipalities and/or prefectures; thus, a motivated teacher conducting DRR courses may find that, upon moving to another school, the previous program does not exist. Considering that aspect of the educational system, the new programs introduced in Miyagi that designate responsibility to specific teachers and the local community could support the continuity of effective DRR practices in the schools and districts such as *Bosai Shukan* and *Bosai Shunin* discussed in Sect. 5.3.1.

Presently, the designated teachers in the Miyagi program have more opportunities for DRR trainings, the added responsibility offers self-esteem to involved teachers, and teachers receive a salary increase for the additional work. Teachers who are already motivated, once assigned the responsibility, could engage the

principal and her or his colleagues in proposing and implementing DRR programs at the school. The institutionalization of DRR programs would thereby increase and the programs would be less likely to be regarded as something extracurricular based on a teacher's personal interests.

Currently, the designated DRR teachers may or may not be equipped with appropriate knowledge and experience in disaster science and management. However, if these educators were to have systematic knowledge and experience taught to them at the preservice stage, such as in teaching practicums, they would be more likely to be prepared and there would be more teachers to take on the responsibilities of DRR education in schools and in the community. The development of teaching materials and guidebooks to fit the existing curriculum would help teachers begin or maintain DRR programs during work hours as a frame of reference for their efforts. Such materials could be used for preservice teaching practices.

As we discussed, DRR education is amidst the change in its existence. For effective and comprehensive DRR education promotion, the following changes should (continue to) occur. First, all of the teachers at a school should be open and learn the roles played by schools during disasters and value of conducting DRR-related programs at school. Post-3.11 disaster Japan has experienced increasing numbers of teachers who have heightened awareness regarding learning about and conducting DRR education at schools because their *mindsets changed*.

A *curriculum change* is another important aspect of sustainable DRR programs at schools. The teacher-training programs, working closely with DRR-related institutions, should be willing to adapt curricula and develop textbooks or guidebooks that present specific information and examples of experience teachers can gain during their preservice training period. For junior high and senior high school teachers, the links between the subjects that they teach and DRR-related content should be clarified, and the DRR-related textbooks used in schools should be employed as important reference materials. The basic level training program should be required to all preservice teachers as compulsory. Moreover, the university could guide advanced learners toward further study and certification.

An *institutional change*, such as university certification on DRR, should be evaluated and recognized by school administrators when they consider human resources' issues. Incentives should be given. Teachers with high levels of DRR knowledge are expected to take on the responsibilities of senior DRR teachers in future assignments, and they should feel confident working with a variety of stakeholders, such as local disaster response groups, PTAs, and municipal representatives.

This change would be expected to lead to further *relational/partnership change* for schools and other stakeholders in the community regarding DRR. Motivated and knowledgeable DRR-sensitive teachers can help neighborhoods to develop DRR planning and lifelong learning programs. Stronger and sustainable communication between teachers and local resource persons could yield effective consensus building on DRR concerns, particularly during an actual emergency.

5.6 Conclusions: Challenges and Outlook for Post-3.11 Teacher-Training in Japan

Although Japan is believed to be relatively advanced in the field of DRR and many efforts have been made to improve DRR education in schools since the 1995 Kobe disaster, DRR training for preservice and in-service teachers in Japan leaves significant room for improvement. The tragedies experienced among educators during the 3.11 disaster prompted the central government to consider DRR as a valuable part of teacher-training programs. Based on schools' new practices regarding DRR education and disaster management for existing teachers, teacher training must respond to the new and changing context of school safety and DRR.

The development of DRR education in universities' teacher-training programs faces several challenges. For example, university faculty members generally have wide discretion on the contents of their courses, and it is difficult to encourage them to adopt new comprehensive programs using a top-down approach. Furthermore, national teacher-training programs must comply with numerous laws and regulations for licensing, making curriculum reform a challenging task. How can a majority of faculty and administrative staff be motivated to develop DRR programs in the scope of a systematic curriculum?

Teacher-training colleges, which can bring together a variety of scholars from the arts and the sciences on one relatively small campus, are well positioned to develop comprehensive programs that emphasize the interdisciplinary nature of DRR. As seen in the above examples, collaborations among universities and between universities and public organizations relevant to DRR are valuable. Moreover, DRR programs should consider the 3-week teaching practice (practicum) required for all aspiring teachers for licensing as an important opportunity to teach DRR. However, no specific training has yet been established to teach school safety and DRR. A pilot program could assess the effectiveness and the challenges of DRR training. In line with the recently adopted Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR 2015), which stresses "the use of existing training and education mechanisms and peer learning" for "sharing experiences, lessons learned, good practices and training and education on disaster risk reduction," further examination by international peers is needed on the developing DRR educational practices in teacher training.

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Chapter 6
Curriculum of Maiko High School in Kobe

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Abstract The Great Hanshin-Awaji Earthquake took place in 1995 and it left behind the important lessons of promoting the DRR education. The Environment and Disaster Mitigation Course was introduced in Hyogo Prefectural Maiko High School in April 2002, with the aim of fostering citizens who can contribute to the disaster management in various levels. One-third of course curriculum is composed of the disaster- and environment-related subjects which can give knowledge on natural hazards and social environment. In addition, the course takes several off-school learnings into curriculum such as visiting active fault place and disaster museum. Students have opportunities to practice their learning at actual field by visiting neighboring schools to teach about disaster management, going to disaster-affected areas to work as volunteers, and joining various meetings to share the experience of Great Hanshin-Awaji Earthquake.

It has been already 12 years since the course was introduced and nearly 400 students have already graduated from that course. The questionnaire survey was conducted for those who have graduated, and the results show that graduates have been involving in disaster-related activities even after their graduation. It also demonstrates that DRR education which interlink student's future vision and DRR and experience-based education are effective to bring DRR into occupation and study as well as keeping active participation in DRR. The educational method of the course thus shows its effectiveness and it can be applied in different practices of DRR education.

Keywords DRR curriculum • DRR education • Maiko High School • Behavior change • Education effect

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6.1 Introduction

The Great Hanshin-Awaji Earthquake hit the developed city of Kobe, Japan, in 1995. It resulted to kill 6434 people and destroyed more than 100,000 houses. This disaster revealed the urban vulnerability and it left behind important lessons to encourage the DRR education with three important facts. The first fact was more than 80 % of victims died within 14 min after the occurrence of earthquake (Ueno 1996), and mostly it was crushing death due to the collapsed of houses or fallen down of furniture. Secondly, it calculated that more than 164,000 people were caught under the debris or furniture and approximately 80 % of them were rescued by neighbors (Kawata 1997). Lastly, due to the huge number of houses collapsed and the blockade of road and simultaneous house fire in scattered location, fire department, police department, and self-defense forces couldn't make full use of their own capacities. These facts thus lead to two important lessons. The first lesson was the importance of preparedness. It showed that people have deceased without having time for evacuation, and it implied that the ordinary disaster education such as evacuation and fire drills didn't make effect in the case. Therefore the individuals' awareness of disasters and knowledge of how to prepare and take actual measures before disaster occurs was realized necessary. Secondly, in the phase of immediate response in such a huge disaster, it could hardly expect the prompt response from specialized rescue team. Therefore the citizens themselves needed to have skills to save their own lives and neighbors' lives. From these contexts, the importance of DRR education for the citizens has been recognized to raise their awareness and have knowledge and skills.

Taking the facts and lessons into consideration, Hyogo Prefectural Board of Education (2012) has proposed "The New Disaster Education" soon after the earthquake, and this education put emphasis on teaching the preparedness, fostering the sense of mutual help, cherishing the life, and letting students think of the way as a human being besides evacuation drill and fire drill. The effort to improve the disaster education has been continuing by the Board of Education, and it was decided to set up the Environment and Disaster Mitigation Course (EDMC) at Hyogo Prefectural Maiko High School to embody the "New Disaster Education" in 2000, and the first batch of students have joined the course in April 2002 after 2 years of preparation period. The course has full quota of 40 students per year and 378 students have graduated as of April 2014. One of the educational goals of EDMC is to foster the citizens who can contribute to the society in the field of disaster risk management. This chapter aims to show to what extent the graduates are involved in the field of disaster risk management and what kind of education at EDMC has led graduates to keep involving in the field.

6.2 Education of the Environment and Disaster Mitigation Course

6.2.1 Concept of DRR Education

The importance of implementing disaster education at school is widely recognized (Shaw et al. 2004). A typical example was observed in 2004 Indian Ocean Tsunami when a British girl who visited a beach in Thailand alerted surrounding people on the beach after seeing the possibility of tsunami and saved a lot of lives by utilizing the knowledge that she has learned in her school (Shaw et al. 2011). School thus plays an important role in transferring the knowledge of DRR as school is an education center, and it can spread out the knowledge through students to parents and community (Shiwaku 2009). Fostering people with knowledge and skill to protect their own lives from disaster is the basic objective of DRR education, and Petal (2009) pointed out that DRR education should teach not only natural hazards but also the human interaction with natural environment as the impact of natural hazards can vary depending on human intervention to the environment such as natural resource exploitation and human settlement pattern. In addition, DRR education tends to teach what to do when disaster takes place. However, it is needed to address preparedness, which is what to do before occurring disaster (Petal 2009). These ideas suggest that DRR education should integrate both aspects of natural hazards and social environment as well as preparedness into DRR education which has been mentioned in the concept of the Environment and Disaster Mitigation Course.

6.2.2 Setup

The Environment and Disaster Mitigation Course (EDMC) is unique and only one course in Japan as of February 2015, which was introduced to provide DRR education at high school level. High school education is equivalent to 10th–12th graders and adopts unit system. In the case of EDMC, students are required to take 35 classes of 50 min each to obtain one unit which is equal to 29 h and 10 min per unit. The course is composed of 96 units in 3 years and 27–31 units of them are allocated for specialized subjects in disaster management as of academic year 2014. It has four units of range due to the optional classes. Hence, one-third of the courses are specialized in disaster management, while two-thirds are assigned for general subjects such as Language, Mathematics, English, and so on. Each subject is allocated one to five units.

Educational goals of the course give main focus on learning about the topic from both aspects of natural hazards and society and foster the person who can contribute to the disaster management actively as the citizen as per the following:

- Based on the lessons learned from the Great Hanshin-Awaji Earthquake, let students think of the significance of life, raise the capacity to deal with disasters, and foster person who can contribute to the society.
- Through the learning of the mechanism of natural phenomena and the relationship between the disasters and human society, let students understand the natural and social environment.
- Collaborating with universities, research institutes, and disaster-related organizations, deepening the understanding of the environment and disaster mitigation through practical and experience-based learning, nurture the person who have the attitude of "think globally, act locally" and who can actively get involved in the activities.

6.2.3 Curriculum

The EDMC has nine specialized subjects in disaster management as shown in Table 6.1 as of the academic year of 2014. The modifications of curriculum have been made according to the experiences of during 12 years. For example, "Disaster Mitigation Workshop" was delivered in the beginning to raise the ability of expressing opinion and making presentation. However this subject was replaced by "Environment and Disaster Mitigation Reading" in 2005 to enhance the reading skills because the lack of capacity in obtaining the information from reading materials was recognized. The subject "Human Beings & Society, Social, Welfare, Volunteerism and Mental" was another example of improvement. Its contents were modified in 2006 to give more specific focus on the support after disasters such as mutual help in disaster-affected area, support for vulnerable group of people, establishment of disaster relief volunteer center, and so on, which had originally contained the health issues such as mental health, HIV, etc. The contents of the subjects are being modified according to the occurrence of the disasters in order to reflect the real situation such as the international support, and its problems when Indian Ocean Tsunami took place in 2004 were included in the class. As Table 6.1 shows some subjects also consist of the experience of the Great East Japan Earthquake and Tsunami which occurred in 2011. Hence the course contents are dynamic and vary from year to year.

These subjects were basically designed under the following three elements to achieve the educational goals:

1. Learning both natural and social aspects of disasters
2. Synergetic effect among subjects
3. Fostering moral sense

Firstly, specialized subjects have been created to learn both natural hazards and social impact of disasters. Natural hazards such as earthquake, typhoon, and landslide are the potential of inducing the natural disasters, and natural hazards themselves don't influence the society unless they take place which people live.

Table 6.1 Specialized subjects and its contents in 2014

Name of subject	Unit	Subject contents
Disasters and human beings	5	Lecture on the Great Hanshin-Awaji Earthquake and Great East Japan Earthquake and Tsunami by invited lecturers of lifeline companies, fire department, police department, universities, graduates of the EDMC
		Visit of Disaster Reduction and Human Renovation Institution and Nojima fault museum
		Delivery of DRR class for elementary school students given by EDMC students
Environment and science I • II	2 each	Lecture on mechanism of earthquake, volcanic eruption, atmospheric circulation, change of seasons, and formation of geographical features
		Field work at Mt. Rokko
Natural environment and disaster management I • II	2 each	Lecture on chemical element, atom, theory of evolution, biological cell, inheritance, laws of motion, energy of work, heat, wave, and electricity
Social environment and disaster management I • II	2 each	Lecture on disaster's damage and reconstruction occurred in Japan, disaster-related law
		Visit of Nagata ward, Kobe City, which was severely damaged by the earthquake to learn the community recovery and its issues
		Lecture on earthquake-resistant structure by invited lecturer
		Delivery of the class about the earthquake-resistant structure to children using paper-made scale model
		Elaboration of disaster management plan for imaginary city
Activity in disaster mitigation I • II	2 each	Lecture on natural disasters in the world
		Elaboration of culture box for exchange program with Nepal
		Lecture on trauma counseling by invited lecturer
		Elaboration of disaster management game in the group
		Making connection of dream with disaster risk management

(continued)

Table 6.1 (continued)

Name of subject	Unit	Subject contents
Human beings and society, social, welfare, volunteerism, and mental I • II	2 each	Lecture on mid- and long-term support after disaster by invited lecturer
		Elaboration of volunteer activity plan at affected area of tsunami
		Evaluation of volunteer activity plan with the EDMC students who worked as volunteer at tsunami-affected area
		Drill to set up the disaster relief volunteer center
Environment and disaster mitigation reading	2 optional	Reading on nuclear power plant in Great East Japan Earthquake and Tsunami
		Elaboration of presentation for junior high school students
		Reading of experiences of Great Hanshin-Awaji Earthquake and Great East Japan Earthquake and Tsunami
Computer in disaster management I • II	2 each, II is optional	Use of word, excel, and power point
		Simple image processing
		Elaboration of safety map utilizing GIS software, web page, and disaster management game
		Delivery of DRR class at elementary school
Graduation work	2	Writing of experiences of Great Hanshin-Awaji Earthquake based on the interviews
		Elaboration of report or work relating to the topic learned through the course

Society as well has the ability of resilience to natural hazards, and depending on the extent of the mitigation and preparedness, the impact to the society varies. Thus the understanding of both natural and social aspects is essential to learn about disaster management. To be more concrete, "Environment and Science" contains the mechanism of natural phenomena, and "Disasters and Human Beings" and "Social Environment and Disaster Management" are the classes for learning about the impacts of natural hazards to the society. Second is the synergetic effect among the subjects. For example, learning the mechanism of earthquake at the class of "Environment and Science" and at the same academic period learning the impact of Great Hanshin-Awaji Earthquake at "Disaster and Human Beings" are encouraged to understand disaster comprehensively. Along with those in school learning, visiting the Nojima Fault which triggered the Great Hanshin-Awaji Earthquake and Disaster Reduction and Human Renovation Institution which is the museum to convey the experiences and lessons of the Hanshin-Awaji Earthquake to the next generation and to reduce damage during disasters is integrated as a part of curriculum. Thus contents of subjects are interrelated to promote the understanding of both social impact and natural hazard simultaneously. Thirdly, the education is designed to foster the moral sense of cherishing life. The course has a lot of

opportunity to interact with the people who lost their important persons or experts who worked during the emergency phase of the 1995 earthquake. For example, firefighters told with tears how the rescue activities were difficult and how helpless they felt when they couldn't save lives. Listening to such heart-touching stories gives the opportunity to think of the human life and it leads to foster the moral sense of each student.

6.2.4 Cocurricular and Out-of-School Activities

Apart from the curriculum, EDMC's education contains a lot of cocurricular activities and out-of-school activities. Cocurricular activities defined as the activities which are not included in the curriculum but conducted as formal event of high school or EDMC. Out-of-school activities in this context are regarded as the activities which are optional to participate but open to students. According to the date provided by Maiko High School, 168 activities of both cocurricular and out-of-school activities have been conducted in the academic year of 2013 with the participation of a cumulative total of 5925 students. Some activities were participated by not only the students of EDMC but also students of normal courses; hence, the cumulative numbers of students were higher than the number of EDMC regular students. However, this number shows that the course positively provides the learning opportunity for students in both cocurricular and out-of-school activities. The following are the examples of cocurricular and out-of-school activities which were conducted in the academic year 2013.

Examples of co-curricular activities:

- Training courses of first aid and AED (for first year students)
- Great Hanshin-Awaji Earthquake Memorial event at Maiko High School
- Evacuation drills

Examples of out-of-school activities:

- Exhibition of the EDMC at community festivals
- Participation of evacuation drill at neighboring community
- Fund-raising activities
- International exchange program in Nepal to learn about school safety program
- Presentation at DRR-related seminars
- Volunteer for camp program for children to learn about how to survive during disasters
- Exchange program with other high school students regarding on DRR
- Volunteer activities at tsunami-affected area
- Exchange with the foreign trainees of disaster management
- Delivery of DRR classes for elementary, junior high, and high school students

These activities are considered as the opportunity to practice students' learning at actual field. Although the affected area is not the place to learn and main purpose of activities in affected areas is to support, lessons about the support in the class of

"Human Beings & Society, Social, Welfare, Volunteerism and Mental" were being utilized for the volunteer opportunity at tsunami-affected area. Students of EDMC are also requested to deliver the class for elementary, junior high, and high school students, and these classes are carried out by making the use of elaborated educational materials.

6.3 Questionnaire Survey for Graduates

The EDMC has produced 378 graduates as of April 2014. Educational goals focused on fostering the person who can contribute to DRR in the society, and actually many of graduates have been involving in the disaster-related activities as both professionals and volunteers although they were not conducted the survey to follow up how the graduates are developing their career and their present status of participation in DRR. The questionnaire survey was thus implemented and analyzed the behavior of the graduates.

6.3.1 Outline of the Questionnaire Survey

The questionnaire survey was conducted from 3 December 2014 to 31 January 2015 with specific focus on the following three elements in order to study whether the course curriculum can successfully foster the students who match the educational goals of EDMC:

1. Relationship of present job or study with disaster management
2. Level of involvement in disaster-related activities after graduation
3. Influence of the course in choosing career

In terms of the survey form distribution, the web-based questionnaire survey form was adopted and its link was delivered to the graduates in the following two ways. The first way is sending the link by post individually for those who have graduated from the year of 2005 to 2010. The second way is circulating through SMS by the representative of each grade for those who have graduated from the year of 2011–2014. One hundred twelve graduates out of total 378 graduates have responded to the questionnaire.

Before going to the results, the background of graduates is explained. As the course has introduced in 2002, the first batch students have graduated in 2005 and until tenth batch has already graduated as of 2014. Most of the high school graduates go to 4-year undergraduate course; therefore, from 2005' to 2010' batches have basically completed the undergraduate education, while from 2011' to 2014' batches are still in the ages of studying at university. Besides, there are some exceptions such as the person who got a job soon after graduating high school or entered the university a few years later the graduation of high school. Table 6.2 shows the number of respondents based on the graduation year.

Table 6.2 Number of graduates and respondents based on the graduation year

Graduation year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Total graduates	39	39	30	37	40	38	40	38	39	38	378
Number of respondents	12	16	9	13	15	8	6	7	18	8	112

6.3.2 Relationship of Present Job or Study with Disaster Management

This part introduces what kind of occupation or study the graduates have chosen and how it relates to the disaster risk management. According to the result of the questionnaire, present affiliations of respondents are shown at Table 6.3. Among 112 respondents, there are 36 students (32 %) both undergraduates and graduates and 57 (51 %) full-time workers which are composed of 35 (31 %) employed by private company and 22 (20 %) public workers. Ten (9 %) were part-time workers; one housewife and eight (7 %) have chosen "Others" at questionnaire survey, which means that don't fit to any of the categories. These eight people are basically working under definite period such as overseas volunteer program and agricultural and medical trainee. Looking at the public workers, there were 13 graduates working at fire department, two at self-defense force, and one at police department. Apart from them, two graduates are employed as full-time worker by NGO and mainly working to promote the disaster education and supporting the disaster-affected area. In terms of the students, at least five students raise the disaster management as study topic or belong to the faculty focusing on disaster management. Hence, 21 % (23 of 112 respondents) are considered working at disaster-related field or study about disaster-related topic.

While 21 % of respondents have direct relationship with the disaster management in their work and study, 65 % (73 people of 112) answered "Definitely yes" and "Yes, I think so" to the question "Do you think your present affiliation has relation with disaster mitigation/prevention?" This result indicates that even if graduates are not affiliated in the disaster-related occupation or study, many of them find the connection of their present occupation and study with the disaster management. The following comments show how graduates connect their affiliation with disaster management:

- Nurse assistant: My work has a relationship with the disaster management because I have to guide the patients to evacuate to the safe places in case disasters happen, and we also have conducted the evacuation drill.
- Sales staff: I am selling the wheel chair and stick for elderly people, which will need to be provided during the disaster situation.
- Teacher of kindergarten: I usually tell the children about how to respond in case of disaster and we conduct evacuation drill six times a year.

Table 6.3 Number of graduates categorized by present job or study ($N = 112$)

Present status	Students		Full-time worker		Part-time worker	Housewife	Other
	Undergraduates	Graduates	Private	Public			
Number of graduates	36 (32 %)		57 (51 %)		10 (9 %)	1 (1 %)	8 (7 %)
	33 (29 %)	3 (9 %)	35 (31 %)	22 (20 %)			

- Worker of Welfare Center: I was assigned as a person in charge of fire prevention at the center.
- Agricultural trainee: Connecting neighboring farmers is one of the means of creating community and agriculture is influenced by the nature; thus, it has relationship with disaster management.

Even though there are some limited numbers of graduates who are directly working or studying in disaster management field, graduates connect the affiliation with disaster management. This fact suggests that the education of EDMC shows possibility of incorporate disaster management perspective into various types of occupations and study.

6.3.3 *Level of Involvement in Disaster-Related Activities After Graduation*

It is suggested that graduates tend to find a linkage between affiliation and disaster management. In this section, it is explained that to what extent the graduates of EDMC are involved in the disaster-related activities besides their affiliation. Based on the preliminary survey to identify the types of disaster-related activities that the graduates have been involved in, the activities are categorized into eight as follows:

- Conducting disaster education for children
- Working at disaster-affected area as volunteer
- Participating in workshop on disaster/disaster mitigation
- Participating in evacuation drill
- Participating in fund-raising activity
- Sharing the experience of Great Hanshin-Awaji Earthquake
- Participating in the community organizations for disaster prevention
- Others (none of the category abovementioned)

According to the result of the questionnaire survey, 78 % (87 graduates out of 111) answered that they conducted or participated at least one of the activities after graduation. Those who answered "Others" have participated in the training for evacuation center management, worked as volunteer staff for disaster education contest, developed application on disaster management, and so on. Table 6.4 shows that the numbers of graduates categorized by the number of activities conducted or participated. The graduates who participated or conducted once reach 18 % (20 graduates); however, those who chose three activities or more are 67 % (74 out of 111 respondents). These results indicate that graduates are involved in several types of disaster-related activities even after graduation.

Figure 6.1 shows to find out what kind of disaster-related activities tends to be involved by the graduates. This question was developed with multiple answers. As a result, graduates were more involved in conducting disaster education, working at disaster-affected area, and participating in workshop, evacuation drill, and fund-raising activities. Graduates keep the habit of learning through participation of

Table 6.4 Number of graduates categorized by number of activities participated or conducted ($N = 111$)

Number of activities	0	1	2	3	4	5	6	7	8
Number of graduates	24	20	15	12	17	9	4	8	2

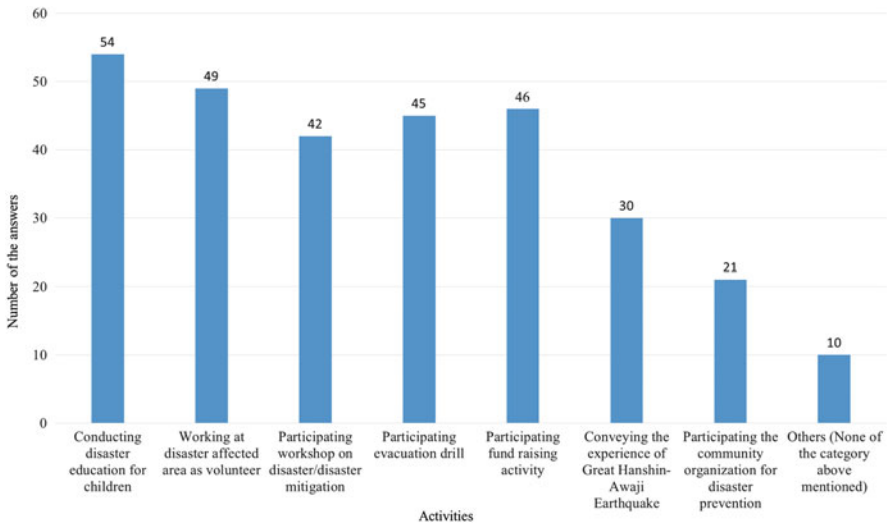

Fig. 6.1 Involvement of disaster-related activities by graduates

workshop and reflect their learning through delivering classes and working in disaster-affected area. However, the number of graduates who have participated in the activities of community organization for disaster mitigation is relatively low compared with others, and it suggests that graduates are rather working at outside of their own residing community.

In terms of the activities, graduates are basically involved in several disaster-related activities. Table 6.5 shows the frequency of participating or conducting disaster-related activities. Eighty-seven people out of 111 have been involving in disaster-related activities, 13 (12 %) people do "more often than once in a month," 22 (20 %) answered "once in 2–3 months," and 15 (14 %) answered "once in six months." While graduates keep involving in the activities, 37 (33 %) people answered "less often than once in six months." One of the reasons of less frequency of involvement is the employment. Table 6.5 shows the comparison of employee and student in terms of frequency. In this context, employee includes full-time worker, part-time worker, and those who answered "Others" at Sect. 6.3.2. Students include both students of undergraduate and graduate schools. Thirty-one out of 37 who answered "less often than once in six months" are employees, and it indicates the difficulty in keeping the same level of involvement of other students in terms of availability of time after getting work, while workers find the linkage of affiliation with disaster management. At the same time, nine employees are actively involving as they answered "more often than once in a month." This is because

Table 6.5 Frequency of involvement in disaster-related activities

Frequency	Total	Employee	Student
Never involved	24	18	6
More often than once in a month	13	9	4
Once in 2–3 months	22	9	13
Once in 6 months	15	8	7
Less often than once in 6 months	37	31	6
Total	111	75	36

some of them are involving in activities through their occupation such as delivering DRR education as NGO member and implementing awareness program through fire department. Therefore, especially students of university have been actively involving in the disaster-related activities.

6.3.4 Influence of the Course Contents to the Action After Graduation

It is discussed that graduates of EDMC integrate their affiliation with disaster management, and most of the graduates are still involving at a certain level in the disaster-related activities even after the graduation. As mentioned earlier, one of the educational goals of the course is to foster the person who can make an active contribution to the disaster management as the citizens and the results of the survey match with that goal. Hence, this section shows what kind of component of the course leads to foster the graduates. To measure what types of educational method are more impressive and more effective to influence the action after graduation, the specialized subject of EDMC, cocurricular, and out-of-school activities have been categorized by its educational method as Table 6.6 shows.

Based on the above categorization, respondents make a ranking in order of impression. Figure 6.2 shows the sum of rank from 1 to 3. The highest one is the invited lecturer followed closely by the volunteer activities at affected area. Most of the invited lecturer comes to the "Disaster and Human Being" class and share their experiences of Great Hanshin-Awaji Earthquake and Great East Japan Earthquake and Tsunami, even though the other two subjects "Human and Society" and "Activity in Disaster Mitigation" have invited lecturer once in the academic year 2014, and thus its frequency is much less than the "Disaster and Human Being." Regarding volunteer activities at affected areas, students were dispatched to the disaster-affected areas such as typhoon 23rd in 2004, Niigata Earthquake in 2004, Noto Peninsula Earthquake in 2007, flood in west part of Hyogo Prefecture in 2009, and Great East Japan Earthquake in 2011. In those affected areas, students cleaned up mud, conducted needs survey for residents, planned resident gathering, played with children for physiological care, and so on.

Table 6.6 Adopted educational method in EDMC

Method	Contents
Invited lecturer	Officers of fire department, self-defense forces, police department and local government, experts in trauma counseling, staffs of NGO, graduates of EDMC, professors, workers of lifeline company, etc.
Experience-based learning	Visit of Disaster Reduction and Human Renovation Institutions, Nojima Fault Museum, Mt. Rokko, Fire Fighter Academy, Museum of Nature and Human Activities
International exchange	Exchange with trainees of JICA, Asian Disaster Reduction Center, exchange program with Nepal, Sri Lanka, and China
Delivering class at schools	Giving the classes at neighboring elementary, junior high, and high school
IT education	Using internet, presentation software, GIS mapping
Problem-solving learning	Graduation work, elaborating disaster education materials, making wall newspaper
Volunteer activities at affected area	Volunteer activities at the flood-, earthquake-, and tsunami-affected areas
Volunteer activities from outside of affected area	Fund-raising for earthquake-affected area, writing message to disaster-affected area (Sri Lanka and Niigata, Japan)
Presentation in public	Make a presentation in public forums, symposiums, and workshops
Participation in the drill	Participating in the disaster response drills of prefectural, municipal, and community level

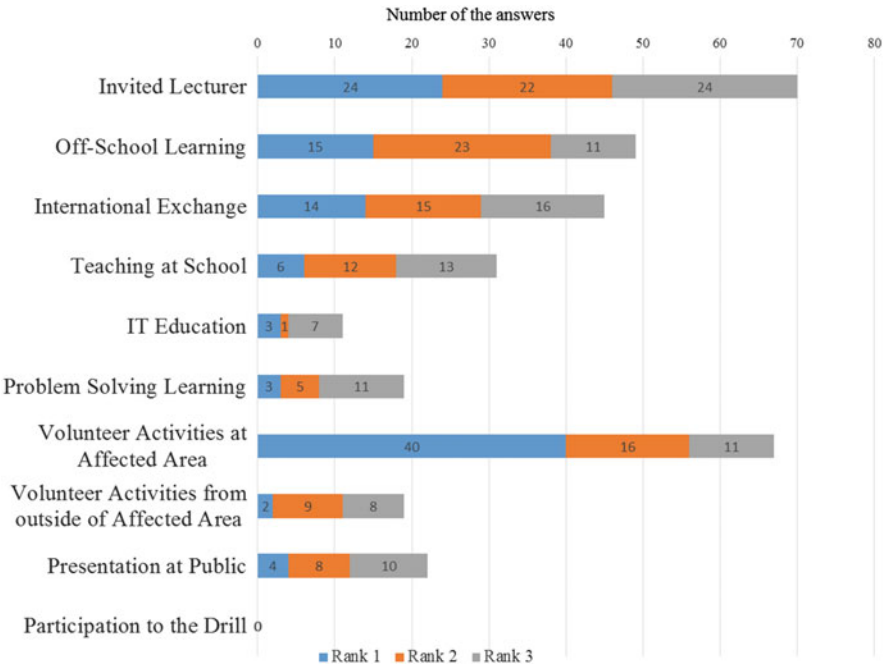

Fig. 6.2 Sum of impressive educational method ranked 1–3

EDMC also maintained the connection with the schools in affected areas and created the long-term relationship. Not only during the response phase, students periodically visit the school for exchange program. In addition, off-school learning, international exchange, and teaching at school also show relatively higher rate than the others, while no one chose participation in the drill within the rank between 1 and 3.

6.4 Implication of the Survey's Results

The results of the survey suggest two necessary aspects to foster human resources who can contribute to the society in terms of the disaster risk management.

While 21 % of respondents work at or study about disaster-related field, 65 % think that their present affiliations are related to the disaster risk management. This attitude of interconnecting their present affiliation with disaster risk management comes from the class of "Activity in Disaster Mitigation." As shown in Table 6.1, the class provides to students the time to think of how the learning at EDMC can be utilized at the occupation that each student wishes to have in the future. In fact, the learning at EDMC is interdisciplinary and the classes are delivered with various points of view containing volunteer, social welfare, international relations, and revitalization of the community. These topics can be overlapped with the students' dreams. Throughout the class making the clear linkage between the future job and disaster risk management help to foster the people to think of the interrelation between their present job and disaster risk management. This aspect at the same time implies the possibility of promoting the mainstreaming of disaster risk management. The nurse assistant, sales staff, and worker of welfare care center normally aren't aware of the disaster management unlike the graduates who found the connection with disaster risk management. Disaster education to make the connection of disaster with their future job thus can integrate the disaster risk management perspective into the occupation which does not have direct relation with the disaster risk management. This type of approach should be utilized not only for EDMC but also for the normal course. In fact, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan integrated DRR education into various subjects of school curriculum (MEXT 2013) in elementary, junior high, and high school level. Hence students are equipped with basic knowledge on DRR, and the class to interlink with their knowledge of DRR and students' future vision can promote the dissemination of DRR in the society.

Apart from the class "Activity in Disaster Mitigation," two educational methods, invited lecturer and volunteer activities at affected areas, are more impressive than the others. The common point of these two activities is simulated experiences. Zaalberg and Midden (2010) have assessed the behavioral change through "simulating real disaster experience." This simulation program includes the flood simulation movie and experiencing disaster through virtual environment. Through this simulated experience, participants' risk perception to flood has arisen and they were

motivated to have flood insurance. Integrating this kind of simulating experiences into education is considered as effective. East Japan Earthquake and Tsunami in 2011 induced huge impact to education sector along with the east coast of Japan. One of the coastal cities called Kamaishi, Iwate Prefecture, was attacked by tsunami. However due to the DRR education conducted in schools, once students felt strong earthquake, they promptly decided to evacuate by themselves and most of them could be successfully evacuated to a safer place (five students out of 2923 students at Kamaishi city were victimized) (Matsuura and Shaw 2014). Among the various educational contents such as teaching the mechanism of earthquake and tsunami and how to respond when the earthquakes occur, DRR education at Kamaishi city also includes simulation movie of past tsunami disaster at Kamaishi area, listening to the story of tsunami experiences from community people and evacuation drill assuming the occurrence of tsunami (Kamaishi city 2010). Students thus had a simulated experiences and knowledge through past tsunami disasters. Students of EDMC as well, throughout the story of invited lecturer, experience the Great Hanshin-Awaji Earthquake and Great East Japan Earthquake. Working as volunteers at affected areas accompanies a lot of moments to see the damages of disasters and listen to the emotion of affected people. The questionnaire survey suggests that these simulated experiences contribute to raise the awareness of students and lead to active involvement in disaster-related activities.

Relatively high rate in off-school learning, international exchange, and teaching at school in questionnaire survey suggest that giving the opportunity of utilizing the school learning at actual field to the students is also an important component for fostering active human resources. Regarding the international exchange, before interacting with the foreign trainees from different countries, students study about the background of countries, disasters in the world, and English terminology in disaster-related field. These knowledge are utilized at the time of direct exchange with foreign trainees. Besides, depending on the exchange program, students make the presentation in English for them. This process of applying the knowledge for actual field is observed in the off-school learning, too. As mentioned earlier, each subject of EDMC is associating with each other such as after learning about the history of Mt. Rokko and its geological feature at class room; students visit to Mt. Rokko and observe the geographical features and understand the real situation by fully applying their knowledge. This point of view of utilizing the knowledge at actual field is recognized as effective in the field of educational psychology. Students of EDMC often teach about disaster risk management to other students what they have learned from other schools as well as community people. This process makes the students effective for learning and at the same time it becomes a motivation for further learning (Hasegawa 2006). Thus methodologies that EDMC adopt such as simulated experiences and giving opportunity to apply their learning for actual field lead to foster the human resources who can contribute to the disaster risk management.

6.5 Education to Lead to the Active Involvement in Disaster Risk Management

The Environment and Disaster Mitigation Course was introduced to embody the lessons of Great Hanshin-Awaji Earthquake. Its main educational goal is to foster the people who can contribute to the disaster risk management. Questionnaire survey revealed that graduates are actively involved in the disaster-related activities, and especially students tend to be involved more frequent than employees. One of the examples is that nine graduates organized a volunteer activity group in 2013 and this group arranged the volunteer activity in tsunami-affected area in 2013 and 2014, also held youth exchange program between Kobe which was affected by earthquake in 1995 and Tohoku which was affected by earthquake and tsunami in 2011. During the 20th commemoration of Great Hanshin-Awaji Earthquake in 2015, the group gathered youths to convey the experiences of earthquake that happened. On the other hand, employees practice to integrate present affiliation with disaster management, and this indicates that education that lets the students to think of integration between the dream and disaster management is considered as effective. Besides, it can lead to incorporate the disaster risk management perspective into society more widely. The analysis of the educational method suggests that the two methods are considered as effective to foster the human resources as mentioned in educational goals. One is simulated experiences and the other is the reflection of learning at actual field which both can enhance the awareness of students and lead to the active involvement to disaster-related activities. EDMC is thus producing the graduates who can contribute to the disaster risk management as both workers and volunteers. Therefore, education of EDMC shows one of the models of disaster education which leads to the active involvement in disaster risk management even after graduation.

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Chapter 7
Community Linkages and Disaster Risk Reduction Education

Koichi Shiwaku and Rajib Shaw

Abstract The Hanshin-Awaji Earthquake is the turning point of community-based approach in Japan. The Kobe City Office started the system of community-based disaster management organization in 1995, which is a new sustainable approach of community involvement. This chapter highlights three examples: Kobe City, Saijo City, and Kesennuma City to aim (1) to understand initiatives on community-based approaches, (2) to understand the strengths and weaknesses on community-based approaches, and (3) to suggest the key factors for improvement and sustainability of community linkage. The Kobe City Office has prepared technical and fund support system to promote the concept, but some of sustainability problems have been seen although 20 years has passed since the Hanshin-Awaji Earthquake. Saijo City's concept is community involvement led by schools under the innovative education system. Kesennuma example shows inclusion of multi-stakeholder. These three examples are different types of community-based education approaches. One of key factors is suggested to include school as a main actor for community activities under the sustainable system supported by local government.

Keywords BOKOMI • Hanshin-Awaji Earthquake • East Japan Earthquake and Tsunami • School-community linkage • Local government

7.1 Introduction

Community-based disaster management is widely considered to be important. Currently, there are many researches on community-based disaster management in Japan. Isayama and Shaw (2014) emphasized necessity of disaster measures to strengthen the community through healthcare. Hibino and Shaw (2014) pointed out community radio is an effective tool for every phase of disaster management.

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Matsuura (2015) researched school-community linkage and concluded structural and nonstructural integration of school with other public facilities and function can help community recovery and building.

Recently, many disasters have occurred in Japan. Each disaster has provided us new lessons on community disaster management and community development. But the Hanshin-Awaji Earthquake is the turning point of community-based approach (Shaw 2014). In 1995, the Hanshin-Awaji Earthquake with its magnitude 7.3 hit Hyogo Prefecture and surrounding prefectures. More than 6000 persons were dead and more than 40,000 persons were injured due to the earthquake. Kobe is the capital city of Hyogo Prefecture and was one of the worst affected cities at that time. In Kobe City, around 4500 persons were killed and around 15,000 persons were injured by the earthquake. As of the causes of death, 77 % are asphyxia and crushing, 9 % are related by fire, and 14 % are other causes including damages of inner parts (Ministry of Land, Infrastructure, Transport and Tourism Kinki Regional Development Bureau 2002). In the disaster situation, around 98 % of people who needed help and rescue were saved by themselves, family members, neighborhood, and passersby according to the survey report on fire in Hyogo-ken Nanbu Earthquake cited in the Fire Disaster Management Agency (2011).

The experiences of the Hanshin-Awaji Earthquake pointed out that public sectors had difficulties to work properly in devastated disaster situation and that community needs to help each other for enhancing disaster coping capacity. In the recovery and reconstruction process in the earthquake, community development and recovery was regarded as one of important issues as well as disaster management against future disasters. Based on the lessons of the Hanshin-Awaji Earthquake, the system of community-based disaster management organization (CBDMO) was started in 1995, which was highlighted as new sustainable approach of community involvement by Shaw (2014).

This chapter mainly focuses on CBDMO in Kobe City and introduced two other case examples in Japan shown in Fig. 7.1, in order to aim to the following purposes:

- To understand initiatives on community-based approaches in Japan
- To understand the strengths and weaknesses of community-based approaches
- To suggest the key factors for improvement and sustainability of community linkage

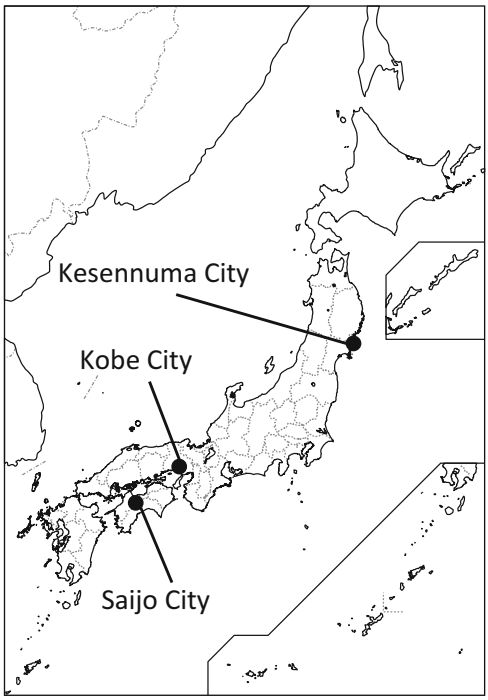

Fig. 7.1 Location of three target cities

7.2 Case Example of Kobe City, Hyogo Prefecture

7.2.1 Overview of Community-Based Disaster Management Organizations in Kobe City

Based on the lessons of the Hanshin-Awaji Earthquake, in 1995, the Kobe City Office started to promote establishment of CBDMO. The leading divisions of the Kobe City Office were the fire department and health and welfare department since they had the concept that welfare should be integrated with disaster management in community level. Therefore, CBDMO in Kobe was called as the disaster prevention and welfare community. In Japanese, it is called as the Bosai Fukushi Community and its abbreviation is BOKOMI. The BOKOMI concept targets elementary school areas, and currently all households in Kobe City have been covered by 191 BOKOMIs. Each BOKOMI consists of its headquarter and five groups: information group, firefighting group, rescue group, evacuation guidance group, and livelihood group. The leader and deputy leader belong to a headquarter. Table 7.1 shows the main activities conducted by a headquarter and five groups in daily life (before disaster) and in disaster situation.

Table 7.1 Activities conducted by five groups of BOKOMI

	In daily life	In disaster situation
Headquarter	Planning of disaster management drill	Supervising for community
	Conducting disaster management drill	Supporting other communities
	Preparing to support evacuation center	Supporting management at evacuation center
	Sharing information	
Information group	Utilizing information on people who need help	Collecting information related to disasters
	Conducting drill on collecting and transferring information	Making list of evacuees
Firefighting group	Conducting firefighting drill	Conducting firefighting activities in initial stage
	Ensuring water for firefighting	Patrolling for prevention of fire
Rescue group	Acquiring skill of rescue	Conducting rescue activities
	Acquiring skill of first aid	Transferring injured persons to aid station
Evacuation guidance group	Checking evacuation place and ways	Transferring evacuation warning to community
	Making safety map	Checking staff and guiding evacuation
Livelihood group	Preparing cooking tools and food stock	Cooking food
	Conducting drill on soup kitchen (cooking emergency food)	Distributing water and relief goods

The Kobe City Office is conducting the following for supporting BOKOMI:

- Providing disaster management equipment when BOKOMI is established
- Providing funds
- Training for disaster management leaders
- Giving support by staff of the fire department
- Giving support by volunteer fire company
- Giving other supports

There are two types of fund. One is annual fund for each BOKOMI and it is around 1200 US dollar (140,000 JPY). The other fund is proposal type and the maximum fund is around 1700 US dollar (200,000 JPY). BOKOMI makes the proposal and applies to this fund in order to conduct more innovative activities. In 2014, 49 proposals were submitted and 29 proposals were accepted. These two types of fund system are effective to make BOKOMI to continue and enhance the activities.

As mentioned before, each BOKOMI is covering elementary school ward and conducting several types of drills. In Japan, main evacuation centers are schools. Therefore, BOKOMI concept emphasizes elementary school area. But elementary school area is large to involve community people in drill. The Kobe City Office accepts drills in community association level and regards such drills as BOKOMI level drills. Under the BOKOMI concept, community association level is called as

"block." In 2013, the number of drills is 828 including block level drills and 79,270 people participated in the drills. Thus, BOKOMI concept is flexible to accelerate community-based disaster management activities although unit area is elementary school ward.

The community needs to cope with disaster situation but they are not specialist on disaster management. Kobe City has trained people as disaster management leader with aim that they take initiatives at block level. Training is conducted every year and more than 13,000 people were trained so far. Another type is training to be disaster management chief leaders who organize BOKOMI. This training started in 2014 and the Kobe City Office aims that ten leaders are trained for each BOKOMI.

As for support by the officers of the fire department, two or three fire department officers are in charge of a BOKOMI. Fire department staff discusses with BOKOMI members, supports drills, participates in BOKOMI meeting, and does other supportive activities so that BOKOMI can work properly.

Members of volunteer fire companies have taken appropriate training to get special knowledge and skills for disaster management. They can support BOKOMI activities.

7.2.2 Examples of BOKOMI Activities

This section explains kinds of BOKOMI activities. As mentioned before, around 800 BOKOMI activities, for example, various types of disaster management training, first aid training, lecture on disaster management, meeting on disaster management, and patrol, have been done every year. The following are parts of innovative BOKOMI activities shown in the book "Kobe Disaster Management and Welfare Community" (Kobe City Office 2010):

- Drill to support people who need help in emergency situations and training for establishment of evacuation center: Trainings on information transmission, safety confirmation, rescue, and evacuation guidance were done. Then training of establishment of evacuation center in elementary school was conducted. Not only BOKOMI members but also elementary school, junior high school, medical doctors, volunteer fire company, police station, ward office, community center, welfare workers, and other stakeholders had joined these trainings.
- Activities by disaster management junior team: Some BOKOMIs have established and strengthened junior team which consists of elementary school and junior high school students. Junior teams have participated into community cleaning programs and local events as well as community disaster management training.
- Collaborative training with other BOKOMIs: Neighbor BOKOMIs conduct collaborative disaster management training.

- BOKOMI festival: All BOKOMIs in a ward conduct disaster management training every year. In some areas, competition style training is conducted so that participants would concentrate on the training.
- Experiencing livelihood in evacuation center: Participants gather at elementary school, which is designated as evacuation center. They experience cooking, staying at night, and others. This activity needs close relationship with school.

The following are the activities accepted for proposal-type fund raising in 2014 (Kobe City Office 2014):

- Evacuation drill with involvement of the community
- Evacuation drill for supporting people who need help in emergency situations
- Disaster learning and disaster management training for elementary school students (fifth grade) and parents
- Evacuation center management drill in apartment areas
- Disaster response drill for four generations
- Evacuation experience-based learning and evacuation drill in tsunami situations
- Drill on disaster management day
- Training for junior team
- Collaborative training together with BOKOMI, junior high school, and elementary school
- Activities to support people who need help in emergency situations
- Collaborative training together with BOKOMI and elementary school
- Disaster management sports festival
- Strengthening junior team with utilization of the lessons of the Hanshin-Awaji Earthquake
- Disaster management camp
- Disaster management training with involvement of aged people and children
- Strengthening young generation with utilization of the lessons of the Hanshin-Awaji Earthquake
- Making the community more active through training for junior team
- Collaborative training with elementary school and junior high school
- Training for youth leaders
- Participatory disaster management training for three generations
- Establishment of disaster management school
- Evacuation guidance drill
- Drill for establishment of evacuation center
- Disaster management stamp rally

The activities mentioned in this section include several types of stakeholders.

7.2.3 Problems and Improvement of BOKOMI Activities

According to the fire department of Kobe City, the following are the problems on BOKOMI for its sustainability and improvement:

- Aging and immobilization of participants in BOKOMI activities
- Lack of human resources in daytime
- Lack of awareness of the community on BOKOMI activities
- Lack of leader
- Lack of places for meeting and preparation for drills
- Lack of innovative programs and activities

Mutual help was emphasized in the Hanshin-Awaji Earthquake. But 20 years has passed since the earthquake in 1995. The return period of large scale of earthquake is longer than people's lives. Therefore, it can be considered that people's awareness has been decreased gradually for the last 20 years. As the recent innovative activities are mentioned in Sect. 7.2.2, many activities are including schools. It is considered involvement of schools can be important in transferring the lessons of the disasters to the future generation and can provide opportunities to train future leaders in order to solve the current problems mentioned above.

7.3 Case Examples of Other Cities in Japan

This section highlights the examples of community-based education and school-community linkages from Saijo City (Ehime Prefecture) and Kesennuma City (Miyagi Prefecture).

7.3.1 Case Example of Saijo City, Ehime Prefecture

Saijo City was affected by two typhoon events in 2004. After typhoon disasters in 2004, the education program was started with emphasis of knowing living area and making connection between mountain area and plain area, with the assistance of a university. The key activity for this education program was town watching, and it was suggested the city office to conduct town watching as a part of school disaster education. In parallel, the city mayor emphasized disaster education for sixth grade (11–12 years old) students. Sixth grade is the final grade in elementary school. Generally in Japan, some or many students enter high schools which are not located in their own living area (community). Many business people work outside the community. This fact means only children, housewives, and elderly people stay in the community during daytime. In case a disaster occurs in daytime, junior high school students need to play important roles for response. Therefore, the mayor

Fig. 7.2 Learning from the community (*left*, town watching; *right*, visit to a facility for disability aid)

emphasized final grade students in elementary school so that they can work properly in disaster situations when they are junior high school students. This city is also at risk of earthquake and tsunami as well as typhoon. In 2006, Saijo City started 12-year-old education with town watching as the key activity (Saijo City 2015). This education program is 1-year program. Each school develops education program according to their natural and social environment. At the end of school year, students from all elementary schools are gathered, and they present their outputs of 1-year education.

Iioka Elementary School, one of the elementary schools in the city, also has conducted town watching-based disaster education. The area of this school was affected by the typhoon in 2004. But students who are 11–12 years old do not have memories and experiences of the typhoon in 2004. When this school conducts town watching, community persons with the qualification of disaster management experts and with the experiences of the typhoon in 2004 support town watching (refer to Fig. 7.2). They take students to the typhoon-affected areas and tell students about the disaster situations. In this school area, there is a facility for disability aid which was also seriously affected in 2004. During town watching, students visited the facility and the facility staff talked about the disaster situations in 2004. In addition to town watching, according to the practice in 2014, this school provided learning on sediment control, experience learning on emergency food, and sharing emergency goods (each student brought emergency goods and discussed with other students on what they can add as emergency goods). Finally, students developed the collection of the suggestions for disaster management through group work.

Another example of 12-year-old education program is Tanbara Elementary School. This school organized several disaster education programs in 2014 as below with the purpose that students acquire knowledge, skills, and practical coping capacities for disaster management in close collaboration among the school, family, and community:

- Evacuation simulation: Students consider how they evacuate.
- Town watching in school area: Students found landmarks for evacuation and safety and dangerous places and took photos of important places and buildings

during town watching. The collected information was summarized in disaster management map by students.

- Development of disaster management book: This was conducted through group work. Students conducted disaster imagination game (DIG), questionnaire survey, and interview survey and collected necessary information through books, the Internet, and others. The collected information was compiled as the collection of the suggestions for disaster management.
- Outreach and promotion of outputs: Disaster management map was shown in this school to enhance awareness of other grade students. This school also plans to display the map at community meeting places.

In addition to this, Tanbara Elementary School with the community participated in the integrated disaster management training organized by the Saijo City Office, which was held on Sunday. The school designated that day as school day so that students could join the training. Close relationship with students' family enables the school to make such decisions.

The third example from Saijo City is Tataki Elementary School. Disaster management needs to be considered as a part of sustainable development. In other words, the livelihood and community linkage need to improve as the basic needs for human beings. Tataki area in Saijo City has conducted innovative community development activities although the activities are not related to disaster management. The number of households in Tataki is 122 with 292 people and more than 40 % of the households are farmers (Ministry of Agriculture, Forestry and Fisheries 2012). Thus, Tataki is a small community and there were no new students in Tataki Elementary School in 2003 and 2004. The number of students in the school was 17 in 2003, which made the community feel a sense of crisis on the future community. In 2004, the community started "Symposium to consider tomorrow Tataki" with involvement of community association, PTA, women association, elderly club, community center, and Tataki Elementary School. They developed community development system which included the school and relevant community-based organizations, through periodically conducting the symposium. Their efforts contributed to activation of agriculture, and farm crops are sent to the school to utilize for food and agriculture education. Currently, the community thinks the school event is a community event and the school is a member to participate in community festival and community association activities. According to the officer of the Board of Education of Saijo City, the elementary school students visit houses of elderly people and celebrate their birthdays. Tataki is one of good practices on school-community linkage for sustainable development.

7.3.2 Case Example of Kesennuma City, Miyagi Prefecture

Kesennuma City, Miyagi Prefecture, was one of the worst affected areas by the East Japan Earthquake and Tsunami. Since 2002, Kesennuma City has been promoting

Education for Sustainable Development (ESD) by utilizing the rich environment and cooperation of local communities (Oikawa 2014). Hashikami area, which is a part of the areas of Kesennuma City, was also devastated, and 46.2 % of houses were damaged including 1951 completely collapsed houses as of 6 June 2011 (Kesennuma City Office 2011). The Suginoshita community in Hashikami area was completely washed away even in designated evacuation places in the community. In Hashikami area, 208 persons died, which was 4.3 % of the population in this area (Kesennuma City School Principal Committee et al. 2014).

Hashikami Junior High School is famous for disaster education. This school started disaster education as a part of ESD in 2005 with emphasis of self-help, cooperation, and public help. In this school, students had learned each of self-help, cooperation, and public help through a year, which means that students can complete these three components in 3 years. In the EJET, according to the officer of the Board of Education of Kesennuma City, the response activities in school worked well compared to other schools though this school became an evacuation center for the community. This fact shows continuous disaster education is important. On the other hand, it is said students' awareness on disaster management was not low but three students died by the tsunami. Therefore, this school reviewed disaster education and developed the new concept of disaster education shown in Fig. 7.3.

This school reemphasized the importance of self-help due to the EJET and combined self-help with cooperation and public help. Therefore, students can learn about self-help in 3 years.

The innovative challenge in Hashikami area is the establishment of the Hashikami Area Disaster Education Promotion Committee in 2013. The committee consists of Hashikami Junior High School, Hashikami Elementary School, kindergarten, community associations, fishery association, farmer association, volunteer fire corps, and other community-based associations. The committee aims to (1) strengthen self-help, (2) enhance cooperation capacities, and (3) learn about natural environment and disaster risks (Matsuura and Shaw 2014). In Hashikami area, integrated disaster management training has been held with participation of Hashikami Junior High School and other stakeholders, which includes evacuation, establishment of evacuation center, rescue, setting up tent and toilet, preparation of meals, and other activities considered to be done in disaster situations.

The school principal at the time before the committee was established was originally from this area and was living there. The leader of community

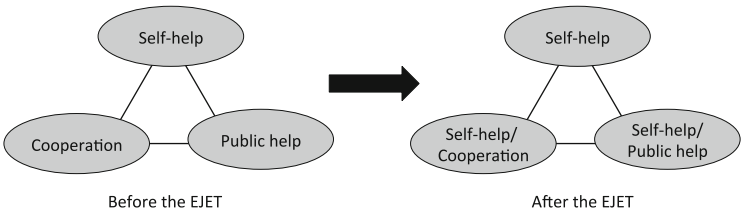

Fig. 7.3 The concept of disaster education in Hashikami Junior High School

associations was also from this area and had been a schoolteacher. These two persons know each other for a long time since they are children. They discussed the establishment of the committee. This background points out that close relationship between the school and community is a key factor to make community-based organization or committee. In the education administration system in Japan, schoolteachers transfer to other schools in the same or other municipalities. It means schoolteachers cannot stay in a place for a long time. Therefore, it can be said that community-based disaster management needs to be led by the community with the assistance of the school. Currently, the Hashikami Area Disaster Education Promotion Committee is being led by community associations.

In one of areas in Kesennuma City, a school is working to establish similar committee. A schoolteacher in the school who is in charge of disaster management in his area pointed out that one of difficulties on the establishment was consensus building between/among schools.

The example of Kesennuma City suggests the importance of collaboration between the school and community and between/among schools in an area.

7.4 Conclusion: Achieving Sustainability of Community-Based Disaster Risk Reduction

This chapter mainly highlighted the example of Kobe City and introduced the examples of Saijo City (Ehime Prefecture) and Kesennuma City (Miyagi Prefecture).

Table 7.2 summarizes the characteristics of three cities on community-based activities from the various aspects, and Fig. 7.4 shows characteristics of the three

Table 7.2 Comparative analysis of three cities

	Kobe City	Saijo City	Kesennuma City
Government sector in charge	Fire department of Kobe City	Saijo City Board of Education	There is no specific government sector
Involvement of Board of Education	Board of Education is not involved actively	Board of Education has initiatives	Board of Education does not have initiative
Involvement of school	Some activities include schools	All public elementary schools are involved	Schools are a part of main stakeholders for the committee
Teacher's initiative	Teachers are not main actors	Teachers are the main players to connect to community	Teacher's initiative was strong in initial stage when the committee was established
Community participation	Community has initiative	Some schools have active participation	Various stakeholders participated in activities
Sustainability	Budget is given by the government	12-year-old education is the project of the city government	There is the committee in local level

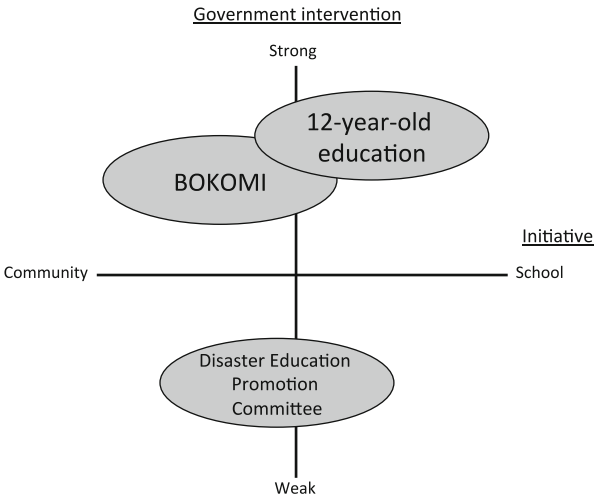

Fig. 7.4 Types of school-community activities for disaster risk reduction

examples in the aspects of government intervention (strong/weak) and initiative (school-community) based on Table 7.2.

The three cities highlighted in this chapter were affected by different types of disasters (earthquake in 1995, typhoons in 2004, and tsunami in 2011). In the case of BOKOMI, the Kobe City Office has supported BOKOMI activities in technical and fund aspects even now although 20 years has passed since the earthquake in 1995. In addition, the Kobe City Office provides additional fund to motivate BOKOMI. BOKOMI is mainly initiated by the community, but innovative activities include several types of stakeholders, for instance, school students as mentioned in Sect. 7.2.2. In disaster-affected areas, there are few people who have actual disaster experiences after many years. In addition, such people are old. To enhance community awareness, multi-stakeholder involvement is a key for community-based disaster management especially in Japan, where societies are aging, to conduct more practical and effective activities for them and the next generations.

The strength of a 12-year education in Saijo City is that the city office has established and continued this system and allocated budget for this education system. Due to this system, schools need to conduct disaster education with town watching as key activity. Compared to other education activities, town watching is useful to involve parents and the community. However, community involvement is not the responsibility of each school. Additionally, especially in urban areas, it is difficult for schools to involve the community in their activities. One of the problems pointed out by a school principal and an officer of the Board of Education is the difference of opportunities for disaster education between elementary schools and junior high schools because there is no system for junior high schools. They suggested junior high school to participate in integrated disaster management training organized by the city office so that junior high school can provide opportunities of disaster education and make connection with stakeholders.

In Kesennuma City, area-based disaster management/education organizations like the Hashikami Area Disaster Education Promotion Committee have been established in some areas. The strength of Hashikami case is that schools are one of main actors in activities although the committee is initiated by the community. It is considered that people have higher disaster awareness in Kesennuma City at present. Therefore, even if the efforts for establishment and continuing organizations or committee are voluntary basis, Hashikami area has worked well so far. But it is significant to develop the system of involving schools in community activities or involving the community in school activities for the future when few people have experiences of the EJET.

Thus, these three cases respectively have strength and weakness but are considered as good practices on strengthening community linkage through disaster education. Finally, this chapter suggests the following key factors for improvement and sustainability of community linkage through disaster education:

- Technical and fund supports by government
- Concrete concept and system for disaster education with involvement of the community
- Co-working of the Board of Education and disaster-related department
- Close communication between the school and community
- Inclusion of school as a main actor for community activities

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Chapter 8
School Disaster Resilience Assessment: An Assessment Tool

Koichi Shiwaku, Yasutaka Ueda, Yukihiko Oikawa, and Rajib Shaw

Abstract Past researches indicate that school disaster management needs to consider various aspects, and there is need for a comprehensive assessment tool. School Disaster Resilience Assessment (SDRA) is a tool to assess the resilience in a comprehensive way and to link it to decision making. This chapter highlights the application of SDRA to public schools in Kesennuma City with the following purposes: (1) to understand the resilience of school against disasters, (2) to identify the process of proposing activities for enhancing school disaster resilience based on the results of SDRA, and (3) to understand the tendencies of proposed activities. According to the results of SDRA, schools are expected to make sufficient relationship with parents and the community for enhancing school disaster resilience. Activities for enhancing disaster resilience of each school were proposed through consultation with teachers, the Board of Education in Kesennuma City, a university, and an NGO. Other schools, family, community, and community-related organizations are included in the many proposed activities. SDRA can be used for capacity development of school teachers and government officers. In addition, SDRA can support PDCA (plan-do-check-action) cycle with scientific quantitative data so that schools review and improve their own conditions.

Keywords School disaster resilience • School-community linkage • SDRA • The East Japan Earthquake and Tsunami • School disaster management

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8.1 Introduction

In the Great Hanshin-Awaji Earthquake in 1995, schools became evacuation centers for the local community. At that time, school teachers managed evacuation places with the local community. Since the adoption of the Hyogo Framework for Action in 2005, the importance of schools for disaster risk reduction has been widely agreed upon in the world. The World Conference on Disaster Risk Reduction was held in March 2015 in Sendai, Japan. The Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030 adopted in the conference also emphasizes education and education facilities. It can be considered that appropriate response, preparedness for response, and early recovery are also necessary components for school disaster management.

Researches on school disaster management cover various topics. Shiwaku (2004, 2007) emphasized importance of innovation in school disaster education from the case studies of the high school in Kobe and Kathmandu, Nepal. Shiwaku et al. (2006) pointed out that teacher training is the most important. Chen et al. (2012) showed the three levels of teacher training program and its evaluation method. Gwee et al. (2011) suggested activities relating to the priorities stated in the Hyogo Framework of Action for integrating disaster risk reduction approaches in the education sector at national, local, and community level.

The East Japan Earthquake and Tsunami (EJET) occurred at 14:46 on 11 March 2011. The EJET affected especially the Tohoku region in Japan, which is located in the northeastern part of Japan. According to the Headquarters for Disaster Countermeasures and Fire and Disaster Management Agency (2014), more than 19,000 people were killed and more than 6219 were missing as of 10 September 2014. A total of 127,000 houses collapsed completely and more than 273,000 houses had been partially damaged. As the lessons of the EJET, decision making by a school principal is important (Takeuchi and Shaw 2012). Matsuura and Shaw (2014) identified various factors for school-based community recovery in the areas affected by the EJET.

Tong et al. (2012) developed School Disaster Resilience Assessment (SDRA) on the basis of the Climate Disaster Resilience Index developed by Joerin et al. (2014), applied in Hue and Da Nang, Vietnam, to assess the resilience of schools in 2011 and subsequently in 2013. According to Tong et al. (2012), SDRA consists of five dimensions of physical conditions, human resources, institutional issues, external relationships, and natural conditions. Each dimension has three parameters and each parameter has five variables. There are 75 variables in SDRA in total.

This chapter highlights the application of SDRA to public schools in Kesennuma City, which is one of the worst-affected areas by EJET, with the purposes mentioned below:

- To understand the resilience of school against disasters
- To identify the process of proposing activities for enhancing school disaster resilience based on the results of SDRA
- To understand the tendencies of proposed activities

This chapter is the case example of Kesennuma City and consists of (1) the overview of Kesennuma City, (2) the appreciation and results of SDRA, and (3) the process of proposing activities for enhancing school disaster resilience.

8.2 Overview of Kesennuma City

Kesennuma City is located in the northeastern part of Miyagi Prefecture facing the Pacific Ocean covering an area of 333.41 km^2 and is a famous fishing port (refer to Fig. 8.1). Owing to the presence of a water body and rich natural resources, the fisheries industry is the main sector followed by agriculture and forestry. Since 2002, Kesennuma City has been promoting Education for Sustainable Development (ESD) by utilizing the rich environment and cooperation of local communities (Oikawa 2014). Currently, all elementary and junior high schools, which are managed by the Board of Education of Kesennuma City, have been registered as UNESCO schools.

Kesennuma City is one of the worst-affected areas by the EJET. According to the Kesennuma City Government (2014), the number of deaths in EJET is 1353, the number of damaged houses and buildings is 15,815, and the number of affected households is 9500.

The EJET affected schools directly and indirectly; 3 out of 21 elementary schools and 1 out of 13 junior schools were inundated above floor level during the 2011 tsunami (Kesennuma City Government 2011). The survival rate of children in preschools and schools in Kesennuma City was 99.8 % with only 12 children killed by the disaster (Board of Education of Kesennuma City 2013). These children were either absent from school on 11 March 2011 or had left school

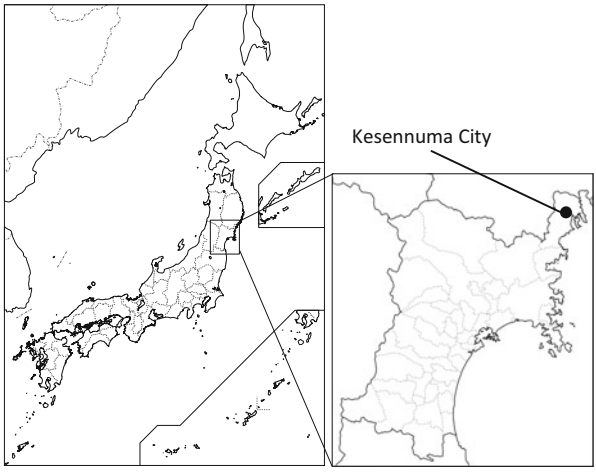

Fig. 8.1 Location of Kesennuma City

early or had gone home before the tsunami hit (Oikawa 2014). It can be inferred from this that all the children in school during the tsunami survived.

In Kesennuma City, the Board of Education has continued the Education Researcher System for around 50 years. In this system, several teachers whose main subject is same are selected by the Board of Education of Kesennuma City to be Education Researchers, and the research improves their teaching methods and subject contents through the meeting called as Education Researcher Meeting. This system has contributed to the improvement of qualities of general subjects. After the EJET, disaster risk reduction was added as one of Education Researcher Systems. In the fiscal year of 2011, Education Researchers examined the content of earlier DRR education and made a study on its improvement in light of experiences of the EJET. Since the fiscal year of 2012, Education Researchers also continued their work with technical assistance of an NGO and Kyoto University (henceforth the University). In the end of the fiscal year of 2013, they developed "DRR (Disaster Risk Reduction) Education Sheets" which is a material for school teachers to provide disaster education systematically. DRR Education Sheets were distributed to all junior high schools and elementary schools in Kesennuma City. In 2014, one of the main topics for the Education Researcher System was SDRA to be applied in all schools in the city.

8.3 Application and Results of SDRA

8.3.1 Preparation and Application of SDRA

As mentioned before, SDRA consists of five dimensions of physical conditions, human resources, institutional issues, external relationships, and natural conditions. Each dimension has three parameters and each parameter has five variables (refer to Table 8.1). There are 75 variables in SDRA in total.

The analysis method is same as the analysis of the Climate Disaster Resilience Index developed by Joerin et al. (2014). Each variable has five options for point

Table 8.1 Dimensions and parameters of SDRA

Dimension	Physical conditions	Human resources	Institutional issues	External relationships	Natural conditions
Parameter	School buildings	Teachers and staff	Planning	Collaboration	Severity of natural hazards
	Facilities and equipment	Students	Management	Relationship of school to community	Frequency of natural hazards
	Hygienic and environmental conditions	Parents/ guardians	Budget	Mobilizing fund	Surrounding environment

scale, and the responder selects the most appropriate option according to their own school conditions. After answering five variables, they prioritize five variables in each parameter. Weight average in each parameter can be the score of each parameter. In same way, the score of dimension can be calculated through prioritization of parameters and calculation of weight average.

The original SDRA variables were used in Vietnam as mentioned before. Therefore, these variables are needed to be applied in Japanese contexts, especially in Kesennuma City. Through a series of consultations with Education Researchers, the Board of Education, and NGO and University researchers, the SDRA was customized to fit the local context of Tohoku and Japan. One of main modifications for customization is the change of climate hazards to other general disasters in Japan under the variables of natural conditions. SDRA survey in Vietnam was conducted through an interview to a representative of each school. But it was decided that the Board of Education would conduct an SDRA survey to all public schools in the city through sending the survey sheet by e-mail and post. In this case, it was necessary to prepare a detailed guidance note for the teachers to respond to the questions.

The Board of Education of Kesennuma City sent the survey form to these 31 schools (18 elementary schools and 13 junior high schools) by post and e-mail in August 2014, and the collection of the survey forms was completed in September 2014. The University produced the analysis, and the feedback was provided to Education Researchers and the Board of Education.

8.3.2 Results of SDRA

The score of each school is calculated with use of same method for the analysis of the Climate Disaster Resilience Index developed by Joerin et al. (2014). The score of Kesennuma City was calculated as the average score of all schools. Scores were rounded off to the second decimal place. Tables 8.2 and 8.3 and Fig. 8.2 show overall and dimension scores and parameter scores of Kesennuma City, respectively.

Comparing the scores for the five dimensions, physical conditions, human resources, institutional issues, natural conditions, and external relationships are listed in descending order of the average scores. The scores of physical conditions and human resources are higher than 3.5, and the other three dimension scores are lower than 3.00.

Table 8.2 Overall score and individual dimension scores

Physical conditions	Human resources	Institutional issues	External relationships	Natural conditions	Overall
3.78	3.54	2.93	2.50	2.84	3.12

Table 8.3 Scores of parameters

Physical conditions			Human resources			Institutional issues			External relationships			Natural conditions		
School building	Facilities and equipment	Hygienic and environmental conditions	Teachers and staff	Students	Parents/ guardians	Planning	Management	Budget	Collaboration	Relationship of school to community	Mobilizing fund	Severity of natural hazards	Frequency of natural hazards	Surrounding environment
3.84	3.41	4.25	3.64	3.75	3.14	3.44	2.65	2.69	3.18	2.10	1.84	1.98	3.34	3.25

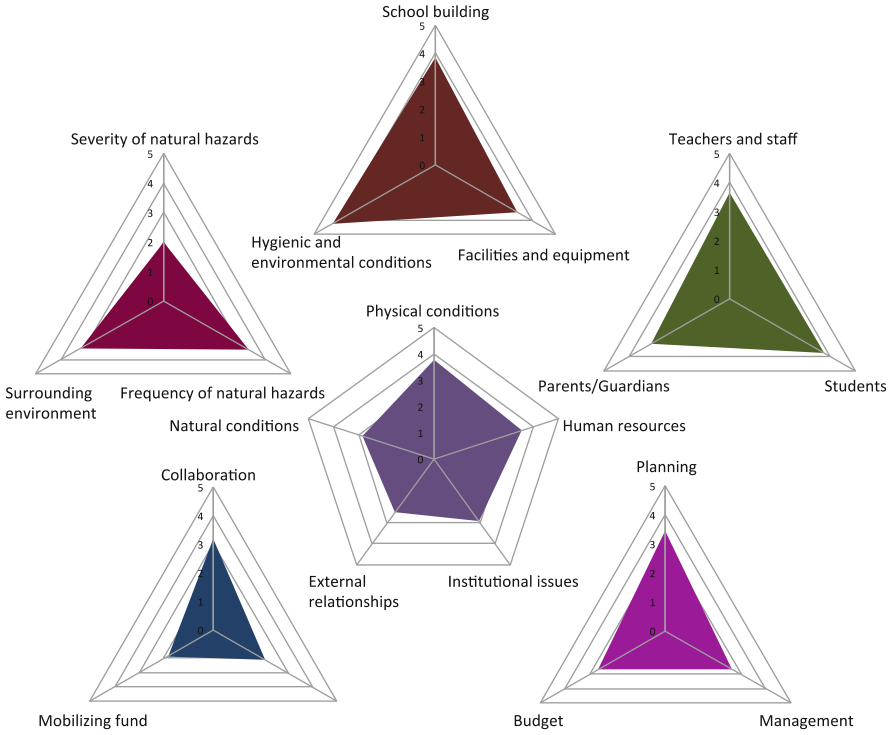

Fig. 8.2 Charts of the results of SDRA in Kesennuma City

Some of the variables in physical conditions are related to the laws and regulations in Japan. Therefore, resilience in physical issues is higher than that of the other dimensions. On the other hand, enhancing the resilience of physical issues needs more money. But each school does not have any budget for this purpose. To enhance the resilience of physical issues, the national and local governments need to check the resilience of each school and allocate budget for improvement. In human resources, the score of parents/guardians is lower than that of teachers and staff and students. It is considered as the reason that parents do not come to school so often and that school does not have enough programs for disaster management targeting parents. In institutional issues, the score of planning is much higher than that of management and budget. It is expected that schools have a certain level of plans for disaster management, but actual activities to test the plans have not been conducted so far. In education governance in Japan, schools do not have any budget for disaster management and disaster education. Therefore, the score for budget is low. In external relationships, the resilience of the relationship of the school to the community and mobilizing fund is low because these parameters are related to the relationship and communication with the community and other organizations. It is considered that schools do not have enough networks with the community and other organizations related to disaster management. In natural conditions, two parameters

are related to natural hazards and phenomenon, and one parameter is related to social environment. Each school needs to consider conditions around the school but cannot change the conditions directly.

In the city level, as discussed above, the resilience of parents/guardians in human resources, management in institutional issues, and relationship of the school to the community in external relationships is low and needs to be enhanced in the future. The components that are related to these issues are parents and the community. Thus, schools are expected to make a sufficient relationship with parents and the community for enhancing school disaster resilience.

8.4 Process of Enhancing School Disaster Resilience

8.4.1 Proposing Activities for Enhancing School Disaster Resilience

Based on the results of SDRA, necessary activities for each school were proposed for enhancing school disaster resilience. Figure 8.3 shows the process of proposing activities for enhancing school disaster resilience.

Descriptive analysis was conducted by the University and the results of the city level were mentioned in Sect. 8.4.1, and each school was given to the officers of the Board of Education and Education Researchers. Education Researchers were

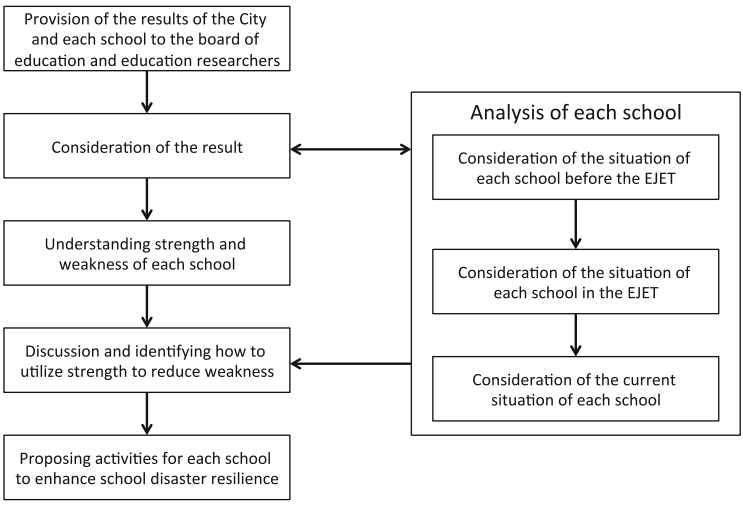

Fig. 8.3 Process to propose activities for enhancing school disaster resilience

requested to propose activities for all 31 schools in Kesennuma City as works of Education Researcher Meeting.

SDRA can be utilized for decision making through showing the resilience of various aspects. The advantage of SDRA is to be able to quantify school disaster resilience, but the limitation is that SDRA cannot consider the detail of conditions inside the school and social environment around schools. Therefore, in the process of decision making and proposing activities, it is necessary to consider how the current status in schools and societies contributes to the results of SDRA. Kesennuma City was heavily affected by the EJET and is still in recovery process. It means that the conditions of Kesennuma City are being changed over time. In the analysis of each school, the University requested Education Researchers to consider the situations before, during, and after the EJET and consider what kinds of such situations have contributed to and been closely related to the resilience identified by SDRA. This process is useful to understand more the specific strengths and weaknesses of each school so that proposed activities are to be accepted by the schools. To propose necessary activities for each school, consultation among Education Researchers, the officers of the Board of Education, the University, and the NGO was conducted through considering how to utilize the strengths to reduce weaknesses and how to improve the strengths. Physical conditions as one of the SDRA dimensions are not easy to improve by schools because improvements of some components are to be done by the government and need much funding. Natural conditions are also difficult to change in a short time by schools. Hence, the proposed activities mainly focus on the improvement of human resources, institutional issues, and external relationships. Finally, around five activities were suggested for each school to enhance its disaster resilience.

8.4.2 Characteristics of Proposed Activities

Table 8.4 shows the proposed activities to be conducted by schools for enhancing school disaster resilience. One hundred twenty-one activities were proposed through discussion with the Board of Education and Education Researchers. The activities are classified into the following. The numbers mean the number of proposed activities for each classification:

- Disaster education and learning (31)
- Drill and activities for disaster management (19)
- Teacher training (8)
- School disaster management plan (10)
- Meeting with relevant organizations (12)
- Networking with community (12)
- Others (29)

Table 8.4 also shows who and which organizations are related to each activity. Here, community-related organizations mean community association, community-

Table 8.4 Proposed activities for enhancing school disaster resilience

Type	Activities	By school only	With other schools	With family	With community	With community-related organizations	With city office	With other organizations
Disaster education and learning	Involving community in disaster learning with ESD concept				V			
	Giving students knowledge on how to prepare disaster management goods utilizing familiar materials through learning with disaster learning sheets	V						
	Conducting disaster management training and disaster learning for the time when students are in house and go to schools	V						
	Making school disaster management plan and conducting disaster learning, considering school location and natural environment	V						
	Making environment and disaster management map as a part of disaster learning with cooperation of volunteer fire corps					V		
	Conducting disaster learning on parents' day			V				
	Involving disaster learning with utilization of disaster learning sheets in teaching plan	V						
	Conducting periodical disaster learning with utilization of disaster learning sheets	V						
	Utilizing practices of ESD for disaster learning	V						
	Developing and conducting ESD programs which consider local environment, industries, and disaster management	V						

	Conducting disaster learning and disaster management training, considering routes between students' house and the school are water immersion area	V						
	Conducting town watching with community and volunteer fire corps and planning and conducting disaster learning including disaster management map making				V	V		
	Utilizing volunteer fire corps, police station, safety association, and others for disaster learning					V		
	Conducting training and learning, considering school become evacuation center	V						
	Conducting disaster learning for elementary school students by junior high school students as a part of activities of disaster management committee		V					
	Developing the learning programs which integrated disaster learning and environment education conducted under ESD	V						
	Conducting disaster learning to consider support that student can do in disaster situations	V						
	Inviting emergency management division to give lecture on support in disaster situations						V	
	Making disaster calendar to utilize disaster learning sheets	V						
	Conducting ESD to consider food and health in disaster situations	V						
	Conducting disaster learning with inclusion of transferring experiences by community				V			

(continued)

Table 8.4 (continued)

Type	Activities	By school only	With other schools	With family	With community	With community-related organizations	With city office	With other organizations
	Improving annual plan and teaching plan with utilization of disaster learning sheets	V						
	Conducting disaster learning for tsunami, tidal wave, and disasters which are possible to occur in community	V						
	Reviewing the programs of other schools for the improvement of disaster learning program between parents and students	V						
	Promoting ESD with involvement of volunteer fire corps, community center, and community associations for making collaboration relationship					V		
	Asking emergency management division and fire department to give lecture in the time of disaster management training and disaster learning						V	
	Making disaster calendar targeting 9 years for elementary school and junior high school	V						
	Providing opportunities in order that students feel earthquake disasters	V						
	Making map including experiences of damages by the East Japan Earthquake and Tsunami as disaster learning	V						
	Suggesting disaster learning model to utilize website, the Internet, and tablet	V						

	Providing opportunities for presentation and meeting on safety community development with consideration of environment as a part of ESD	V						
Drill and activities for disaster management	Conducting evacuation drill for time on the way to and from school and for thunder and gust	V						
	Telling households about the importance of disaster management goods and emergency foods			V				
	Conducting evacuation drill for various situations like less emergency exit	V						
	Making plan in order that parents participate in evacuation drill and other activities in school	V						
	Planning and conducting periodical disaster management training with community and PTA under coordination by school			V	V			
	Conducting disaster management training with cooperation with the city office						V	
	Participating in local integrated disaster management training with cooperation with junior high school, PTA, volunteer fire corps, and community center		V	V		V		
	Conducting disaster management training, considering various situations	V						
	Planning and conducting disaster management training, considering the situation of heavy rain	V						
	Conducting disaster management training with parents and community			V	V			

(continued)

Table 8.4 (continued)

Type	Activities	By school only	With other schools	With family	With community	With community-related organizations	With city office	With other organizations
	Conducting disaster management training with kindergarten, junior high school, and relevant organizations several times a year		V			V		
	Conducting training with community-based disaster management organizations for evacuation center management					V		
	Conducting evacuation drill and handover drill, considering rapid change of weather for students' safety on the way to and from school			V				
	Conducting disaster management training with students and community, considering a situation that school become base to take relief goods				V			
	Conducting disaster management training with community associations, residents of temporary housing, and community center, considering various situations				V	V		
	Conducting evacuation drill with parents, community associations, residents in temporary housing, kindergarten, and elementary school and sharing information		V	V	V	V		
	Conducting training for establishing evacuation center and other parents-children participatory activities as PTA events			V				

	Strengthening cooperation with community through disaster management training with community and volunteer fire corps				V	V		
	Strengthening cooperation with parents through disaster learning on parents' day and drill for handing over students		V					
Teacher training	Conducting teacher training to enhance knowledge and skills, inviting emergency management division, disaster management chief teachers, and others		V				V	
	Conducting teacher training with topics of SDRA and school disaster management plan	V						
	Conducting teacher training to know disaster learning and disaster management activities in other schools and to acquire special knowledge, inviting disaster management chief teacher		V					
	Enhancing awareness of teachers through periodical teacher training	V						
	Conducting periodical teacher training, inviting emergency management division and universities						V	
	Conducting teacher training, inviting emergency management division and disaster management chief teachers so that teachers can imagine various situations		V				V	
	Planning and conducting teacher training on disaster management	V						

(continued)

Table 8.4 (continued)

Type	Activities	By school only	With other schools	With family	With community	With community-related organizations	With city office	With other organizations
	Understanding strength and weakness through teacher training inside school	V						
School disaster management plan	Distributing and explaining disaster management manual in PTA events and meeting to share the manual with parents			V				
	Identifying the number of inspection of school building in school disaster management plan and its implementation	V						
	Identifying the number of safety inspection of dangerous materials in school disaster management plan	V						
	Improving school disaster management plan with involvement of community and parents			V	V			
	Improving school disaster management manual with utilization of the lessons of past school activities and sharing it with parents and community			V	V			
	Identifying roles of teachers, students, and parents in school disaster management plan			V				
	Making school reopening plan	V						
	Improving school reopening plan with consideration of alternative place for classroom, evacuation routes, and space for evacuation center after disasters	V						

	Making one-page school disaster management manual for students and parents	V						
	Identifying evacuation center inside school building in school disaster management plan	V						
Meeting with relevant organizations	Having PTA meeting on disaster management			V				
	Having periodical meeting on disaster management with board of education and relevant organizations						V	
	Having meeting between teachers and students and between teachers and parents to share disaster management manual			V				
	Having meeting between teachers and affected people in community				V			
	Having meeting with community and parents to consider the situation that teachers are not available			V	V			
	Having meeting with parents and community for safety of students when they go to school and go home and conducting disaster management training through map exercise			V	V			
	Having meeting with utilization of PTA budget to prepare food, water, flashlight, and other necessary things immediately after disasters			V				
	Having meeting with parents to identify roles of teachers, students, and parents in disaster-related regulation for school			V				

(continued)

Table 8.4 (continued)

Type	Activities	By school only	With other schools	With family	With community	With community-related organizations	With city office	With other organizations
	Having meeting with community association, volunteer fire corps, and other schools to strengthen disaster management in the island		V			V		
	Having meeting with parents and community to improve school disaster management plan			V	V			
	Having meeting with leader of community association for evacuation drill and drill on establishment of evacuation center					V		
	Participating in community association meeting for preparation to establish school-community disaster management organization					V		
Networking with community	Communicating with community association and community-based disaster management organization					V		
	Providing opportunities for communication to residents in temporary housing and students				V			
	Communicating neighbor private companies and stores with PTA for emergency situations			V				V
	Improving communication with community and residents in temporary shelters				V			

	Improving communication with community associations and residents in temporary housing				V	V		
	Providing opportunities of communication between residents in temporary housing and students				V			
	Improving communication with neighbor hospital for emergency situations							V
	Interacting other school students through ESD/UNESCO schools for enhancing disaster awareness		V					
	Strengthening relationship for collaboration with community center, fire station, and relevant organizations					V	V	
	Making network with NPO/NGO for the improvement of conditions on solar panel, well, and environment protection equipment							V
	Having periodical cooperation with community center, kindergarten, and junior high school		V			V		
	Strengthening cooperation with the board of education and fire station						V	
Others	Conducting the project on display of height above sea level with community				V			
	Continuing mental support for students with utilization of counselor	V						
	Sharing information between community association and school in the meeting with person in charge of disaster management					V		

(continued)

Table 8.4 (continued)

Type	Activities	By school only	With other schools	With family	With community	With community-related organizations	With city office	With other organizations
	Visiting school where disaster learning is done actively and sharing information with teachers		V					
	Conducting seminar on disaster management in PTA meeting and get-together			V				
	Conducting safety inspection of school building and equipment once a month	V						
	Making implementation plan on disaster management activities targeting students, parents, and community	V						
	Establishing organization for disaster management with the board of education and various types of community organizations					V	V	
	Continuing disaster management activities with junior high school, parents, and community associations		V	V	V			
	Making organization and cooperation with various types of community organizations					V		
	Conducting disaster management activities with utilization of relationship with community which has been developed through ESD				V			
	Conducting map exercise with community, volunteer fire corps, and community center to confirm evacuation route				V	V		

	Considering with community on safety confirmation of students	V						
	Conducting map exercise with cooperation of community associations and volunteer fire corps					V		
	Establishing cooperation organization in community				V	V		V
	Disseminating disaster learning conducted under ESD framework	V						
	Planning events related to disaster management which PTA can participate in	V						
	Planning and conducting disaster management events with utilization of the existing relationship with community				V			
	Transferring the outputs of disaster learning with NPO/NGO to other schools		V					V
	Sharing information on ESD and disaster learning with neighbor elementary school and disaster management chief teacher		V					
	Conducting the project on display of height above sea level with neighbor junior high school as a part of ESD		V					
	Conducting play to transfer experiences of the earthquake and tsunami with cooperation of NPO/NGO							V
	Giving support to elementary schools and conducting disaster learning together with elementary schools		V					
	Improving disaster management activities including sharing information with the board of education and emergency						V	

(continued)

Table 8.4 (continued)

Type	Activities	By school only	With other schools	With family	With community	With community-related organizations	With city office	With other organizations
	management division and conducting evacuation drill with cooperation of fire station							
	Summarizing the experiences and lessons that school became evacuation center in the EJET and improving the school functions as evacuation center for community	V						
	Sharing information with the Board of Education, emergency management division, and community associations					V	V	
	Ensuring security on the way to and from school in disaster situations	V						
	Making and utilizing safety card as preparation for tsunami, tidal wave, and flood	V						
	Distributing school letter to residents in temporary housing to inform school activities				V			

based disaster management organization, and volunteer fire corps. Other organizations mean private company, hospitals, and NPO/NGO.

Proposed activities were not necessarily prepared to solve specific weaknesses identified through SDRA and discussion with the Board of Education and Education Researchers. For instance, in a disaster management plan, "making one-page school disaster management manual for students and parents" was proposed. To achieve this, teachers need to have appropriate knowledge. Teachers also need to explain the manual to students. Schools also need to have good relationships with parents and make an opportunity to distribute to parents. Thus, an activity is related to several weaknesses and/or strengths and contributes to enhancing various types of resilience of schools.

Table 8.5 then summarizes Table 8.4 and shows the result of the relationship between activity classification and related persons/organizations.

Forty-five activities out of 121 are expected to be conducted only by schools. In disaster education and learning, 21 out of 31 are done only by schools. Thus, many activities are requested to be conducted by the school and other persons and organizations. Even in the case of "disaster education and learning," 10 out of 31 request involvement of other schools, family, community, community-related organizations, and city office.

In Kesennuma City, schools know the importance of relationship among school, family, and community because school has the experiences of the EJET. In addition, SDRA was an opportunity to consider the current relationship. Therefore, family and community involvement are emphasized in drills and activities and meetings. "Networking with community" and "Others" cover various types of activities, and these activities need involvement of many actors according to Table 8.5.

In Kesennuma City, establishment of an area-based disaster management organization has been promoted, and one of the examples is the Hashikami Area Disaster Education Promotion Committee shown in Chap. 7 of this book. School teachers know the concept of this type of organization and SDRA suggested the importance of the involvement of community and parents. Therefore, other schools, family, community, and community-related organizations are included in the many proposed activities rather than the city office and other organizations.

8.5 Conclusion

This chapter highlighted the process of application of SDRA to Kesennuma City as well as a part of the results and the activities proposed to each school for enhancing school disaster resilience. The results of SDRA applied in Kesennuma City can be summarized as below:

- The resilience of physical conditions and human resources is high compared to institutional issues, external relationships, and natural conditions.

Table 8.5 Relationship of classification and related persons/organizations

Classification of activities	No. of activities	By school only	With other schools	With family	With community	With community-related organizations	With city office	With other organizations
Disaster education and learning	31	21	1	1	3	4	2	0
Drill and activities for disaster management	19	5	4	7	6	6	1	0
Teacher training	8	4	3	0	0	0	3	0
School disaster management plan	10	6	0	4	2	0	0	0
Meeting with relevant organizations	12	0	1	7	4	3	1	0
Networking with community	12	0	2	1	4	4	2	3
Others	29	9	6	2	7	7	3	3
Total	121	45	17	22	25	23	6	5

- Parents in human resources dimension have lower resilience than teachers and students.
- Schools have a disaster management-related plan and the level of actions is not satisfactory.
- Schools do not have enough networks with the community for disaster management.
- The resilience of parents and the community needs to be enhanced in the city level.

Education Researchers and the officers of the Board of Education of Kesennuma City understand that school disaster management is not an internal issue in the school itself, based on their own experiences and SDRA. Therefore, they were able to propose many activities that request to involve stakeholders.

The experiences of SDRA application can point out the following effectiveness of SDRA:

- SDRA can be used for capacity development of school teachers and government officers.
- School teachers understand the concept of school disaster management.
- SDRA results are easier for teachers to understand the strengths and weaknesses of each school because the results are shown in quantitative form.
- Multi-stakeholder discussion is useful to understand the standpoints of each stakeholder.
- Application process can be used in other cities.
- External help is useful because outside organizations can support technically and give outside perspectives and viewpoints so that the process of reviewing the results is more fruitful.
- SDRA can support PDCA (plan-do-check-action) cycle with scientific quantitative data.

In Japan, most of schools have formulated their school plan on disaster management and disaster education. To enhance school disaster resilience, schools need to take actions based on the plans. SDRA can check school disaster resilience from various aspects. Schools understand the changes of resilience through periodical usage of SDRA. During the application process in Kesennuma City, the key factor was involvement of external help (the University and NGO). They cannot only technically support teachers and local government but also suggest outside perspective. School teachers need to have appropriate knowledge on disaster management but they are not specialists. When activities for enhancing school disaster resilience as well as SDRA are conducted, it is suggested to involve external help so that quality can be enhanced and the school can make a step to build a multi-stakeholder network.

This chapter describes the SDRA application process including preparation of survey sheets, analysis, and consultation between the Board of Education, Education Researchers (school teachers), the University, and NGO in order to propose activities for enhancing school disaster resilience in EJET-affected areas with

utilization of Education Research Meeting, which is a kind of teacher training system initiated by the Board of Education. School teachers need to have the fundamental knowledge on disaster management, but the more important thing is that teachers consider and analyze the current situation on their own schools and take actions for enhancing school disaster resilience. In this regard, SDRA and the process mentioned in this chapter can be utilized in school level. Especially in a small municipality, the government does not have enough human resources for school disaster management. In such municipalities, it is suggested that SDRA can be used for a training program for school teachers so that they can conduct necessary measures and activities for their resilience and the Board of Education can understand the conditions of all schools even if human resources are not enough.

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Chapter 9
Training Project in Higher Education: Regional Rehabilitation for Safer and More Secure Society in Fukushima Without Nuclear Energy

Takayuki Nakamura

Abstract The recovery and the rehabilitation of Fukushima are still on the way. Especially, it is pointed out that it takes several decades to abolish and terminate the Fukushima nuclear power plant completely and safely. In order to realize that, raising young generation who has the knowledge and the skills on regional rehabilitation for safer and more secure society in Fukushima without nuclear energy is very critical. The National Institute of Technology, Fukushima College, established an office named the "Office for Regional Rehabilitation" in January 2012. The office takes the role to implement a training project which consists of three fields such as renewable energy, nuclear safety, and disaster mitigation. The office is implementing a special course for regional rehabilitation at both the advanced course and the regular course of the college. In addition, the office prepares for a special program for the community too. Fukushima has become a worldwide known word recently. However, in order to achieve the true recovery in Fukushima from the devastated disaster, steady efforts for the sake of raising young generation are indispensable.

Keywords Training project • Office for regional rehabilitation • NIT-FC • Renewable energy • Nuclear safety • Disaster mitigation

9.1 Background

Due to the Great East Japan Earthquake which occurred on March 11, 2011, and the following explosion of the Fukushima nuclear power plant, the Fukushima prefectural government determined and declared the change regarding energy utilization from nuclear energy to renewable energy. Based on the declaration, the Fukushima prefectural government is implementing the policy to invite private industrial

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sectors which are related to renewable energy. In line with implementing this policy, the National Institute of Technology, Fukushima College (hereinafter called "NIT-FC"), is expected to raise many engineers who have the knowledge and the skills regarding renewable energy, because NIT-FC is the only national technical institution of higher education in Fukushima Prefecture.

Furthermore, it is said that it takes several decades to abolish and terminate the Fukushima nuclear power plant completely and safely. It means that Japanese institutions of higher education like NIT-FC will have to produce engineers for a long time in the future, who have the skills on the technology of a nuclear power plant and the knowledge of radiation. NIT-FC is required to have a cooperative relationship with the Japan Atomic Energy Agency (JAEA) for the sake of creating engineers specialized in nuclear safety. Based on the abovementioned background, it is one of the important responsibilities of NIT-FC to implement the policy concerning educating students in the field of nuclear safety.

In addition, there are many devastated and still untouched areas in Fukushima Prefecture which were damaged by the earthquake and the tsunami, and these areas still remain far from the recovery and the rehabilitation because of the radiation influence by the incident of the Fukushima nuclear power plant. Based on this reality, the engineers who have the knowledge and the skills related to disaster mitigation for urban areas are needed by the Iwaki City government and other nearby municipalities.

In order to resolve the problems of Fukushima Prefecture, NIT-FC established an organization named the "Office for Regional Rehabilitation (hereinafter called ORR)" in January 2012. This office is directly supervised by the president of NIT-FC and is implementing a project named "Training project in higher education on regional rehabilitation for safer and more secure society in Fukushima without nuclear energy" under the budgetary support by the Ministry of Education, Culture, Sports, Science and Technology (hereinafter called MEXT) from FY2011 to FY2015. This office is also working for the purpose of human resource training on regional rehabilitation and research on regional industry development.

9.2 Introduction of NIT-FC

NIT-FC was founded in April 1962 as the first institute of technology in Fukushima Prefecture. In addition, its advanced course was established in April 2004. The educational system of NIT-FC is situated into the so-called "KOSEN" system in Japan. The "KOSEN" system consists of both 5 years of regular course and 2 years of advanced course. This educational system is very unique in the Japanese educational system as the following Fig. 9.1 shows. In addition, the departments and the advanced course of NIT-FC are shown in Fig. 9.2.

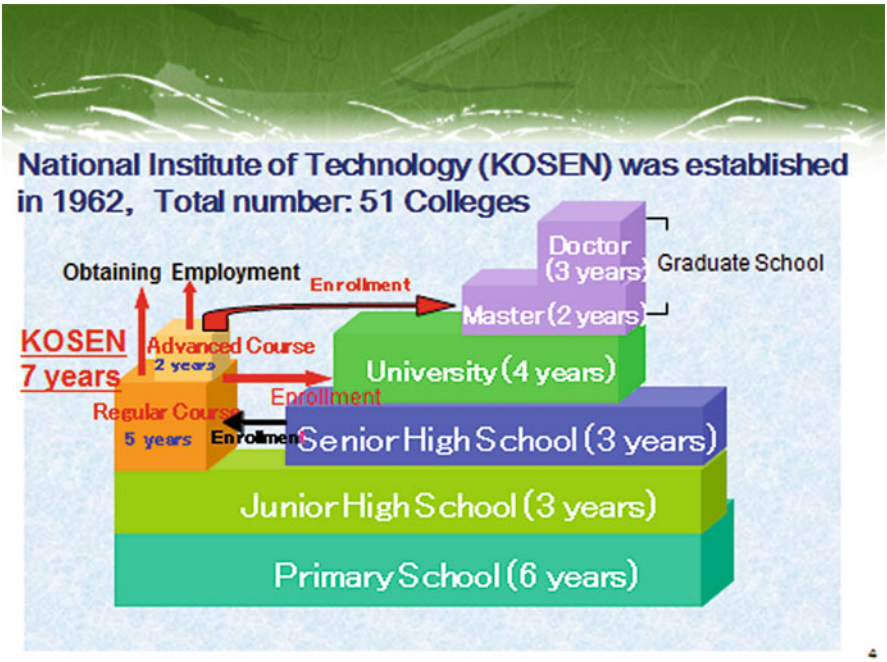

Fig. 9.1 Educational system in Japan

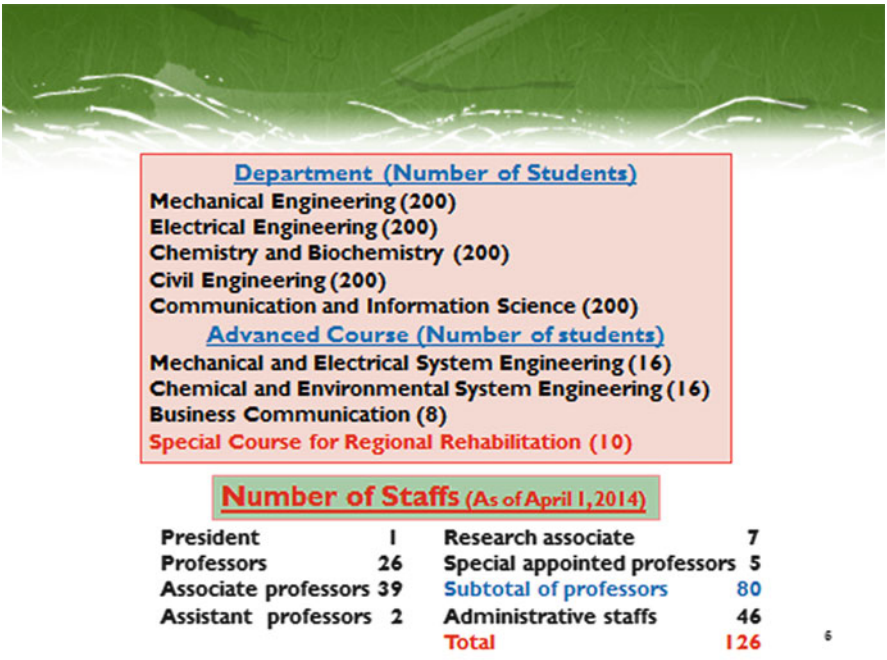

Fig. 9.2 Key data of NIT-FC

9.3 Outline of This Project

When the ORR started its works, two professors in charge of renewable energy, two professors in charge of nuclear safety, and one professor in charge of disaster mitigation, a total of five professors, were newly hired by NIT-FC. In addition, approximately 40 professors of NIT-FC join the ORR.

A special course for regional rehabilitation was established at the advanced course of NIT-FC from FY2013, and the number of students of the advanced course per year was increased from 20 to 25. The students who belong to the special course are able to obtain the credits of the lessons related to renewable energy, nuclear safety, and disaster mitigation which are taught by newly hired professors and professors who belong to NIT-FC (Fig. 9.3).

In addition, the ORR of NIT-FC implements a special educational program for the employees of small and midsized private sectors which were damaged by the disaster. The purpose of this program is to improve their technical skills and knowledge. The program is able to contribute to enhance the company's competitiveness and increase the job opportunities for the victims by the disaster.

Furthermore, the ORR carries out the measurement of radiation for the municipalities and the community and the consultation to rehabilitate the damaged areas in Fukushima. Moreover, the office organizes community forums and seminars on regional rehabilitation.

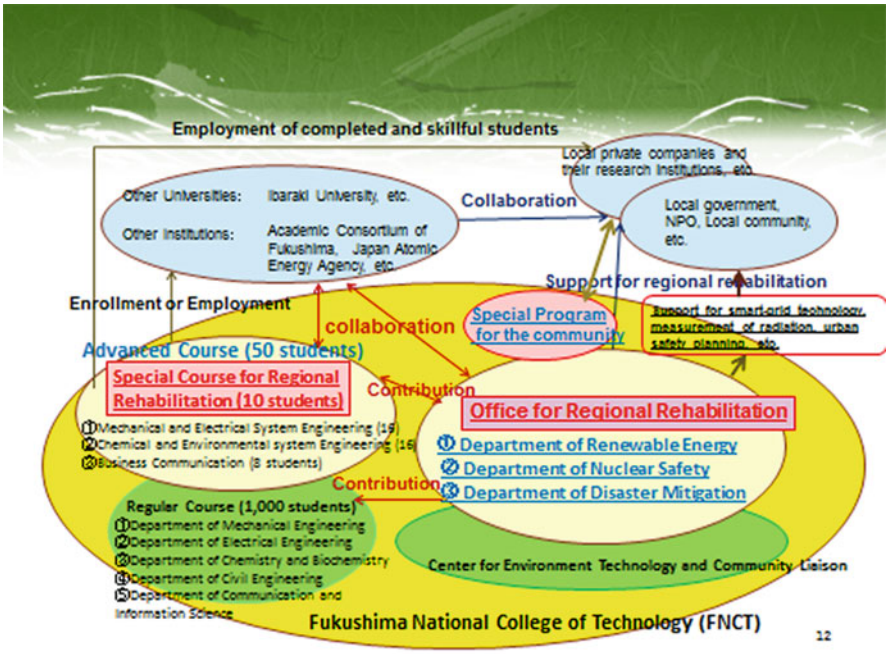

Fig. 9.3 Components of this project

9.4 Facilities for This Project

In order to start this project, the following facilities were subsidized by MEXT and installed at NIT-FC (Figs. 9.4a, 9.4b, and 9.4c):

- Smart-grid experimental facilities (in October 2012)
- Inductively coupled plasma–mass spectrometry (ICP–MS) (in June 2012)
- HP radiation detector (in August 2012)
- Liquid scintillation counter (in August 2012)
- Geographic information system (in March 2012)

Figure 9.5 shows the real-scale experimental system of smart grid. This experimental system consists of gas cogeneration system, wind power, photovoltaic power, outdoor switchgear, simulator, etc. This experimental system supplies electricity to the loads at NIT-FC by connecting with normal electric system and sends heat to the bathroom of the dormitory of NIT-FC. Even though a blackout occurs when natural disaster hits NIT-FC, this experimental system is able to function properly and sends electricity and heat to the important areas of NIT-FC. This system is able to be applied to the renovation or the rebuilding of hotels or schools.

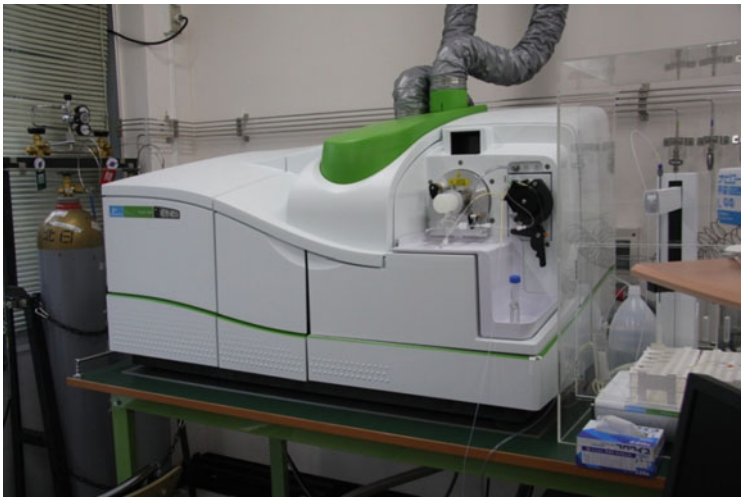

Fig. 9.4a Inductively coupled plasma–mass spectrometry (ICP–MS)

Fig. 9.4b HP radiation detector

Fig. 9.4c Liquid scintillation counter

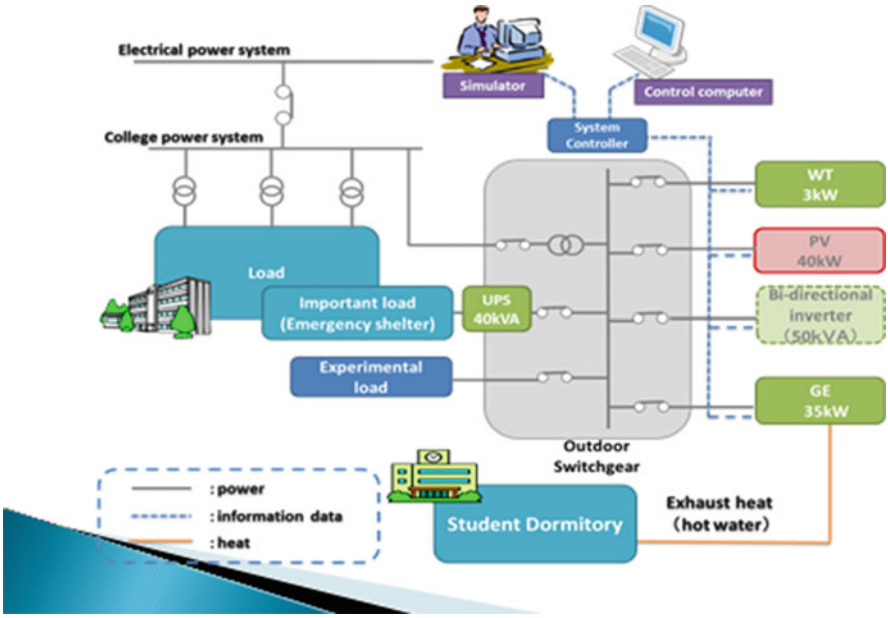

Fig. 9.5 Real-scale experimental system of smart grid

Table 9.1a Subjects at advanced course

Environmental preservation engineering	Renewable electricity generation engineering	Radiation safety engineering	Disaster prevention engineering	Energy conversion engineering
Disaster mitigation engineering	Power delivery system engineering	Nuclear reactor engineering	General remarks on safety engineering	Urban economics

Table 9.1b Subjects at regular course

Introduction to radiational administration	Introduction to environmental and energy engineering	Communication engineering for disaster prevention

9.5 Education

9.5.1 Special Course for Regional Rehabilitation

The number of subjects for the special course for regional rehabilitation is ten and the titles of the subjects are shown in Table 9.1a. The students who belong to this special course at the advanced course have to take more than five subjects. In addition, the experiment related to rehabilitation is prepared for the students. Moreover, the students have to conduct special research related to regional rehabilitation. The inauguration ceremony for this special course took place at NIT-FC on May 9, 2013. In addition, three subjects related to regional rehabilitation which are shown in Table 9.1b are prepared for the students who belong to the regular course. The length of regular course is 5 years and it is set before the advanced course.

9.5.2 Special Program for the Community

The ORR of NIT-FC organizes a special program for the community (Figs. 9.6a and 9.6b). During FY2014, several programs for the community such as "Basic course for photovoltaic," "Basic course for radiation," "Raising engineers of civil-engineering who are in charge of regional rehabilitation," etc., were prepared.

Fig. 9.6a Citizens listening to the lectures

Fig. 9.6b Delivered class to primary school

9.6 Research

The ORR of NIT-FC implements the state-of-the-art research and development on renewable energy, nuclear safety, and disaster mitigation under the cooperation with other universities and research institutions as the following Figs. 9.7 and 9.8 show.

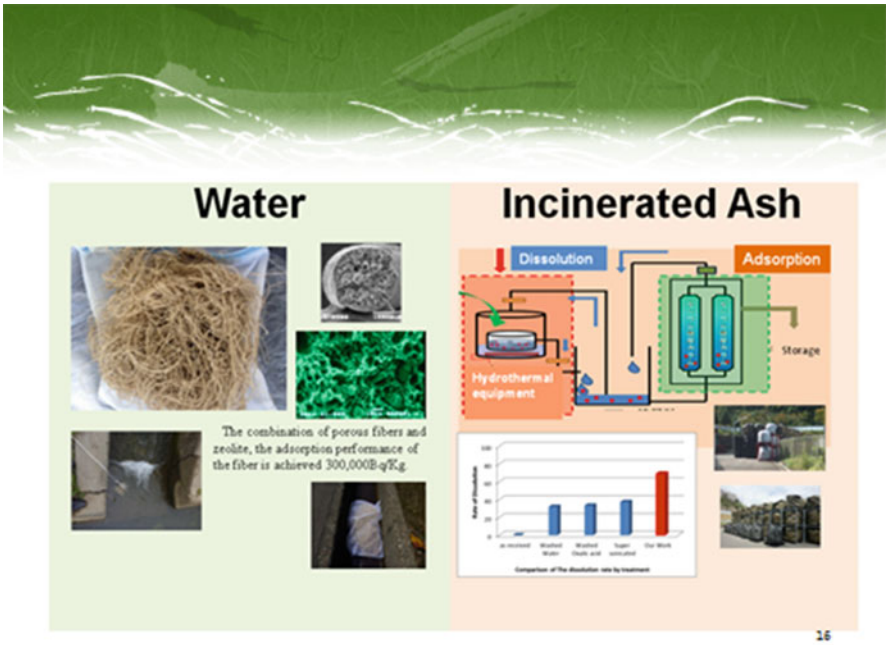

Fig. 9.7 Removing and recovering cesium from water and incinerated ash

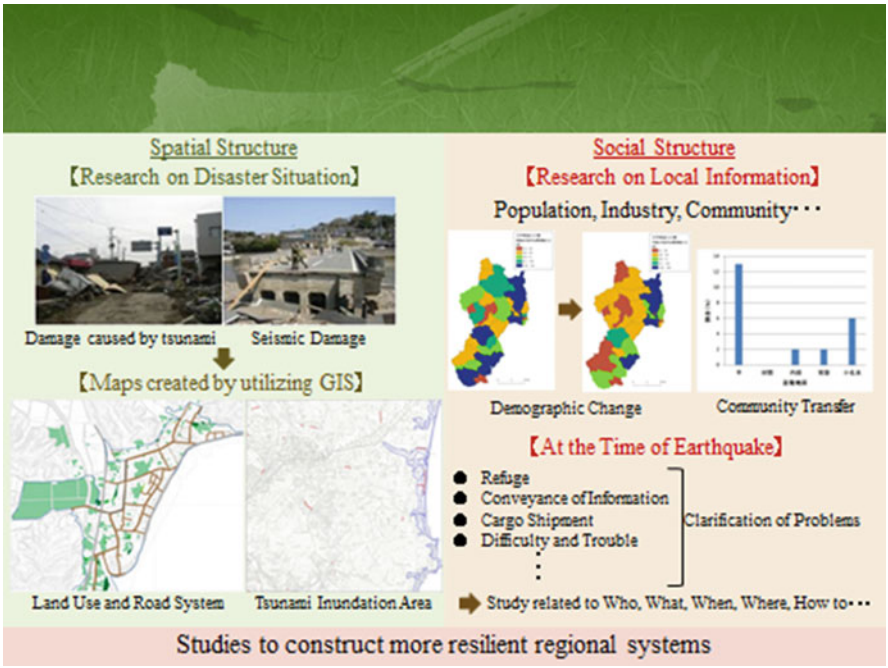

Fig. 9.8 Studies to construct more resilient regional systems

9.7 Contribution to the Community

9.7.1 Measurement of Radiation

The ORR of NIT-FC fundamentally implements the measurement of radiation based on the requests from the municipalities like Iwaki City, public organizations, cooperative private sectors of NIT-FC, researchers, and students of NIT-FC. In addition, the ORR also started the measurement of radiation based on the request by normal citizens from July 2013.

9.7.2 Regional Forum

The ORR of NIT-FC organizes regional forums on renewable energy, nuclear safety, and disaster mitigation in order to lecture related information and knowledge to the community. Several forums such as "Basic course for photovoltaic," "Examples for nuclear safety," and "Countermeasures in the case of disasters" were held during FY2013. Lectures and panel discussion on the abovementioned themes took place. A forum titled "Geothermal power plant and the utilization of geothermal heat" was already held in June 2014 regarding FY2015.

9.8 Conclusion

At the graduation ceremony of NIT-FC on March 2015, 14 students were successfully able to get the credit to complete this special course of regional rehabilitation for the first time. Each of them mentioned her or his ambition to contribute to the recovery and the rehabilitation process of the affected regions in Fukushima. The recovery and the rehabilitation of Fukushima are still on the way, even though the rest area of Japan tends to forget the damages caused by the Great East Japan Earthquake. Especially, it is pointed out that it takes several decades to finalize the abolishment of the Fukushima nuclear power plant, and many cutting-edge technologies will have to be invented to realize the abolishment of the plant. On this point, NIT-FC will have to raise talented engineers and send them to the society for long time in the future under the cooperation with other related universities and research institutions.

Chapter 10
International Cooperation: ESD and DRR in Japan

Yukihiko Oikawa

Abstract United Nations Decade of Education for Sustainable Development (DESD) has ended in 2014. However, local and global issues or challenges caused by environmental, economic, social, and cultural background are spreading and getting more serious day by day locally and globally, such as climate change, biodiversity, disaster risk reduction, religious conflict, and so on. Therefore the significance and necessity of ESD should be sustained toward the future beyond DESD. In 2014, at the end of DESD, the "UNESCO ESD World Conference" was held in Nagoya, Aichi, and Okayama, Japan, along with the "World Conference of Regional Centres of Expertise (RCEs)" and "World Conference of UNESCO Associated Schools," and the declarations or proposals were stated by each conference including some side events for ESD promotion in the future. Through these conferences, UNESCO launched the "Global Action Programme on ESD" to sustain and enhance ESD at post-DESD in the world. Also, the Ministry of Education in Japan (MEXT) has started the "ESD Promotion Program for Fostering Global Human Resource" since 2014 to promote ESD beyond DESD by establishing consortium in each region. On the other hand, in March 2015, the World Conference on Disaster Risk Reduction (WCDRR) was held in Sendai City, Japan, and launched the "Sendai Framework for Disaster Risk Reduction 2015–2030" to enhance the efforts to strengthen disaster risk reduction as the follow-up to "Hyogo Framework for Action (HFA) 2005–2015." Moreover, the United Nations are discussing to launch "Sustainable Development Goals (SDGs)" from 2015 following to "Millennium Developing Goals (MDGs)," and it will be enforcing to promote ESD and DRR for the achievement of SDGs. This chapter will discuss international cooperation of ESD and DRR through the new trend at post-2015.

Keywords International cooperation • Education for sustainable development (ESD) • Disaster risk reduction (DRR) • Aichi-Nagoya declaration • Global

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Action Programme (GAP) on ESD • Sendai Framework for Disaster Risk Reduction (SFDRR)

10.1 Trend of the Decade of Education for Sustainable Development

At the end of the twentieth century, human beings had been facing a lot of crises in the environment such as global warming, desert spreading, crisis of biodiversity, disruption of ozone layer and rain forest, pollutions of water and air, and also social problems such as poverty in many developing countries, disputes caused by religious and racial problems, gender problems, and so on; all of those were not able to sustain society and future at the local and global level. "Sustainable development" was getting a common and crucial issue around the world. And in order to realize "sustainable development," it was recognized by many people and nations that "education" could take a key role for the future, so that "Education for Sustainable Development (ESD)" was proposed as the key concept to build the sustainable future of human beings. The significance and importance of Education for Sustainable Development (ESD) was emphasized by many international conferences, and that was reflected in key documents (Oikawa 2012).

In 1992, the Earth Summit in Rio de Janeiro, Brazil, has recognized the critical role of education in achieving a sustainable development and future. Chapter 36 of Agenda 21 specifically addresses reorienting education toward sustainable development and encompasses all streams of education, both formal and nonformal, basic education, and all the key issues related to education for sustainable development (UNU-IAS 2005). The four major thrusts as identified in Chapter 36 of Agenda 21 are:

- Public awareness and understanding
- Access to quality basic education
- Reorienting existing education
- Training programs for all sectors

In the process of negotiating a Plan of ESD Implementation of the World Summit on Sustainable Development in Johannesburg, South Africa, in 2002, Japan proposed the "Decade of Education for Sustainable Development (DESD)" in response to the proposals of Japanese NGOs, and a recommendation to the UN General Assembly to consider adopting this idea was included in the plan. According to this, Japan submitted a resolution as one of the 40 cosponsors to designate the 10 years as the UN Decade of Education for Sustainable Development (UN-DESD) at the 57th UN General Assembly in 2002. The proposal was adopted unanimously to launch the "Decade of Education for Sustainable Development (DESD)" from January 2005, following the Johannesburg 11 May 2014 Plan of Implementation. UNESCO was designated as the lead agency for the Decade of

Education for Sustainable Development (DESD), which developed a draft International Implementation Scheme for DESD.

ESD, advocated by UNESCO as a lead agency of the United Nations, aims to help people develop the attitude, skills, and knowledge required to make decisions for their own life and others, now and in the future, and to act on these decisions. Four major aspects focused in ESD are as follows: (i) improving quality of basic education, (ii) reorienting educational programs, (iii) developing public understanding and awareness, and (iv) providing training (UNESCO 2005). The UN Decade of Education for Sustainable Development (DESD) which was launched from 2005 to 2014 by the UN General Assembly in 2002 aims to promote the following in the educational scheme: (i) interdisciplinary and holistic learning rather that subject-based learning, (ii) value-based learning, (iii) critical thinking rather than memorizing, (iv) multi-method approaches (word, art, drama, debate, etc.), and (v) participatory decision-making and locally relevant rather than national information (UNESCO 2006). The primary aim of DESD is to encourage government to consider the inclusion of measure to implement the ESD in their respective education system and national development plans with four key objects: (i) facilitating networking and collaboration among stakeholders in ESD, (ii) fostering greater quality of teaching and learning of environmental topics, (iii) supporting countries in achieving their MDGs through ESD efforts, and (iv) providing countries with new opportunities and tools to reform education (UNESCO 2005). UNESCO which is designated to lead the DESD seeks to integrate the principals, values, and practices of sustainable development into all aspects of education and learning, in order to address the social, economic, cultural, and environmental problems faced in the twenty-first century. Implementation focused on the following seven building blocks: (i) advocacy and vision building, (ii) consultation and ownership, (iii) partnership and network, (iv) capacity building and training, (v) research and innovation, (vi) information and communication technologies, and (vii) monitoring and evaluation (UNESCO 2006).

In the midterm of DESD, UNESCO World Conference on Education for Sustainable Development was held in Bonn, Germany, on 31 March to 2 April 2009. The conference issued the Bonn Declaration following the statement and call for action. The declaration pointed "The progress of ESD remains unevenly distributed and requires different approaches in different contexts. In the coming years, there is a clear need for both developed and developing countries, civil society and international organizations to make significant efforts," so that it requires 5 calls for action at policy level and 13 calls for action at practice level. And it also welcomed the intention announced by the Government of Japan to host jointly with UNESCO the end-of-decade World Conference on ESD in 2014. In 2010, at the beginning of the second half of the DESD, UNESCO stated three priorities in addressing global sustainable development challenges through ESD, by focusing on the following: "climate change," "biodiversity," and "disaster risk reduction and preparedness." They have key action themes for the second half of the DESD (2010–2015) as UNESCO strategy (Interministerial Meeting on UN-DESD 2009).

Twenty years later from the Earth Summit in Rio de Janeiro in 1992, the "United Nations Conference on Sustainable Development (Rio+20)" was held in Rio de Janeiro, Brazil, in June 2012. The conference addressed the agenda, "The Future We Want," as outcome of the conference. In Chap. 5, "Framework for action and follow-up – A. Thematic areas and cross-sectoral issues – education 233," it is described "We resolve to promote education for sustainable development and to integrate sustainable development more actively into education beyond the United Nations Decade of Education for Sustainable Development" (United Nation 2012).

10.2 ESD Fosters Local and Global Cooperation by Establishing Network

Since the latter half of the twentieth century, as international conflicts and global-scale environmental problems that threaten the continued existence of humankind and society have emerged, "Education for Sustainable Development" – that is, ESD – has drawn increasing attention as awareness has increased of the importance of education to nurture future leaders of sustainable societies in order to solve these global issues. Against this background, at the Johannesburg Summit in 2002, Japan proposed the establishment of the United Nations Decade of Education for Sustainable Development (DESD), to begin in 2005 (Interministerial Meeting on UN-DESD 2009).

During the Decade of Education for Sustainable Development (DESD), ESD has been progressing and disseminating over the world by the efforts of many countries and stakeholders in the world. ESD practices also have been getting good effects and fruits through good practices such as Regional Centres of Expertise (RCEs) and UNESCO Associated Schools Project Network (ASPnet). Those ESD practices have contributed to enhance the quality of education in not only school education but also nonformal and informal education, by changing values and idea for education. On the other hand, ESD also have progressed to establish network and collaboration among diverse actors and sectors in the community, intercommunity, and in the world. That enhances the power of community for sustainable development. ESD aims to solve global issues such as "bio and cultural diversity," "climate change," and "disaster risk reduction (DRR)," but ESD also should be promoted locally by tackling local urgent issues and problems which are different depending on each community and region. In this context, Regional Centres of Expertise (RCEs) and UNESCO Associated Schools Project Network (ASPnet) are based on their communities so that their practices and activities focused on local issues or legacies for the purpose of building sustainable regional society and city mainly. On the other hand, it facilitates to establish global networks in order to exchange and collaborate each other. By taking actions locally and globally, ESD has been spreading and moving forward to the world (Oikawa 2014).

10.3 UNESCO World Conference on ESD

At the end of the Unite Nations Decade of Education for Sustainable Development (UN-DESD), UNESCO held UNESCO World Conference on Education for Sustainable Development (ESD). The conference took place from 10 to 12 November 2014 in Aichi-Nagoya, Japan, along with Stakeholder Conferences from 4 to 8 in Okayama City, including the Kominkan-CLC International Conference on ESD which took place from 9 to 10 October 2014 in advance. The World Conference on ESD marked the end of the UN Decade of ESD (2005–2014) and saw the new framework of ESD post DESD. Under the banner of "Learning Today for a Sustainable Future," the conference celebrated the achievements of the UN Decade of ESD, identifying lessons learned while setting the stage for the future of ESD. Over 1000 formal participants from 150 countries including 76-cabinet minister level attended the World Conference in Nagoya City. And about 1800 people participated in Stakeholder Conferences in Okayama City such as Global Regional Centres of Expertise (RCEs) Conference by the United Nations University, UNESCO School World Conference, including students forum, teachers forum and UNESCO School National Conference, and youth forum. It also showcased initiatives, key players, networks, and ideas that the Decade had stimulated. Such examples from all over the world helped to generate future action under the new framework of ESD post DESD. The outcomes of the World Conference will inform the deliberations of the World Education Forum to be held from 19 to 22 May 2015 in Incheon, Republic of Korea.

10.3.1 Aichi-Nagoya Declaration on ESD at World Conference

As the achievement of UNESCO World Conference on ESD, the "Aichi-Nagoya Declaration on Education for Sustainable Development" was adopted at the closing session of the conference on 12 November to sustain and scale up ESD for future beyond DESD. The declaration is celebrating the significant achievements made by the UN Decade of ESD as first, and it is noting that the Global Action Programme (GAP) on ESD as a follow-up to the Decade of ESD aims at generating and scaling up ESD actions in all levels and areas of education, training, and learning. It is also reaffirming ESD as a vital means of implementation for sustainable development, as recognized in intergovernmental agreements on climate change, biodiversity, disaster risk reduction, sustainable consumption and production, and children's rights, among many others; also it is welcoming the growing international recognition of ESD as an integral and transformative element of inclusive quality education and lifelong learning and an enabler for sustainable development, as demonstrated by the inclusion of ESD as a target in the Muscat Agreement of Education for All (EFA) and in the proposal for Sustainable Development Goals

Table 10.1 Structure of the Aichi-Nagoya declaration on ESD

Aichi-Nagoya declaration on ESD		
Evaluation of DESD		
1. *Celebrating* the significant achievements made by the UN-DESD		
2. *Expressing* the appreciation to many stakeholders		
3. *Recalling* the international commitment to further promoting ESD		
4. *Noting* the Global Action Programme (GAP) on ESD		
5. *Reaffirming* ESD as a vital means of implementation for SD		
6. *Welcoming* the growing international recognition of ESD		
7. *Recognizing* the establishment of the UNESCO-Japan prize on ESD		
Requests for accelerating ESD in the future		
To stakeholders (participants)	To UNESCO member states	To UNESCO's director
Emphasize the potential of ESD to empower learners to transform themselves and the society	Review the purposes and values that underpin education, assess the extent to which education policy and curricula are achieving the goals of ESD, and ensure the education, training, and professional development to integrate ESD into teaching and learning	Provide global leadership, support policy synergy, and facilitate communication for ESD within the framework of the UNESCO roadmap to implement the GAP
Stress that ESD is an opportunity and a responsibility that should engage both developed and developing countries	Allocate and mobilize substantial resources to translate policies into actions along the priority action areas of the GAP	Harness partnerships and mobilize networks including the UNESCO ASPnet, UNESCO chairs, etc.
Underscore that the implementation of ESD should take into consideration local, national, regional, and global contexts	Reflect and strengthen ESD in the post-2015 agenda and its follow-up processes	Advocate the importance of ensuring adequate resources including funding for ESD
Appreciate commitments to ESD expressed by all concerned stakeholders through the GAP launch commitments	(a) Integrated in SDGs	
Commit to building and maintaining the momentum of the launching of the GAP in its five priority action areas	(b) Taken into consideration at the World Education Forum 2015	
Call upon to set specific goals, develop support and implement activities, create platforms, and strengthen monitoring and evaluation approaches in GAP		
Urge to engage in knowledge production, dissemination		

(continued)

Table 10.1 (continued)

and utilization, and promotion of innovation with involving and respecting youth as key		

Main data from *Aichi-Nagoya Declaration on Education for Sustainable Development* (2014), analyzed by author

(SDGs). Moreover, it is recognizing the establishment of the "UNESCO-Japan Prize on ESD" (UNESCO 2014a). After these evaluations, the declaration is requesting to three levels of initiatives – all participants (stakeholders), governments of UNESCO member states, and UNESCO's director-general – to accelerate the progresses of ESD (Table 10.1).

10.3.2 Messages from Aichi-Nagoya Declaration

Aichi-Nagoya Declaration emphasizes the importance of international and intersectoral cooperation to accelerate ESD for the future. In section 2, the declaration is expressing the appreciation to many governments, UN entities, nongovernmental organizations, all types of educational institutions and setups, educators and learners in schools, communities and workplaces, youth, the scientific community, academia, and other stakeholders who had actively committed to and participated in the implementation of the UN Decade of ESD and to UNESCO for the leadership role it has played as lead agency of the Decade of ESD. On the other hand, the declaration calls upon all concerned stakeholders, including governments and their affiliated institutions and networks, civil society organizations and groups, the private sector, media, the academic and research community, and education and training institutions and centers as well as UN entities, bilateral and multilateral development agencies, and other types of intergovernmental organizations at all levels, to set specific goals; to develop, support, and implement activities; to create platforms for sharing experiences (including ICT-based platforms); and to strengthen monitoring and evaluation approaches in the five priority action areas of the GAP in a synergistic manner. Furthermore, to all governments of UNESCO member states, the declaration urges to reinforce the integration of ESD into education, training, and sustainable development policies, with a special attention paid to system-wide and holistic approaches and multi-stakeholder cooperation and partnerships between actors of the education sector, private sector, civil society, and those working in various areas of sustainable development on reviewing the purposes and values that underpin education and assessing the extent to which education policy and curricula are achieving the goals of ESD. In addition, it requests UNESCO's director-general to provide global leadership, support policy synergy, and facilitate communication for ESD, in cooperation with governments, other UN entities, development partners, private sectors, and civil society, and also

to harness partnerships and mobilize networks including the UNESCO ASPnet, UNESCO Chairs, centers under the auspices of UNESCO, the World Network of Biosphere Reserves and World Heritage Sites, as well as UNESCO Clubs and Associations (UNESCO 2014a).

Aichi-Nagoya Declaration is also affirming the necessity of integrated, interdisciplinary, and interregional approach to promote ESD by multi-stakeholders. In section 5, the declaration recognizes the significance of the linkage and intergovernmental agreements on climate change (Article 6 of the UN Framework Convention on Climate Change and its Doha work programme), biodiversity (Article 13 of the Convention on Biological Diversity and its work programs and related decisions), disaster risk reduction (Hyogo Framework for Action 2005–2015), sustainable consumption and production (Sustainable Lifestyles and Education Programme of the 10-Year Framework of Programmes on Sustainable Consumption and Production 2012–2021), and children's rights (Articles 24[2], 28, and 29 of the UN Convention on the Rights of the Child), among many others. And it also underscores that ESD should take into consideration local, national, regional, and global contexts, as well as the contribution of culture to sustainable development and the need for respecting peace, nonviolence, cultural diversity, local and traditional knowledge and indigenous wisdom and practices, and universal principles such as human rights, gender equality, democracy, and social justice in section 10 (UNESCO 2014a).

Lastly, the declaration is enforcing to put ESD into the next global framework and action for sustainable development, reflecting and strengthening ESD in the post-2015 agenda and its follow-up processes, such as the "Muscat Agreement" adopted at the 2014 Global Education For All Meeting, "Global Action Programme (GAP) on ESD" endorsed by the 37th session of the General Conference of UNESCO, "Sustainable Development Goals (SDGs)" by the Open Working Group of the UN General Assembly on SDGs, and "World Education Forum 2015" to be held in Incheon, Republic of Korea, from 19 to 22 May 2015. Especially, it emphasizes the inclusion of ESD in the proposal for SDGs as a crosscutting theme and the commitment to five priority action areas of GAP as a follow-up to the Decade of ESD and a concrete contribution to the post-2015 agenda. Global Action Programme (GAP) will be discussed in next section.

10.4 Global Action Programme (GAP) on ESD Beyond the DESD

To build on achievements and create new momentum when the UN Decade of Education for Sustainable Development (DESD) closes in 2014, UNESCO, as the lead agency of the Decade, has developed a Global Action Programme (GAP) on Education for Sustainable Development (ESD). Based on broad consultations and input from a wide range of stakeholders, the Global Action Programme was

endorsed by the 37th UNESCO General Conference in 2013. It comes at a time when the international community is charged with proposing a new set of sustainable development goals that are action oriented, global in nature, and universally applicable. As a follow-up to the Decade of ESD, the Global Action Programme is also designed as a concrete, tangible contribution to the post-2015 development and education agendas (UNESCO 2014b). The Global Action Programme is due to be submitted to the United Nations General Assembly in 2014; it is needed to set out the future direction for promoting ESD. The GAP seeks to generate and scale up ESD action. It is intended to make a substantial contribution to the post-2015 agenda.

The overall goal of the GAP is to generate and scale up action in all levels and areas of education and learning to accelerate progress toward sustainable development.

The GAP has two objectives (UNESCO 2013):

(i) To reorient education and learning so that everyone has the opportunity to acquire the knowledge, skills, values, and attitudes that empower them to contribute to sustainable development – and make a difference
(ii) To strengthen education and learning in all agendas, programs, and activities that promote sustainable development

10.4.1 Five Priority Action Areas of the Global Action Programme (GAP)

The Global Action Programme (GAP) focuses on five priority action areas in order to enable strategic focus and stakeholder commitment. These action areas are considered as key leverage points to advance the ESD agenda. While ESD action at all levels and in all areas of education and sustainable development is encouraged, action under this Global Action Programme focuses in particular on the following areas and the following strategic objectives (UNESCO 2013):

Priority action area 1: *Policy Support*

Advancing policy – mainstream ESD into both education and sustainable development policies, to create an enabling environment for ESD and to bring about systemic change.

The GAP states to integrate ESD into international and national policies in education and sustainable development. An enabling policy environment is crucial for mobilizing education and learning for sustainable development and the scaling up of ESD action in formal, nonformal, and informal education and learning. Relevant and coherent policies should be grounded in participatory processes and designed through interministerial and inter-sectoral coordination, also involving civil society, the private sector, academia, and local communities.

Creating an enabling policy environment, which must be properly linked to implementation, requires in particular the following:

(a) ESD is systematically integrated into education policies that cover the education sector as a whole or a subset of the sector. This includes the integration of ESD in curricula and in national quality standards and indicator frameworks that establish standards for learning outcomes. It also includes integrating ESD as an important element of international education agendas.
(b) ESD is systematically integrated into policies relevant to key sustainable development challenges. This includes reflecting the role of education and learning in national policies related to the three Rio Conventions, in line with the important role the Conventions ascribe to communication, education, training, and public awareness. It includes integrating ESD into relevant international agendas in sustainable development.
(c) ESD is a systematic element of bilateral and multilateral development cooperation frameworks.

Priority action area 2: *Whole-Institution Approach*

Transforming learning and training environments – integrate sustainability principles into education and training settings.

The GAP promotes whole-institution approaches to ESD at all levels and in all settings. Whole-institution, or institution-wide, approaches require not only the reorientation of teaching content and methodology but also campus and facility management that is in line with sustainable development as well as the cooperation of the institution with sustainable development stakeholders in the community. Particular successes in this regard can be found in the areas of higher education and secondary schools. These need to be scaled up and expanded to other levels and types of education, including early childhood care and education, technical and vocational education and training, and the nonformal education of youth and adults. The promotion of whole-institution approaches requires in particular the following:

(a) An institution-wide process is organized in a manner that enables all stakeholders – leadership, teachers, learners, and administration – to jointly develop a vision and plan to implement ESD in the whole institution.
(b) Technical and, where possible and appropriate, financial support are provided to the institution to support its reorientation. This can include the provision of relevant good practice examples, training for leadership and administration, the development of guidelines, as well as associated research.
(c) Existing relevant interinstitutional networks are mobilized and enhanced in order to facilitate mutual support such as peer-to-peer learning on a whole-institution approach and to increase the visibility of the approach to promote it as a model for adaptation.

Priority action area 3: *Educators*

Building capacities of educators and trainers – increase the capacities of educators and trainers to more effectively deliver ESD.

The GAP strengthens the capacity of educators, trainers, and other change agents to become learning facilitators for ESD. Educators are one of the most important levers to foster educational change and to facilitate learning for sustainable development. There is therefore an urgent need to build the capacity of educators, as well as trainers and other change agents, on relevant issues related to sustainable development and appropriate teaching and learning methodologies. This requires in particular the following:

(a) ESD is integrated into preservice and in-service education and training for early childhood, primary, and secondary school teachers, as well as teachers and facilitators in nonformal and informal education. This may start with the inclusion of ESD in specific subject areas but will ultimately lead to the integration of ESD as a crosscutting issue. It includes ESD training for head teachers.
(b) ESD is integrated into the preservice and in-service education and training of teachers and trainers in technical and vocational education and training. This includes building capacities on sustainable consumption and production modalities as well as skills for green jobs.
(c) ESD is integrated into faculty training in higher education institutions to enhance capacity in teaching sustainability issues, conducting and supervising solution-oriented interdisciplinary research, and informing policymaking on ESD and sustainable development.
(d) Sustainable development perspectives – including resource efficiency and social and corporate responsibility – are integrated in an enhanced manner in postgraduate education, capacity building and training of decision-makers, public sector personnel, members of the business sector, media and development professionals, and other sectoral and thematic specialists relevant to sustainable development. This includes, among others, "train-the-trainers" ESD programs, the integration of ESD into executive education, as well as aligning in-house training programs of private company staff with ESD.

Priority action area 4: *Youth*

Empowering and mobilizing youth – multiply ESD actions among youth.

The GAP supports youth in their role as change agents for sustainable development through ESD. Youth have a high stake in shaping a better future for themselves and generations after. Moreover, youth are today increasingly drivers of the educational process, especially in nonformal and informal learning. Supporting youth in their role as change agents through ESD requires in particular the following:

(a) Learner-centered nonformal and informal learning opportunities in ESD for youth are enhanced. This includes developing and enhancing e-learning and mobile learning opportunities for ESD.
(b) Participatory skills that empower youth to act as change agents in global, national, and local sustainable development processes become a specific focus of formal and nonformal education programs within and outside of ESD.

Priority action area 5: *Local Community*

Accelerating sustainable solutions at the local level – at community level, scale- up ESD programs and multi-stakeholder ESD networks.

The GAP accelerates the search for sustainable development solutions at the local level through ESD. Effective and innovative solutions to sustainable development challenges are frequently developed at the local level. Multi-stakeholder dialogue and cooperation play a key role in this, for example, between local governments, nongovernmental organizations, the private sector, media, education and research institutions, and individual citizens. ESD supports multi-stakeholder learning and community engagement and links the local to the global. The full mobilization of education and learning for sustainable development calls for enhanced action at the local level. This requires in particular the following:

(a) Local networks that facilitate multi-stakeholder learning for sustainable development are developed, operationalized, and enhanced. This includes the diversification and expansion of existing networks, so that new and more stakeholders are integrated, including indigenous communities.
(b) Local authorities and governments enhance their role in providing learning opportunities for sustainable development. This includes, as appropriate, supporting, at the local level, the integration of ESD in formal education, as well as the provision of, and support to, nonformal and informal learning opportunities in sustainable development for all members of the community.

At the end of the Unite Nations Decade of Education for Sustainable Development (UN-DESD), UNESCO held the UNESCO World Conference on ESD in Japan, November 2014. Global Action Programme on ESD was launched at the World Conference as a follow-up to the UN-DESD after 2014, based on resolution 12 of 37th UNESCO General Conference in 2013. At the conference, UNESCO also proposed the Roadmap for Implementing the Global Action Programme on Education for Sustainable Development (UNESCO 2014b). The roadmap is indicating actions, main stakeholders, expected outcomes, and examples according to each of the five priority action areas. It recommended that ESD should be scaled up in all levels and areas to accelerate progress toward sustainable development beyond DESD through the collaborations and networks by involving multi-stakeholders and respective sectors (Table 10.2).

Table 10.2 Structure and implementation of Global Action Programme

Priority action area	Actions	Main stakeholders and missions	Expected outcomes and examples
Policy support *Advancing policy*	ESD into international and national policies on education and sustainable development • The Ministries of Education around the globe have integrated ESD into curricula and national quality standards, developing relevant indicator frameworks that establish standards for learning outcomes • ESD needs to be seen as an important contributor to educational quality and included in national education system measures of quality • National and international strategies dealing with the social, economic, and environmental dimensions of sustainable development, ranging from disaster management plans to low-carbon development strategies, should include ESD as a means of implementation • ESD should also become a systematic part of bilateral and multilateral development cooperation frameworks	Policymakers in both the education and the sustainable development sectors 1. Stakeholders in education • They need to set out policies and agendas to integrate ESD into various processes and structures of the sector • They need to allocate and to mobilize resources to translate these policies into actions, especially building necessary capacity at national and subnational levels 2. Policymakers working in sustainability challenges • They are invited to recognize and to adopt ESD to tackle these issues • They can invest their efforts in supporting interministerial and multi-stakeholder coordination and collaboration, where education is an integral part of discussions on sustainable development 3. Civil society organizations – community groups, NGOs, associations, unions, and foundations • They can urge governments to take the necessary actions, or they can pursue their own initiatives to complement the actions of the public sector, bridging the gap between policy and practice 4. Intergovernmental bodies, agencies, and institutions • They should integrate ESD into their agendas and mandates on sustainability. They should also encourage their member states to do their part in efforts at country level	1. Outcomes ESD integrated into national, regional, and international policy frameworks, plans, strategies, programs, and processes related to education and to sustainable development 2. Examples • National governments include ESD in national quality standards and indicator frameworks that establish standards for learning outcomes • National governments, development banks, international NGOs, and UN agencies include ESD in global agreements on sustainable development

(continued)

Table 10.2 (continued)

Priority action area	Actions	Main stakeholders and missions	Expected outcomes and examples
Whole-institution approach *Transforming learning and training environment*	• Institutions develop a vision and a plan to implement ESD in the dedicated learning and training environment, in partnership with the broader community • Institutional leaders are prompted to take a holistic view of ESD, focused not only on transferring content about sustainable development but also on participating in sustainable development practices, including taking actions to reduce the institution's ecological footprint • Collaboration between the learning and training institution and the host community is important	Leaders and the managers of all types of learning and training institutions 1. School principals, directors of technical and vocational education, and training (TVET) centers 2. Presidents of universities and community colleges as well as those of private companies 3. Community leaders, parents, learners, and trainees are important partners for these main stakeholders	1. Outcomes Sustainability plans or strategies could be implemented by schools and other training institutions and public and private sector organizations 2. Examples • Schools develop a school sustainability plan in partnership with the broader community • Universities incorporate sustainability into campus operations, governance, policy, and administration
Educators *Building capacities of educators and trainers*	• ESD should be integrated into preservice and in-service teacher education • ESD should be also integrated into training for early childhood, primary and secondary schools, and TVET institutions • At post-secondary level, higher education institutions can also integrate ESD into faculty training, to improve the ability of the faculty to teach sustainability issues and to conduct and supervise related research • Sustainability lens is introduced to the professional development programs for educators, trainers, and staff members of various private institutions	1. Educators and trainers who deliver ESD to learners and trainees 2. Educators and trainers working in education and training institutions for teachers and trainers 3. Training personnel or managers of human resources working in public or private organizations, civil society, and other institutions • They must be given opportunities to acquire the skills and knowledge they need to design and deliver education and training programs for their staff based on ESD principles 4. Faculties of colleges and universities, especially professors of business, journalism, public policy, development studies, international relations, or other relevant specialties • They play a vital role in making professionals in these areas aware of sustainability issues and ultimately in guiding their decision-making processes to support sustainable development	1. Outcomes ESD integrated into preservice and in-service teacher education programs and the capacity of education and training institutions for teachers and trainers enhanced • Training certification and accreditation standards aligned with the ESD concept and ESD incorporated into TVET training programs • The professional ESD workshops for faculty 2. Examples • Teacher education institutions deliver preservice and in-service training on ESD • National TVET agencies build the capacity of TVET teachers and trainers to address ESD

Youth *Empowering and mobilizing youth*	• Providing young people with opportunities to harness the enormous benefits of information and communication technologies including social media, not only for learning but also for networking • Promising approaches include e-learning on ESD and online platforms where young people can share their own ideas and actions on sustainable consumption and sustainable lifestyles • Mass mobilization of youth toward sustainable development requires empowering youth with information on the impacts of their daily choices and actions, while tapping into their creativity and determination to find workable and innovative solutions and alternatives	Youth between 15 and 24 years old who are the largest group of more than one billion to make the transition to adulthood 1. Youth, including activists and leaders, are both beneficiaries and drivers of this priority action area 2. Youth-focused and youth-led organizations as well as institutions that serve youth in the public and private sectors, ranging from mass media and faith-based organizations to local and national governments	1. Outcomes • More quality e-learning opportunities for youth • Youth participating in and contributing to ESD advocacy, policy development, and implementation at local, national, and international levels • More youth-led ESD activities 2. Examples • Public-private partnerships develop free smartphone apps that provide information on ESD and sustainable lifestyles • Youth organizations build a global coalition for youth on sustainable lifestyles
Local community *Accelerating sustainable solutions at local level*	• Strengthening multi-stakeholder networks at local level and improving the quality of local platforms for learning and cooperation • Mobilizing many new stakeholders to involve as large a stakeholder population as possible • Local authorities and local leaders are called upon to increase and strengthen learning opportunities for the community through formal, nonformal, and informal venues • Empowering and increasing the capacity of civil society as critical agents of change • These concerned members and stakeholders will develop measures and mechanisms to resolve the sustainable challenges facing their communities	1. Public authorities such as governors and mayors 2. Local education stakeholders such as school board members and the leaders of education institutions (e.g., school principals, presidents of universities) 3. Managers of private companies 4. Civil society representatives, NGOs, associations, and groups for the disadvantaged and the marginalized as well as individuals 5. Local media • It has an important role to play in mobilizing communities and disseminating information and knowledge 6. The private sector • It has critical role to play in developing locally based sustainable enterprises	1. Outcomes • The integration of ESD programs and ESD perspectives into the planning and decision-making processes of the community • The number of multi-stakeholder networks at local level should be increased and their networks be expanded through involving a wider range of stakeholders 2. Examples • Local authorities set up local ESD centers • The local business sector integrates ESD in corporate social responsibility activities

Main data from the *UNESCO Roadmap for Implementation the Global Action Programme on Education for Sustainable Development* (2014), analyzed by author

As a proponent of DESD, Japan is also expected to demonstrate the specific direction that its post-2015 efforts in these areas will take and to engage in active communication at the international level. In promoting ESD, it is essential to involve a wide range of actors, such as educators, NGOs, businesses, and young people, not only government.

10.4.2 New Concept of DRR Education in the Context of Global Action Programme

As discussed above, DRR is one of the priority areas for promoting ESD on the second half of DESD, and linkage between ESD and DRR is also emphasized in Aichi-Nagoya Declaration and Global Action Programme (GAP) furthermore. DRR has the synergy with ESD on the concept, the abilities to foster, and methodologies such as curriculum development, partnership, and network building for its promotion; as a result, DRR education could progress more in the context of ESD. Therefore, in order to promote DRR education based on ESD forward, it should be considered and rebuilt in the priority action areas of GAP also. Through the rebuilding of DRR education according to the five priority action areas of GAP, the synergy between ESD and DRR should be enhanced as follows:

(i) Policy support: Advancing policy for DRR

- DRR should be integrated into international and national policies on education and sustainable development.
- The Ministries of Education and Board of Education have integrated DRR education into curricula and national quality standards, developing relevant indicator frameworks that establish standards for learning outcomes.
- DRR needs to be seen as an important contributor to the educational environment and included in national education system measures of environment.
- National and international strategies dealing with the social, economic, and environmental dimensions of sustainable development should include DRR as a means of implementation.
- DRR should also become a systematic part of bilateral and multilateral international cooperation frameworks.
- Government ensures adequate resources including funding and human resources for promoting DRR education.

(ii) Whole-institution approach: Transforming learning and training environment for DRR education

- Institutions develop a vision and a plan to implement DRR education in the dedicated learning and training environment, in partnership with the broader community.

- Institutional leaders are prompted to take a holistic view of DRR education, focused not only on transferring content about DRR but also on participating in DRR practices, including taking actions to reduce the institution's disaster risk.
- Collaboration between the learning and training institution and the host community is important to promote DRR education.

(iii) Educators: Building capacities of educators and trainers for DRR

- DRR education should be integrated into preservice and in-service teacher education which is conducted by university, board of education, teacher training center, etc.
- DRR education should be also integrated into training for early childhood, primary and secondary schools, and technical and vocational education and training (TVET) institutions.
- At post-secondary level, higher education institutions can also integrate DRR education into faculty training, to improve the ability of the faculty to teach DRR issues and to conduct and supervise research related to DRR.
- DRR lens is introduced to the professional development programs for educators, trainers, and staff members of various private institutions.

(iv) Youth: Empowering and mobilizing youth to DRR action

- Providing young people with opportunities to harness the enormous benefits of information and communication technologies including social media, not only for learning but also for networking for DRR.
- Promising approaches include e-learning on DRR and online platforms where young people can share their own ideas and actions on DRR.
- Mass mobilization of youth toward DRR requires empowering youth with information on the impacts of their daily choices and actions for DRR.
- Through empowering and mobilizing youth to DRR education and action, youth including secondly and high school level would not be protected by adults or parents, but they could also be contributors to their community by taking DRR actions.

(v) Local community: Accelerating sustainable solutions at local level from DRR perspective

- Strengthening multi-stakeholder networks at local level and improving the quality of local platforms for DRR learning and cooperation.
- Mobilizing many new stakeholders to involve a large a stakeholder population as possible for promoting DRR education and activities.
- Local authorities and local leaders who have expertise and indigenous knowledge related to DRR are called upon to increase and strengthen learning opportunities for the community through formal, nonformal, and informal venues.
- Empowering and increasing the resilience of civil society as critical agents of DRR.

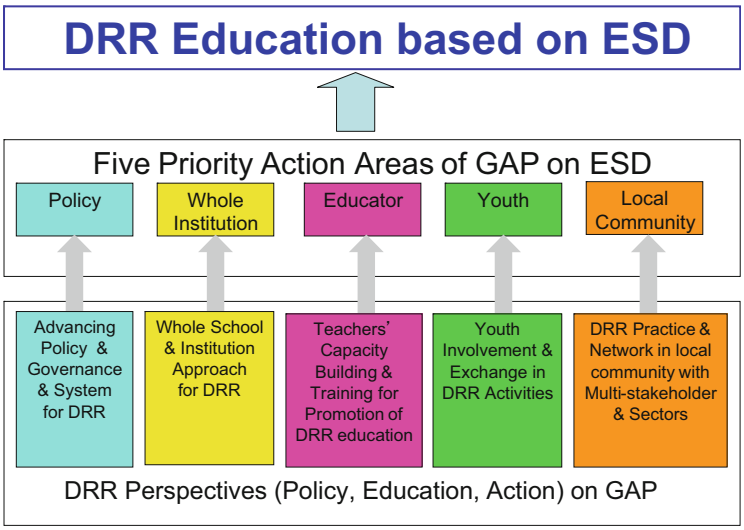

Fig. 10.1 DRR education from Global Action Programme (GAP) on ESD

- These concerned members and stakeholders will develop measures and mechanisms to resolve the disaster risk or challenges facing their communities.

By rebuilding and promoting DRR education from five points of view according to the priority action areas of GAP on ESD policy, whole institution, educators, youth, and local communities, it could be a more systematic and holistic approach, and its implementation can be more effective in formal, nonformal, and informal education involving multi-stakeholders at the local, national, regional, and global level (Fig. 10.1).

10.5 International Cooperation Through World Conference on DRR

10.5.1 Sendai Declaration in World Conference on Disaster Risk Reduction 2015

In March of 2015, 4 years later from Great East Japan Earthquake and 20-year anniversary from Hanshin-Awaji Earthquake, the third United Nations "World Conference on Disaster Risk Reduction (WCDRR)" was held in Sendai City of Miyagi Prefecture in Japan, which is an affected area of Great East Japan Earthquake and Tsunami in March 2011. At the end of this conference, "Sendai Declaration" was adopted by the heads of state and government, ministers, and delegates

participating in the conference, and also the "Sendai Framework for Disaster Risk Reduction 2015–2030" was launched to enhance the efforts to strengthen disaster risk reduction as the follow-up to the "Hyogo Framework for Action (HFA) 2005–2015."

The Sendai Declaration states four points as follows (UNISDR 2015a):

(i) Declare the determination to enhance the efforts to strengthen disaster risk reduction to reduce disaster losses of lives and assets worldwide, recognizing the increasing impact of disasters and their complexity in many parts of the world.
(ii) It adopts the "Sendai Framework for Disaster Risk Reduction 2015–2030" to be strongly committed to its implementation as the guide to enhance our efforts for the future, based on valuing the important role played by the "Hyogo Framework for Action 2005–2015" having completed the assessment and review of and considered the experience gained under its implementation past 10 years.
(iii) It calls all stakeholders to action, aware that the realization of the new framework depends on our unceasing and tireless collective efforts to make the world safer from the risk of disasters in the decades to come for the benefit of the present and future generations.
(iv) It thanks the people and the government hosting the third WCDRR and to Japan for its commitment to advancing disaster risk reduction in the global development agenda.

The declaration requires all states to implement "Sendai Framework for Disaster Risk Reduction" as the new framework for global DRR action.

10.5.2 Synergy of ESD and DRR Through Sendai Framework for DRR

Sendai Framework for Disaster Risk Reduction consists of six sections: (i) Preamble, (ii) Expected outcome and goal, (iii) Guiding principles, (iv) Priorities for action, (v) Role of stakeholders, and (vi) International cooperation and global partnership. As a distinctive feature of the third framework, concrete global targets are set in the section of "Expected outcome and goal" to support the assessment of global progress in achieving the outcome and goal of this framework (UNISDR 2015b). The seven global targets are:

(a) Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020 and 2030 compared to 2005–2015.
(b) Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020 and 2030 compared to 2005–2015.

(c) Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030.
(d) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030.
(e) Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.
(f) Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030.
(g) Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030.

The Sendai Framework is also urging all states to implement four priorities for actions which were identified through WCDRR. The priorities for action are as follows:

Priority 1. Understanding disaster risk

Policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics, and the environment.

Priority 2. Strengthening disaster risk governance to manage disaster risk

Disaster risk governance at the national, regional, and global levels is of great importance for an effective and efficient management of disaster risk.

Priority 3. Investing in disaster risk reduction for resilience

Public and private investment in disaster risk prevention and reduction through structural and nonstructural measures is essential to enhance the economic, social, health, and cultural resilience of persons, communities, countries, and their assets, as well as the environment.

Priority 4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction

The steady growth of disaster risk, including the increase of people and assets exposure, combined with the lessons learned from past disasters, indicates the need to further strengthen disaster preparedness for response, take action in anticipation of events, integrate disaster risk reduction in response preparedness, and ensure that capacities are in place for effective response and recovery at all levels.

The third point of the framework is enhancing "Build Back Better" in recovery as well as disaster preparedness for effective response. This new concept of "Build Back Better" is similar to "Sustainable Development" in the context of post-disaster recovery, rehabilitation, and reconstruction. The framework empathizes to use post-disaster recovery and reconstruction to "Build Back Better" supported by strengthened modalities of international cooperation, setting as priority for action 4:

Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

With regard to the linkage between disaster risk reduction and sustainable development, states which participated in WCDRR reiterated their commitment to disaster risk reduction and the building of resilience to disasters to be addressed with a renewed sense of urgency in the context of sustainable development during the conference, based on the lessons learned, gaps identified, and future challenges from "The Hyogo Framework for Action." And, it is recalled that the outcome of the UN Conference on Sustainable Development 2012, "The Future We Want," called for disaster risk reduction and building of resilience to disasters to be addressed with a renewed sense of urgency in the context of sustainable development and poverty eradication and to be integrated at all levels. Moreover, the Sendai Framework for Disaster Risk Reduction states that effective disaster risk management contributes to sustainable development, and disaster risk reduction is essential to achieve sustainable development, under the recognition of "Disasters, many of which are exacerbated by climate change and increasing in frequency and intensity, significantly impede progress towards sustainable development" and "Ten years after the Hyogo Framework for Action, disasters still continue to undermine efforts to achieve sustainable development." Therefore, the framework is affirming that the development, strengthening, and implementation of relevant policies, plans, practices, and mechanisms need to aim at coherence across sustainable development and growth, food security, health and safety, climate change and variability, environmental management, and disaster risk reduction agendas at its guiding principles (Table 10.3).

Moreover, as priorities for action of "Understanding disaster risk" and "Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction," disaster risk reduction and its management should be based on an understanding of disaster risk in all its dimensions; therefore, education including learning and training would take a key role for not only disaster risk reduction but also reconstruction and building resilience, through the implementation of the Sendai Framework. Education would be a bridge between sustainable development and disaster risk reduction, which is significance of Education for Sustainable Development.

10.5.3 International Cooperation Through Sendai Framework for DRR

The Sendai Framework for Disaster Risk Reduction identifies modalities of cooperation based on commitments to implement a post-2015 framework for disaster risk reduction. Based on lessons learned, gaps identified, and future challenges from the Hyogo Framework for Action, the Sendai Framework analyzes at preamble:

Table 10.3 Related to sustainable development in Sendai Framework for Disaster Risk Reduction

Section of framework	Related to sustainable development
I. Preamble	2. States also reiterated their commitment to disaster risk reduction and the building of resilience to disasters to be addressed with a renewed sense of urgency in the context of *sustainable development* and poverty eradication
	The Hyogo Framework for Action: lessons learned, gaps identified, and future challenges
	3. Effective disaster risk management contributes to *sustainable development*
	4. Disasters, many of which are exacerbated by climate change and increasing in frequency and intensity, significantly impede progress toward *sustainable development*
	6. It is necessary to use post-disaster *recovery and reconstruction to "Build Back Better"* supported by strengthened modalities of international cooperation
	10. Ten years after the Hyogo Framework for Action, disasters continue to undermine efforts to achieve *sustainable development*
	12. It is recalled that the outcome of the *UN Conference on Sustainable Development 2012, "The Future We Want,"* which called for disaster risk reduction and building of resilience to disasters to be addressed with a renewed sense of urgency *in the context of sustainable development and poverty eradication* and to be integrated at all levels
	12. The Conference also reaffirms all the *principles of the Rio Declaration on environment and development*
III. Guiding principles	19-(h) The development, strengthening, and implementation of relevant policies, plans, practices, and mechanisms need to aim at coherence across *sustainable development and growth, food security, health and safety, climate change and variability, environmental management, and disaster risk reduction agendas*
	19-(h) Disaster risk reduction is essential to *achieve sustainable development*
	19-(j) Addressing underlying disaster risk factors through disaster risk-informed public and private investments *contributes to sustainable development*

(continued)

Table 10.3 (continued)

Section of framework	Related to sustainable development
IV. Priorities for action	20-1 Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction
	Priority 2. Strengthening disaster risk governance to manage disaster risk
	26. Strengthening disaster risk governance for prevention, mitigation, preparedness, response, recovery, and rehabilitation fosters collaboration and partnership across mechanisms and institutions for the implementation of instruments relevant to disaster risk reduction and *sustainable development*
	Global and regional levels
	28-(b) Foster collaboration across global and regional mechanisms and institutions for the implementation and coherence of instruments and tools relevant to disaster risk reduction, such as *for climate change, biodiversity, sustainable development, poverty eradication, environment, agriculture, health, food and nutrition, and others*
	28-(F) International voluntary mechanisms for monitoring and assessment of disaster risks may promote the exchange of nonsensitive information on disaster risks to the relevant national government bodies and stakeholders in *the interest of sustainable social and economic development*
	Priority 3. Investing in disaster risk reduction for resilience
	National and local levels
	30-(n) Strengthen the *sustainable use and management of ecosystems* and implement *integrated environmental and natural resource management approaches* that incorporate disaster risk reduction
	Global and regional levels
	31-(a) Promote coherence across systems, sectors, and organizations *related to sustainable development* and to disaster risk reduction in their policies, plans, programs, and processes
	31-(h) Strengthen and broaden *international efforts aimed at eradicating hunger and poverty* through disaster risk reduction
	Priority 4. Enhancing disaster preparedness for effective response and to "Build Back Better"
	32. Disasters have demonstrated that *the recovery, rehabilitation, and reconstruction phase is a critical opportunity to build back better*, including through integrating disaster risk reduction *into development measures*, making *nations and communities* resilient to disasters
	National and local levels
	33-(j) Integrate post-disaster reconstruction into *the economic and social sustainable development of affected areas*

(continued)

Table 10.3 (continued)

Section of framework	Related to sustainable development
VI. International cooperation and global partnership	*General considerations*
	42. The effects of disasters (in small island developing states), some of which have increased in intensity and have been exacerbated by climate change, impede *their progress toward sustainable development*
	44. Partnerships play an additional important role by harnessing the full potential of countries and supporting their national capacities in disaster risk management and in *improving the social, health, and economic well-being of individuals, communities, and countries*
	Means of implementation
	47-(d) Incorporate disaster risk reduction measures into *multilateral and bilateral development assistance programs* within and across all sectors related to *poverty reduction, sustainable development, natural resource management, environment, urban development, and adaptation to climate change*
	Support from international organizations
	48-(c) Supporting the *development of coherent global and regional follow-up and indicators* and in coordination with other relevant mechanisms for *sustainable development and climate change*
	48-(c) Participating actively in the work of the Inter-Agency and Expert Group on *sustainable development indicators*
	48-(f) The United Nations Global Compact, as the main United Nations initiative for engagement with the private sector and business, to further engage with and promote the critical importance of disaster risk reduction for *sustainable development and resilience*
	Follow-up actions
	49. The conference invites the general assembly, at its 70th session, to consider the possibility of including the review of the global progress in the implementation of this framework for disaster risk reduction as part of its integrated and coordinated follow-up processes to United Nations conferences and summits, aligned with the Economic and Social Council, the *high-level political forum for sustainable development*
	50. The development of a set of possible indicators to measure global progress in the implementation of this framework in conjunction with the work of the interagency expert group on *sustainable development indicators*

Main data from "Sendai Framework for Disaster Risk Reduction" (2015), analyzed by author
Underlines are related descriptions to "sustainable development"

(i) International mechanisms for strategic advice, coordination, and partnership development for disaster risk reduction, such as the Global Platform for Disaster Risk Reduction and the regional platforms for disaster risk reduction, as well as other relevant international and regional forums for cooperation, have been instrumental in the development of policies and strategies and the advancement of knowledge and mutual learning.
(ii) There is a need for the public and private sectors and civil society organizations, as well as academia and scientific and research institutions, to work more closely together and to create opportunities for collaboration.
(ii) International, regional, subregional, and transboundary cooperation remains pivotal in supporting the efforts of states, their national and local authorities, as well as communities and businesses to reduce disaster risk. (iv) To complement national action and capacity, there is a need to enhance international cooperation between developed and developing countries and between states and international organizations (UNISDR 2015b).

According to this review of Hyogo Framework for Action, the Sendai Framework for DRR also further enhances to establish various kinds of global and national cooperation, partnerships, and platforms for its implementation (Table 10.4).

Main ones are as follows:

(a) Enhance international cooperation between developed and developing countries and between states and international organizations to complement national action and capacity.
(b) Enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for the implementation of this framework by 2030.
(c) Each state has the primary responsibility to prevent and reduce disaster risk, including through international, regional, subregional, transboundary, and bilateral cooperation.
(d) Promote and improve dialogue and cooperation among scientific and technological communities, other relevant stakeholders, and policymakers in order to facilitate a science-policy interface for effective decision-making in disaster risk management.
(e) Enhance collaboration among people at the local level to disseminate disaster risk information through the involvement of community-based organizations and nongovernmental organizations
(f) Promote common efforts in partnership with the scientific and technological community, academia, and the private sector to establish, disseminate, and share good practices internationally.
(g) Establish and strengthen government coordination forums composed of relevant stakeholders at national and local levels, such as national and local platforms for disaster risk reduction.
(h) Engage in the Global Platform for Disaster Risk Reduction, the regional and subregional platforms for disaster risk reduction, and the thematic platforms in order to forge partnerships.

Table 10.4 Cooperation, partnership, and platform through Sendai Framework for Disaster Risk Reduction

Section of framework	Building cooperation, partnership, and platform for DRR
I. Preamble	2-(d) Identify modalities of *cooperation* based on commitments to implement a post-2015 framework for disaster risk reduction
	The Hyogo Framework for Action: lessons learned, gaps identified, and future challenges
	3. International mechanisms for strategic advice, coordination, and *partnership* development for disaster risk reduction, such as the *Global Platform for Disaster Risk Reduction* and the *regional platforms for disaster risk reduction*, as well as other relevant *international and regional forums* for *cooperation*, have been instrumental in the development of policies and strategies and the advancement of knowledge and mutual learning
	6. It is necessary to use post-disaster recovery and reconstruction to "Build Back Better" supported by strengthened modalities of *international cooperation*
	7. There is a need for the public and private sectors and civil society organizations, as well as academia and scientific and research institutions, to *work more closely together* and to *create opportunities for collaboration*
	8. *International, regional, subregional, and transboundary* cooperation remains pivotal in supporting the efforts of states, their national and local authorities, as well as communities and businesses to reduce disaster risk
	12. To complement national action and capacity, there is a need to *enhance international cooperation between developed and developing countries and between states and international organizations*
II. Expected outcome and goal	17. The pursuance of this goal requires the enhancement of the implementation capacity and capability of developing countries, including the mobilization of support *through international cooperation for the provision of means of implementation* in accordance with their national priorities
	17-(f) Enhance *international cooperation* to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030
III. Guiding principles	19-(a) Each state has the primary responsibility to prevent and reduce disaster risk, including *through international, regional, subregional, transboundary, and bilateral cooperation*
	19-(a) The extent to which developing countries are able to effectively enhance and implement national disaster risk reduction policies and measures can be further enhanced *through the provision of sustainable international cooperation*
	19-(d) Disaster risk reduction requires an *all-of-society engagement and partnership*
	19-(e) Disaster risk reduction and management depends on coordination mechanisms *within and across sectors and with relevant stakeholders at all levels*

(continued)

Table 10.4 (continued)

Section of framework	Building cooperation, partnership, and platform for DRR
IV. Priorities for action	22. In the context of increasing *global interdependence*, concerted *international cooperation*, an enabling international environment and means of implementation, is needed to stimulate and contribute to developing the knowledge, capacities, and motivation for disaster risk reduction at all levels
	Priority 1. Understanding disaster risk
	National and local levels
	24-(h) Promote and improve *dialogue and cooperation among scientific and technological communities, other relevant stakeholders, and policymakers* in order to facilitate a science-policy interface for effective decision-making in disaster risk management
	24-(o) Enhance *collaboration among people at the local level* to disseminate disaster risk information through the *involvement of community-based organizations and nongovernmental organizations*
	Global and regional levels
	25-(c) Promote and enhance through *international cooperation*, including technology transfer, access to, and the sharing and use of nonsensitive data, information, communications, and geospatial and space-based technologies and related services
	25-(d) Promote common efforts *in partnership with the scientific and technological community, academia, and the private sector* to establish, disseminate, and share good practices internationally
	Priority 2. Strengthening disaster risk governance to manage disaster risk
	26. Strengthening disaster risk governance for prevention, mitigation, preparedness, response, recovery, and rehabilitation fosters *collaboration and partnership across mechanisms and institutions* for the implementation of instruments relevant to disaster risk reduction and sustainable development
	National and local levels
	27-(g) Establish and strengthen *government coordination forums composed of relevant stakeholders at national and local levels*, such as *national and local platforms* for disaster risk reduction, and a designated national focal point for implementing the post-2015 framework
	27-(g) It is necessary for such mechanisms to have a strong foundation in national institutional frameworks with clearly

(continued)

Table 10.4 (continued)

Section of framework	Building cooperation, partnership, and platform for DRR
	assigned responsibilities and authority to *facilitate and support local multi-sectoral cooperation*
	Global and regional levels
	28-(a) Guide action at the regional level through agreed *regional and subregional strategies and mechanisms for cooperation for disaster risk reduction* in order to foster more efficient planning, create common information systems, and exchange good practices and programs *for cooperation* and capacity development
	28-(c) Actively engage in the *Global Platform for Disaster Risk Reduction*, the *regional and subregional platforms for disaster risk reduction*, and *the thematic platforms in order to forge partnerships*
	28-(c) Regional intergovernmental organizations should play an important role in *the regional platforms for disaster risk reduction*
	28-(d) Promote *transboundary cooperation to enable policy and planning* for the implementation of ecosystem-based approaches with regard to shared resources
	Priority 3. Investing in disaster risk reduction for resilience
	Global and regional levels
	31-(b) Promote the development and strengthening of disaster risk transfer and sharing mechanisms and instruments in *close cooperation with partners in the international community, business, international financial institutions, and other relevant stakeholders*
	31-(c) Promote *cooperation between academic, scientific, and research entities and networks and the private sector* to develop new products and services to help reduce disaster risk
	31-(e) Enhance *cooperation between health authorities and other relevant stakeholders* to strengthen country capacity for disaster risk management for health
	31-(f) Strengthen and promote *the collaboration and capacity building for the protection of productive assets*
	31-(i) Promote and support *collaboration among relevant public and private stakeholders to enhance the resilience of business* to disasters
	Priority 4. Enhancing disaster preparedness for effective response and to "Build Back Better"
	National and local levels
	33-(i) Promote *the cooperation of diverse institutions, multiple authorities, and related stakeholders at all levels* in view of the complex and costly nature of post-disaster reconstruction
	33-(p) Review and strengthen national laws and procedures on *international cooperation*, based on the guidelines for the

(continued)

Table 10.4 (continued)

Section of framework	Building cooperation, partnership, and platform for DRR
	domestic facilitation and regulation of international disaster relief and initial recovery assistance
	Global and regional levels
	34-(d) Enhance international mechanisms, such as the *International Recovery Platform*, for the sharing of experience and learning *among countries and all relevant stakeholders*
	34-(f) Support *regional cooperation to deal with disaster preparedness*, including through common exercise and drills
V. Role of stakeholders	36-(a) Civil society, volunteers, organized voluntary work organizations, and community-based organizations to participate, *in collaboration with public institutions*, to provide specific knowledge and pragmatic guidance in the context of the development and implementation of normative frameworks, standards, and plans for disaster risk reduction
	36-(b) *Academic, scientific, and research entities and networks* to focus on the disaster risk factors and scenarios
	36-(d) Media to disseminate accurate and nonsensitive disaster risk, hazard, and disaster information *in close cooperation with national authorities* and stimulate a culture of prevention and *strong community involvement*
	37. With reference to the General Assembly resolution 68/211 of 20 December 2013, commitments by relevant stakeholders are important to *identify modalities of cooperation and implement this framework*
	37. Those commitments should be specific and time bound in order *to support the development of partnerships at local, national, regional, and global levels*
VI. International cooperation and global partnership	*General considerations*
	38. Developing countries require enhanced provisions of means of implementation through *international cooperation and global partnership* for development, and continued *international support*, to strengthen their efforts to reduce disaster risk
	39. *International cooperation for disaster risk reduction* includes a variety of sources and is a critical element in supporting the efforts of developing countries to reduce disaster risk
	41. Such vulnerability (of developing countries) requires the *urgent strengthening of international cooperation and ensuring genuine and durable partnerships at the regional and international levels* in order to support developing countries to implement this framework in accordance with their national priorities and needs
	43. These challenges (related to enhancing resilience of infrastructure, health, and livelihoods) require increased

(continued)

Table 10.4 (continued)

Section of framework	Building cooperation, partnership, and platform for DRR
	international cooperation and the provision of adequate support to African countries, to allow for the implementation of this framework
	44. *North-South cooperation*, complemented by *South-South and triangular cooperation*, has proven to be key to reducing disaster risk, and there is a need to strengthen *cooperation in both areas* further
	45. Efforts by developing countries offering *South-South and triangular cooperation* should not reduce *North-South cooperation from developed countries* as they complement North-South cooperation
	Means of implementation
	47-(c) Promote the use and expansion of *thematic platforms of cooperation such as global technology pools and global systems* to share know-how, innovation, and research and to ensure access to technology and information in disaster risk reduction
	Support from international organizations
	48-(c) Convening the *Global Platform for Disaster Risk Reduction* and supporting the organization of *regional platforms* for disaster risk reduction *in cooperation with regional organizations*
	48-(i) The united cities and local government organization and other relevant bodies of local governments to continue supporting *cooperation and mutual learning among local governments* for disaster risk reduction and the implementation of this framework
	Follow-up actions
	49. Taking into account the contributions of the *Global Platform for Disaster Risk Reduction* and *regional platforms for disaster risk reduction* and the Hyogo Framework for Action Monitor

Main data from "Sendai Framework for Disaster Risk Reduction" (2015), analyzed by author
Underlines are related descriptions to "corporation, partnership, and platform"

(i) Promote the development and strengthening of disaster risk transfer and sharing mechanisms and instruments in close cooperation with partners in the international community, business, international financial institutions, and other relevant stakeholders.
(j) Promote cooperation between academic, scientific and research entities and networks, and the private sector to develop new products and services to help reduce disaster risk.
(k) Enhance cooperation between health authorities and other relevant stakeholders to strengthen country capacity for disaster risk management for health.

(l) Promote the cooperation of diverse institutions, multiple authorities, and related stakeholders at all levels in view of the complex and costly nature of post-disaster reconstruction.
(m) Enhance international mechanisms, such as the International Recovery Platform, for the sharing of experience and learning among countries and all relevant stakeholders.
(n) Civil society, volunteers, organized voluntary work organizations, and community-based organizations to participate, in collaboration with public institutions, to provide specific knowledge and pragmatic guidance.
(o) North-South cooperation, complemented by South-South and triangular cooperation, has proven to be key to reducing disaster risk.
(p) Promote the use and expansion of thematic platforms of cooperation such as global technology pools and global systems to share know-how, innovation, and research and to ensure access to technology and information in disaster risk reduction.

As described above, in the Sendai Framework, disaster risk reduction, recovery and reconstruction process which is called as "Build Back Better," and building resilience should be recognized and renewed in the context of sustainable development, and it is empathized that disaster risk reduction is essential to achieve sustainable development. To realize it effectively, the framework also reaffirms that DRR education, learning, and training should take a crucial role through various cooperation and partnerships by states, institutions, organizations, and multi-stakeholders at the local and global level.

10.6 Building ESD Consortium for Promoting ESD Post-2015

Since FY 2014, the Ministry of Education, Culture, Sports, Science and Technology in Japan (MEXT) has launched the "ESD Promotion Project for Fostering Global Human Resource" to sustain ESD beyond DESD. This project aims to foster citizens who have global perspectives through advocating ESD not only to UNESCO School but also other sectors and stakeholders and promoting the exchange of UNESCO School at national and international level by establishing ESD regional consortiums which the board of education and university as main stakeholders organize with UNESCO Schools in regions and implementing ESD at each region (MEXT 2014a).

10.6.1 Structure of ESD Consortium by MEXT

The ESD consortium is expected to consist of multi-stakeholders such as city board of education, UNESCO Schools, universities and business enterprises especially. In addition, prefectural board of education, UNESCO Associations, non-formal education institutions and sectors, and UNESCO Club are also invited to consortiums as many as possible (Fig. 10.2).

Expected activities and mission of the ESD consortium are as follows:

(a) Exchange and collaboration among UNESCO Schools at regional, national, and international level
(b) Implementation of ESD activities at non-UNESCO Schools
(c) Collaboration with nonformal education institutions and sectors
(d) Public presentation to share the results inside and outside of the region
(e) Linkage with prefectural board of education
(f) Drawing up the concrete plan to sustain the function of consortium after the term of budget support by MEXT

Each consortium has to set an "ESD coordinator" to organize consortium and implement ESD activities and mission above. The coordinator takes a key role to promote and expand the consortium involving stakeholders and sectors in each region.

There are three types of ESD consortiums: (a) Prefectural Board of Education as a representative organizes consortium which consists of the Municipal Board of

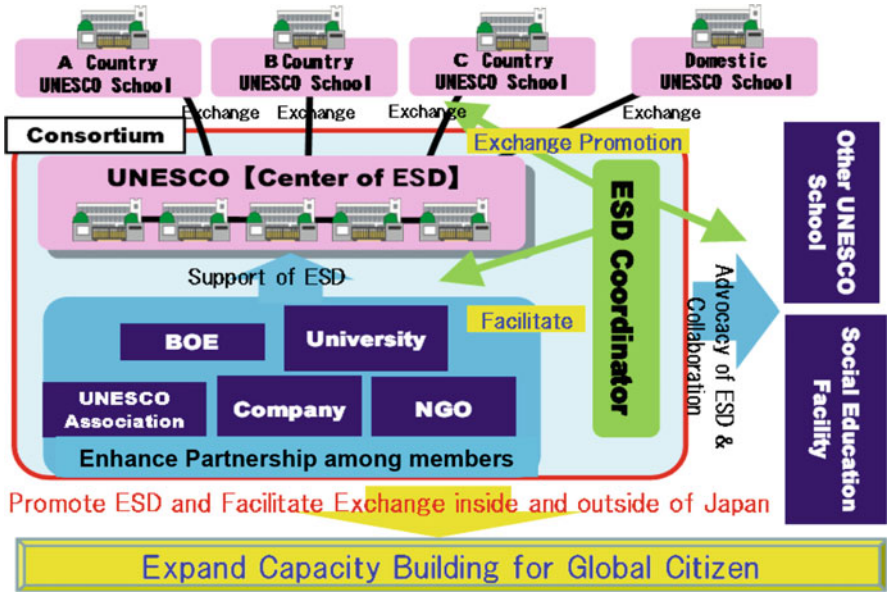

Fig. 10.2 Structure of ESD consortium (Source from MEXT 2014)

Table 10.5 Theme of ESD consortium (2014)

Representative	Region	Themes of consortium
Miyagi University of Education	Tohoku Area	Fostering global citizens and creating ESD regional model based on natural environment, DRR, and global collaboration in Tohoku
Kanazawa University	Hokuriku Area	ESD promotion by establishment knowledge base in Hokuriku Area
Mie University	Mie Prefecture	UNESCO school consortium of Mie brand
Nara University of Education	Kansai Area	ESD promotion through establishing ESD consortium and exchange among UNESCO school for fostering global citizens
Omuta City Board of Education	Fukuoka Prefecture	ESD promotion for fostering global citizens

Education in the prefecture, a university, enterprises and NPO, etc., as composition members; (b) university as a representative organizes consortium which consists of some Municipal Board of Education, enterprises and NPO, etc., as composition members; (c) Municipal Board of Education as a representative organizes consortium which consists of a university, enterprises and NPO, etc., as composition members.

In FY 2014, MEXT acknowledged five ESD consortiums in five regions: (i) Miyagi University of Education (Tohoku area), (ii) Kanazawa University (Hokuriku area), (iii) Mie University (Tokai area), (iv) Nara University of Education (Kansai area), and (v) Omuta City Board of Education (Kyushu area). They are building and promoting characteristic consortiums and implementing original ESD activities utilizing many kinds of resources and networks based on each region (Table 10.5).

The themes of each consortium are as follows:

10.6.2 Establishing ESD Tohoku Consortium and Its Practice

Tohoku region, especially Miyagi Prefecture, is an active region for promoting ESD the past 10 years during the UN Decade of ESD. Greater Sendai area which consists of Sendai City, Kesennuma City, and Ohsaki City – Shiroishi and Shichigashuku area was also joined in 2008 – was acknowledged as "Regional Centres of Expertise (RCEs) on ESD" by the United Nations University in 2005. It is one of the first groups of RCEs in the world that is called "Initial Seven RCEs." After the acknowledgment of RCE, this area is promoting ESD based on community and region, utilizing rich nature and resource, and establishing multi-stakeholder network as a model region of ESD promotion in Japan and the world as well as Okayama City.

Kesennuma City which is one of the Greater Sendai RCEs is very famous as an advanced city for ESD promotion in formal education. Since 2002, the schools in Kesennuma City have developed innovative ESD curriculum and implemented ESD practice collaborating with various sectors and institutions in the community and abroad. Since 2008, under the leadership of the Kesennuma City Board of Education, almost all the schools in Kesennuma have promoted ESD being acknowledged as UNESCO School, and in 2014 all elementary and junior high schools became UNESCO School along with some kindergarten and high schools. That is the first case as whole-city approach to promote ESD and UNESCO School in Japan, and it has been the leading ESD practice of formal education in Japan during DESD (Interministerial Meeting on UN-DESD 2014).

However, overlooking the whole Tohoku region, there are gaps for ESD promotion among each city and prefecture. For example, in 2015, Tohoku region has 87 UNESCO Schools in total, but 76 UNESCO Schools concentrate to Miyagi Prefecture, and the half of those schools belong to Kesennuma City (MEXT 2014b). It cannot be said that the recognition to ESD is high in not only formal but also nonformal and informal education in Tohoku region except some of the cities in Miyagi Prefecture. Therefore, ESD must be spreading to all prefectures and many cities in Tohoku region to sustain ESD and develop new momentum beyond DESD.

To realize this mission, Miyagi University of Education which is one of the UNESCO Schools and the secretariat of Greater Sendai RCE applied to "ESD Promotion Project for Fostering Global Human Resource" with the theme of "Fostering Global Citizens and Creating ESD Regional Model Based on Natural Environment, Disaster Risk Reduction, and Global Collaboration in Tohoku Region" and was acknowledged by MEXT in July 2014. Miyagi University of Education launched this project as "ESD/UNESCO School Tohoku Consortium" and tackled on building ESD consortium in Tohoku involving various sectors and stakeholders. Tohoku Consortium consists of UNESCO School in Tohoku (87 schools), some of the board of education in Tohoku, UNESCO associations, enterprises, nonformal education sectors like zoo, and the composition members of Greater Sendai RCE such as city and prefectural government, NGO/NPO, etc. Miyagi University of Education is organizing the consortium as the secretariat and organizer. The United Nations University (UNU), National Federation of UNESCO Associations in Japan (NFUAJ), and Asia-Pacific Cultural Centre for UNESCO (ACCU) are also invited to Tohoku Consortium as advisory members to connect the consortium to other ESD projects and initiatives at national and international level. Thus the composition members of ESD/UNESCO School Tohoku Consortium will be more than 130 stakeholders and sectors. Through the platform of this consortium, these composition members can share information and their practices to each other within the consortium, and they are able to promote the exchange programs and cooperation with consortiums in other regions and the counterparts in foreign countries such as UNESCO Schools (Fig. 10.3).

However, it is very difficult to involve multi-stakeholders and organize the network to function effectively because Tohoku is a very extensive region and there is a wide range of initiative and activities. To establish an ESD consortium

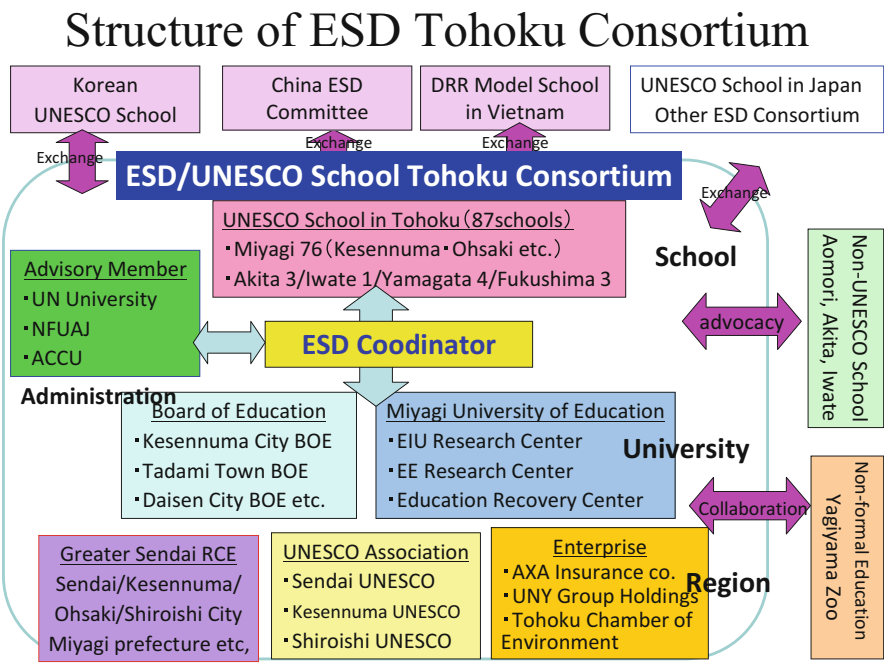

Fig. 10.3 Structure of ESD/UNESCO School Tohoku Consortium

like in this region, it is crucial to respect the diversity of characteristics and backgrounds of each prefecture and city in Tohoku. Therefore, on the process of building up the consortium, multilayer method should be taken into consideration. There are three layers to build up: the first layer is the city-level consortium, the second layer is regional consortium which is the Tohoku Consortium, and the third layer is domestic and international consortium or exchange network. As for the city-level consortium, there are various practices and activities related to ESD, utilizing rich natural and cultural resources in Tohoku, such as the World Natural Heritage Site in Shirakami Mts., World Cultural Heritage Site in Hiraizumi Town, UNESCO Eco Park in Tadami Town, Slow Food Movement in Kesennuma City, Ramsar Convention in Ohsaki City, etc. Respecting these existing practices or initiatives based on precious resources, it is necessary to build city- or town-level consortium in some of cities as satellites are of ESD promotion not only in Miyagi prefecture but also in the whole Tohoku region. At the next step, gathering these characteristic initiatives in Tohoku to the regional consortium, it facilitates to communicate each other and link together, and it is possible to share and scale up their activities for promoting ESD. Through this process, regional consortium is establishing.

This regional consortium also facilitates to access to other consortiums in other regions and to initiatives in foreign countries. This linkage fosters the exchange and cooperation at domestic and international level. As a result, ESD consortium

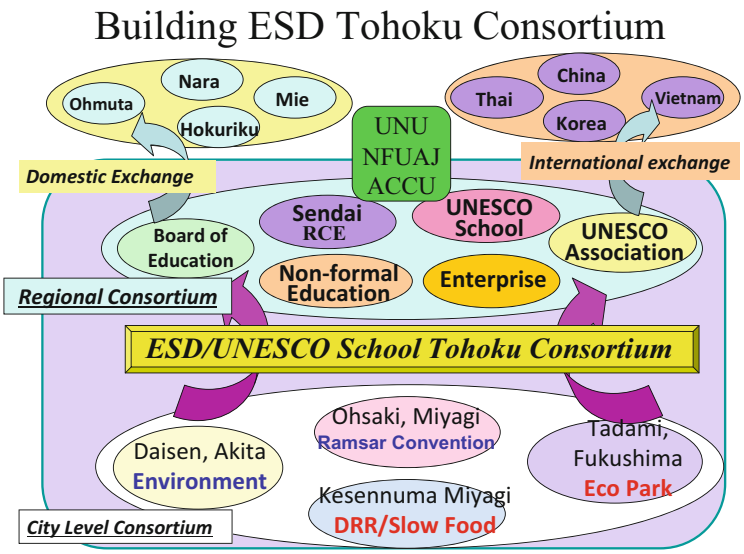

Fig. 10.4 Building the Tohoku Consortium by multilayer method

expands possibility of ESD promotion and collaboration through the process of building up the consortium from locally to globally (Fig. 10.4).

10.7 Conclusion

The United Nations Education for Sustainable Development (UN-DESD) ended in 2014, and Hyogo Framework for Action also ends in 2015. However, new momentum of ESD and DRR are emerging by new frameworks and proposals in the world, also in Japan.

Aichi-Nagoya Declaration emphasizes the importance of international and intersectoral cooperation to create platforms for sharing experiences and to strengthen monitoring and evaluation approaches. Aichi-Nagoya Declaration is also affirming the necessity of integrated, interdisciplinary, and interregional approach to promote ESD by multi-stakeholders' commitments. Moreover, the declaration is enforcing to put ESD into the next global framework and action for sustainable development, reflecting and strengthening ESD in the post-2015 agenda and its follow-up processes, such as the "Muscat Agreement," "Global Action Programme (GAP) on ESD," and "Sustainable Development Goals (SDGs). Global Action Programme (GAP) as a follow-up to the DESD identified concerned stakeholders to commit ESD promotion and their missions, actions, and outcomes as five priority action areas. It also urges inter-sectoral cooperation among concerned stakeholders locally

and globally. It will function as a new framework of ESD promotion from the local level to global level post-2015.

On the other hand, "Sendai Declaration" and "Sendai Framework for Disaster Risk Reduction 2015–2030" were launched in the World Conference on Disaster Risk Reduction (WCDRR) held in Sendai City, 2015, in order to enhance the efforts to strengthen disaster risk reduction as the follow-up to "Hyogo Framework for Action (HFA) 2005–2015." In this new framework for DRR, recovery and reconstruction process to "Build Back Better" and building resilience should be recognized and renewed in the context of sustainable development, and disaster risk reduction is essential to achieve sustainable development. The framework is also urging to establish various cooperation and partnerships by states, institutions, organizations, and multi-stakeholders at local and global level for disaster risk reduction and reconstruction and reaffirming the importance of DRR education including learning and training which should take a crucial role for not only disaster risk reduction but also reconstruction and building resilience, through the implementation of the framework.

ESD Consortium Project launched by MEXT will open the possibility of new ESD promotion system based on each region. Utilizing various resources and involving multi-stakeholders in regions, ESD consortium can be established and it is expanding from city-level to regional-level and to national-level consortiums as multilayer spreading like Tohoku ESD Consortium. Furthermore, promoting international exchanges through this ESD consortium, international cooperation with foreign initiatives is accelerated for sustainable development in the future through ESD and DRR.

Thus, education would be a bridge between sustainable development and disaster risk reduction, which is the significance of "Education for Sustainable Development" (ESD) through various cooperation and participation among diverse actors.

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Chapter 11
Role of International NGOs in Education Sector Recovery in Japan

Aiko Sakurai

Abstract After the Great East Japan Earthquake, Japan received international assistance. In the education sector, major international children's support organizations helped the Japanese schoolchildren to return to schools as early as possible and to secure their safe and healthy learning environment. Though they have been actively involved in many educational recovery operations in post-disaster countries, it was the first time in almost 50 years that disaster recovery operations by these organizations were conducted in Japan. This chapter found that those international child-support organizations played supplemental roles to respect the Japanese educational structure and ownership of the Japanese school. At the same time, they introduced internationally experienced "child-centered" approaches in the Japanese education sector. These supports were realized through abundant global financial contributions, which they independently decided to use, along with building a capable and trustful team among the internationally experienced and locally familiarized Japanese staff. The involvement of international child-support organizations had the potential to strengthen the governance and resilience of the Japanese education sector by encouraging the educational authorities to collaborate with external organizations. Challenges include how to support local civic organizations to continue to work on the ground to maintain working relationships with schools after their support programs have ended.

Keywords Education recovery • Humanitarian assistance • Child-centered approach • Governance • The 2011 Great East Japan Earthquake and Tsunami

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11.1 International Humanitarian Assistance for Disaster Response and Recovery

When a disaster occurs in developing countries, the United Nations and international humanitarian assistance organizations coordinate with the affected government to provide emergency and humanitarian assistance. At a time of disaster, government functions often become paralyzed and limited, so external actors play greater roles in taking immediate actions for search and rescue operations. During such an emergency period, relationships between donors and recipients have a greater impact on the affected society than assistance during a normal period (Kuwana 2012a).

Securing transparency, accountability, and quality of emergency assistance is an important issue for humanitarian assistance because intense and great amounts of financial support are raised in the name of a humanitarian crisis after conflict or disaster. Based on actual experiences and lessons learned, the international humanitarian community has strengthened rules and established standards and procedures, including the Code of Conduct for the International Red Cross and Red Crescent Movement and Nongovernmental Organizations (NGOs) in Disaster Relief, the Sphere Project, the Humanitarian Accountability Partnership (HAP), and the Active Learning Network for Accountability and Performance in Humanitarian Action (ALNAP).

The Tsunami Evaluation Coalition (TEC) was established to identify lessons learned after the 2004 Indian Ocean Tsunami response, and it conducted evaluations on five areas that were recognized as weaknesses of international humanitarian assistance, including (i) the coordination of international assistance to the tsunami-affected countries; (ii) the roles of a needs assessment in the tsunami response; (iii) the impact on capacities of the tsunami-affected countries and communities; (iv) a linkage among emergency assistance, recovery, and development in the post-tsunami response; and (v) financial provisions for tsunami response assistance. Their reports concluded that the humanitarian aid community needed to go about its business in a different way and it needed to concede ownership of the response to the affected population and become accountable to them (TEC 2007).

For the provision of effective international humanitarian assistance with coordination, the cluster approach was introduced in 2005 as part of humanitarian reform. The clusters were formulated among the affected governments, international organizations, and NGOs in the 11 relevant fields of agriculture, camp coordination and operation, early recovery, education, emergency shelter, emergency communication, health, logistics, nutrition, protection, and water and sanitation. In each cluster, a leading agency is assigned to coordinate with clear roles and responsibilities. For example, UNICEF and Save the Children are co-chairs of the education cluster.

The cluster approach has been continuously evaluated since its introduction in 2005. The 2010 evaluation identified challenges as well as improvements and

benefits in the context of humanitarian reform based on six country studies in Chad, the Democratic Republic of Congo, Haiti, Myanmar, the occupied Palestinian territory, and Uganda. Coverage of humanitarian needs has improved, and duplications of humanitarian assistance were reduced. Partnerships between UN agencies and other international actors have become stronger. The planning and quality of proposals for major funding appeals were improved. On the other hand, the report pointed out that clusters largely excluded national and local actors and often failed to link with, build on, or support existing coordination and response mechanisms. As a result, the report concluded that the introduction of clusters has weakened in several cases of national and local ownership and capacities due to the lack of a participatory approach.

The international community has been making efforts for further improvements to deliver better humanitarian assistance. From their experiences, it has become obvious how to support an increase in the ownership of the affected government and communities.

11.2 International Assistance for the 2011 GEJET Disaster in Japan

Contrary to disaster responses in developing countries, Japan has established a strong disaster management governance, and it has actively played a role as a donor and provider of assistance in emergency recovery across the world. During the 2011 Great East Japan Earthquake and Tsunami (GEJET), Japan was put in a position to receive assistance from across the world. More than 60 % of assistance came through private networks (i.e., through corporations, NGOs, community-based organizations) rather than public channels. Private contributions were managed by the Red Cross and Red Crescent Movement, NGOs, private corporations, foundations, and other various organizations. These trends were observed at a time of disaster in developing countries, but it occurred in Japan during the 2011 disaster (IDC 2013).

The differences between disaster responses in developing countries and in developed countries were discussed in the process of evaluating the GEJET assistance in Japan (Tajima 2013; IDC 2013; JANIC 2012; Sakurai 2013). Figure 11.1 shows the difference in support by degree of governance as the horizontal axis and the degree of external involvement as the vertical axis. In the diagram, international nongovernmental organizations (INGOs) are positioned in the middle at the border, as they could be involved in both cases due to their nongovernmental and nonprofit statuses. In a country where governance is weak, INGOs could be part of cluster structures with UN agencies. In a country where governance is strong, as seen during the 2011 GEJET, they could be involved as NGOs without the affected country's request. Having such advantages of organizational flexibility and

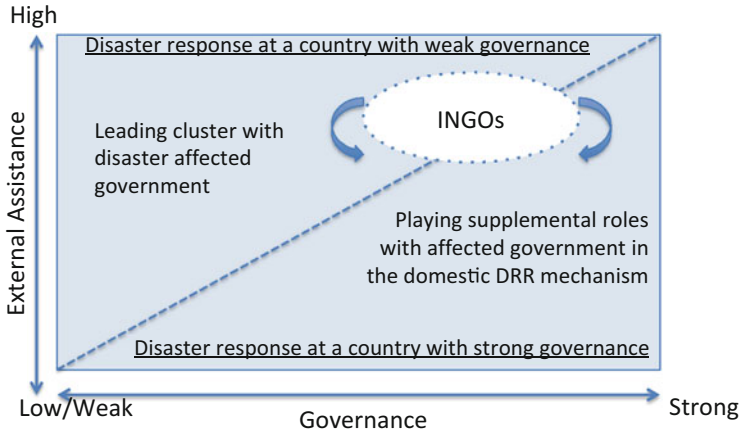

Fig. 11.1 Positioning of INGOs in disaster response (Source: Created and modified by the author based on Tajima 2013)

capacities to raise donations and charity globally, these INGOs now bear greater roles in the field for further improvements to disaster recovery assistance in the world.

Among the private flow of contributions, major international NGOs, such as Save the Children (SC), World Vision (WV), Plan, and UNICEF, were included. UNICEF is included with other international NGOs here. Though UNICEF is a UN agency and could not have been officially involved as a UN agency without a request from the Japanese government, it could have operated in Japan through the Japan Committee for UNICEF. The committee for UNICEF raised funding through a charity campaign at its 36 committee offices across the world, and the UNICEF headquarter dispatched 12 Japanese UNICEF staff to support the Japan Committee for UNICEF (JCU) during emergency periods to the GEJET-affected areas. The 2011 disaster was a first-time operation in Japan for UNICEF and World Vision since the post-WWII period, and this was a first-time experience for SC and Plan in Japan.

Instead of establishing a cluster, they conducted their operation in Japan through their Japanese entities. Their Japanese organizations held the status of a nonprofit organization, a public interest-incorporated association, or a public interest-incorporated foundation in the Japanese legislation system. Therefore, this chapter refers to these international child-support organizations as INGOs.

This chapter examines the roles of these INGOs as focused in the recovery of the education sector in the areas affected by the GEJET disaster. The analyses are based on literature reviews, information on each organization's webpage, and interviews with persons at the organizations, and they are based on the author's experiences working for the 2011 GEJET recovery assistance program. As large-scale international contributions were mobilized to the 2011 GEJET, it is worthwhile to evaluate their disaster recovery operation. The analyses could contribute to providing

insights into how to increase the Japanese capacity as a recipient and how to improve assistance to children as a disaster-vulnerable group and change agents. It could also contribute to the enhanced disaster risk governance of the Japanese education sector with more diversified actor participation.

11.3 Role of INGOs to Support Education Recovery in the Areas Affected by the 2011 GEJET

The strengths of INGOs in the GEJET disaster recovery assistance were already identified as follows in previous studies: (i) accumulated international experiences in emergency response, (ii) holding networks to support the provision of emergency activities at a time of disaster, (iii) the fundraising capacity to respond to emergency response, and (iv) the capacity to dispatch staff for longer periods to the affected areas (JANIC 2012; Kuroda 2013; Kuwana 2012b; IDC 2013). At the same time, the weaknesses of NGOs in the Japanese disaster risk reduction governance are also found. These include the lack of a mechanism of coordination and collaboration between NGOs and municipal governments, as well as among NGOs; a lack of awareness among NGO staff of international minimum standards of humanitarian assistance; and a lack of collaboration with private business entities (Ishii 2013). In addition, there was no information platform to gather international assistance for the GEJET-affected areas at the early stage of recovery before the UN-led cluster system was established. It was hard to identify comprehensively what was done by which organization in which field (IDC 2013). These resulted in lack of comprehensive Post Disaster Needs Assessments (PDNAs) (CAO, JICA, ESCAP 2011).

Table 11.1 shows a summary of the 2011 GEJET disaster recovery program by WV, SC, and the JCU as major international child-support organizations. They supported schools' early recovery and children's continuing education. Major activities included the provision of stationeries and school bags to children, supporting a school lunch program, providing school buses and other transportation supports for commuting to school and for extracurricular and sports activities, and the provision of mental and psychosocial care to the affected children and their caregivers. They followed the Inter-Agency Network for Education in Emergencies (INEE) Minimum Standards for Education (INEE 2010) when providing their support. Among the INEE's domains in access and learning environments, teaching and learning, teachers and other education personnel, and education policy, their areas of support were mainly related to access and the learning environment. Other areas were taken care of by boards of education.

Table 11.1 Summary of the 2011 GEJET disaster response program by major international child-support organizations

	World vision Japan	Save the children Japan	Japan committee for UNICEF
Period	3 years (2011–2014)	5 years (2011–2016)	
Funding amount	4388.07 million JPY	78 million USD (budgeted as of September 2011)	4850.896 million JPY
	71 % from global offices	58 % of total spending for education by the end of March 2012	25 % from other association offices
			Donation campaign ended at the end of March 2013
			54 % of funding spent for education by the end of March 2014
Activities	1. Emergency phase	1. Supporting emergency	1. Providing emergency goods
	Distribution of emergency goods	Providing child-friendly spaces	2. Health and nutrition
	Supporting community kitchens, mental care for children, children going *back to school,* side dishes for school lunches, and school bus services	Supporting children going back to school	Supporting *school lunch*
	2. Recovery phase	2. Education and DRR	3. Education
	(a) *Supporting children* by:	Providing temporary toilets, stationeries, classroom furniture, and school equipment	Back to school/ kindergarten
	Providing child-friendly spaces and an after-school children's club	Supporting transportation services to school, athletic fields, and events	Reconstruction and rehabilitation of preschool facilities
	Supporting the expansion of school lunch kitchen facilities	Supporting online tutoring learning and science programs	Supporting athletic events for junior high and high schools
	Listening to children's voices on reconstruction	Developing disaster education materials and training for teachers	4. Psychosocial care
	2. Supporting employment and income improvements	3. Child protection	5. Child protection
	3. Supporting disaster preparedness in schools and communities	Supporting the construction of after-school care centers and training for caregivers	6. Child-friendly reconstruction planning
	4. Supporting community recovery at temporary housing	4. Child-friendly support	

(continued)

Table 11.1 (continued)

	World vision Japan	Save the children Japan	Japan committee for UNICEF
	sites and in their neighborhoods		
	5. Supporting Fukushima evacuees	Supporting children's voices regarding reconstruction	
		5. Community initiative	
		Supporting PTAs and children's sports activities	

Source: Created by the author based on each organization's homepage and activity reports (Plan 2012, Save the Children 2011, 2012, World Vision 2012a, b, and Japan Committee for UNICEF 2014)

11.3.1 Supporting Early Educational Recovery with the Boards of Education (BOE)

International child-support organizations collaborated with local and municipal boards of education and played a supplemental role in supporting affected schools and children during emergency and recovery phases. As educational authorities faced difficulties in supporting affected schools during emergency periods because municipal governments alongside coastal areas were also damaged by the 2011 GEJET disaster, municipal boards of education did not have enough resources to collect information and update the latest situation periodically. Boards of education also needed to follow standardized procedures and an equality principle in applying related laws and regulations, coordination among the prefectural and central governments, and coordination with legislature. Therefore, municipal boards of education in coastal areas could not respond immediately and flexibly to the affected schools and children. In such situations, these organizations could visit affected schools with their own transportation and communication measures, identify the needs of the affected school and children, and provide assistance.

11.3.2 Donor Coordination

In Miyagi Prefecture, a "child-support meeting" played the role of donor coordination. This was one of very few successful examples of coordination in the GEJET disaster recovery efforts (Ishii 2013). The "child-support meeting" was led by the sports and health unit of Miyagi Prefecture Board of Education and major NGOs to support schoolchildren's participation in the meetings to discuss a basic direction of support and to coordinate their support areas and activities. During emergency periods, they supported a large-scale back-to-school campaign in the affected prefectures that provided stationeries and school bags to the affected children, which is

a common program in international humanitarian assistance. In the provision of school items, the Japanese disaster-relief standards were respected regarding to whom the assistance should be delivered and what kinds of items should be provided. While the repair and reconstruction of damaged primary and junior high school facilities and the building of temporary classrooms were fully taken care of by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), these NGOs supported the boards of education and purchased classroom furniture, school equipment, and equipment for gymnasiums until schools were finally moved back to permanent school facilities. For the provision of school equipment, they coordinated among themselves and decided which areas would be supported by which organizations.

11.3.3 Provision of Flexible and Speedy Support to Emerging Needs

In addition to respecting the existing governance system and regulations of the Japanese education sector and collaborating with local and municipal boards of education, INGOs provided flexible and speedy support to schools, to which educational authorities could not respond before the official support became ready.

After the 2011 earthquake and tsunami, in addition to the fact that many schools were used for evacuation shelters, school playgrounds were occupied with temporary housing. Even though classrooms were kept as children's learning facilities, gymnasiums were occupied by evacuees for longer periods. As a result, children's athletic opportunities were limited, and concern grew regarding the influence on their physical health. Local railroad networks were completely destroyed in coastal areas. Many high school students could not commute to their schools without the railroads. Parents lost their cars and could not support their children's transportation. Tsunami-affected children faced difficulties in attending school. For these children, they provided bus transportation until the official support became ready to take over these supports.

Overseas humanitarian aid experiences were utilized in the Japanese situation. In addition to school classrooms, school kitchen facilities were also damaged by the tsunami. In Miyagi Prefecture, 45 of 671 school kitchen facilities were damaged. As a result, schools could not offer lunches, even after classes resumed. Based on the request from the municipal boards of education, the JCU, SC, and WV supported a school meal program, which was supported at schools in developing countries. This contributed to maintaining children's learning hours and supporting children's health and nutrition. WV also supported the expansions of school kitchen capacities.

11.3.4 Supporting Children Holistically

In the existing administrative structure of the municipal government, boards of education are responsible for public educational organizations from kindergarten to primary and junior high schools. Nursery schools and after-school care services are under the welfare division of the government. High schools are under the responsibility of the Prefecture Boards of Education. On the contrary, international child-support organizations reached children holistically beyond the administrative structure. They also reached children as much as possible, where official and other sources of supports could not be coordinated easily. For example, the JCU supported the reconstruction and rehabilitation of both kindergarten and nursery school facilities.

SC, WV, and the JCU supported the construction of after-school child-care facilities and provided skills training for caregivers at these facilities. These helped children to have a space in which to feel safe and comfortable. Support for the quality of care at after-school facilities was emphasized by these INGOs.

They also supported schoolchildren and their parents in relation to extracurricular activities. Though extracurricular activities are normally supported by parents, parents affected by the disaster could not afford extending their financial support. The JCU supported junior high and high school students in Miyagi and Iwate prefectures to participate in interscholastic athletic competition events. SC supported Parent-Teacher Associations (PTA) and children's sports clubs by providing a small grant to cover the costs of sports-related equipment and goods with financial contributions from major businesses.

While closely working with official educational authorities, SC collaborated with private businesses to support specialized high school students by setting up scholarship programs for students in agricultural and fishery high schools. The idea of the scholarships was to target students who could contribute to the recovery of the local agriculture and fishery industries though grant-based scholarships.

11.3.5 Introduction of Child-Centered Support in Disaster Response and Recovery

The shortage of attention paid to vulnerable groups, such as women, the elderly, and children, during the emergency was pointed out as one of the weaknesses of the Japanese disaster response (Ranghieri and Ishiwatari 2014). With the involvement of INGOs, these weaknesses were found by comparing the Japanese situation to global standards. During emergency periods, the JCU, Plan, and SC provided "child-friendly spaces" at school evacuation shelters and temporary housing complexes for children to play while their parents were away from the shelters during the daytime. In addition to supporting children as a vulnerable group, they supported children in speaking their opinions on reconstruction as active agents of change.

As the Sendai Framework of Disaster Risk Reduction 2015–2030 emphasized, "children and youth are agents of changes and should be given the space and modalities to contribute to disaster risk reduction" (UNISDR 2015). "Child-centered disaster risk reduction" is a flexible rights-based approach combining child-focused (for children) and child-led (by children) activities, with interventions geared toward bringing about change among community, local, and national duty bearers (Plan 2010). To encourage children's participation in the reconstruction process, WV was deeply committed to supporting junior leaders' activities to voice the ideas of children and youth in the reconstruction of Minamisanriku town, Miyagi Prefecture, with community-based volunteer groups and the city boards of education. The JCU and SC collaborated with an academic society, disaster and city-planning experts, and municipal boards of education to support schoolchildren in primary and junior high schools in the affected areas to learn from the disaster experiences of their community and think about the future of their community.

11.4 Discussion and Conclusion

A previous study identified that civil society organizations (CSOs) played a critical role in the education sector during post-disaster recovery in India and Myanmar. Through their unique roles as CSOs, they could fill the gap in ensuring recovery programs remain inclusive of those that are "unreachable," as CSOs may have a limited direct intervention in restoring formal education systems (Gupta 2014). Contrary to developing countries and small-scale civil society organizations, what did the large-scale international child-support organizations bring through their disaster recovery programs to recover the education sector in the GEJET disaster-affected areas?

First, due to the unprecedented scale of disaster damages, the 2011 GEJET disaster brought first-time opportunities for both INGOs, especially for child-support organizations, and the education sector to work together toward the same goal of supporting education sector recovery. The processes of the recovery and reconstruction of the education sector following the GEJET disaster were led by the educational authorities, as described in detail in Chap. 2. Though the disaster also affected the municipal boards of education, they continued to be major players, leading the education sector recovery. INGOs played a supplemental role through coordination between Prefecture BOE and municipal BOEs, coordination between these municipal BOEs and schools and among themselves. Through their involvement, INGOs identified local needs of bus transportation services for schoolchildren and provision of school lunch program. They identified new emerging needs. With INGOs support, beyond school hours and school curriculum, children and their parents could be supported for participation in extracurricular activities and after-school care services. In addition, international practices based on a child-centered approach were introduced to the Japanese educational sector in the post-disaster period, such as creating child-friendly spaces and listening to

children's opinions on reconstruction. Collaboration with the private sector for educational recovery was enhanced in the education sector. INGOs realized support for affected children in areas where official education authorities could not be fully reached.

How could these supports be realized in the education sector in the GEJET disaster recovery? It might be first attributed to the *combination of the strong governance of the Japanese education sector and the existence of experienced NGOs in disaster recovery support*. Both sides understood well what should be done, as well as what could not have been done at the time of the emergency. INGOs had the experience to support school and children's education during emergencies based on the international standards developed by the INEE. Therefore, when INGO staff visited affected areas by their own arrangement, they could collect information, identify the needs of schools and children, and share their findings with the boards of education. Based on reliable and speedy information from the field, boards of education could judge what should be done and what kinds of support they could receive from the INGOs. These professional relationships helped to respond smoothly to the needs of affected schools and to build partnerships with boards of education.

Second, *these organizations could raise large-scale funds domestically and globally*. These funds were raised to help children by the private sector and individual donors in other developed countries and in Japan. Based on their organizational mission, these organizations could decide what to support by themselves. Therefore, in addition to supporting educational authorities and schools, they could independently support after-school care services and parents if local needs were determined. There was the fact that most private contributions tended to go to large-scale NGOs because of tax deduction benefits and their global networks (Kuroda 2013). For example, more than 70 % of funding from WV's GEJET recovery program came from WV's global partnership offices.

Third, *the mobilization of both internationally experienced Japanese staff and local staff helped to build trustful relationships in their operation*. The GEJET disaster created opportunities for Japanese experts in international development to work for the disaster-affected areas in Tohoku. As large contributions came globally to the Japanese branch offices of INGOs, project management and program planning experts who could communicate with and report the activities to global donors in English needed to be hired. On the field level, due to the local culture of remote and traditional fishery villages, local Japanese staff who could understand their dialect and listen to them patiently helped to identify local needs and build trusting relationships with NGOs. It could be said that this combination of the internationally experienced and local staff members as a team helped to increase accountability to the local affected people and organizations.

Some issues remained for further improvements in disaster recovery assistance. One is that the education sector support was capital intensive. For example, 58 % of SC's first-year spending went to the education sector, and 54 % of JCU funding was spent on the education sector in their 4-year program spending. Education sector supports tended to be capital oriented, such as the construction of educational

facilities and the provision of scholarships. From that perspective, they behaved as donors rather than NGOs, pouring money into the education sector. Another issue is about relationships with domestic NGOs and civil society organizations. Due to their massive operational scale, INGOs are sometimes overwhelmed by domestic and local civil society and volunteer organizations.

One potential solution is to strengthen further networks and collaboration from the early stage of recovery with local NGOs and experts in Japan to support disaster response and recovery at the community level. Since 4 years have already passed, most organizations completed their full-scale disaster recovery programs by closing local offices and reducing the number of staff involved in the activities. However, reconstruction will not end until the affected people feel the disaster is over by themselves. Therefore, it is crucial to support affected schoolchildren sustainably to realize a better build-back of the education sector. As the formal education sector could have realized the importance of working with external sources, fostering local civil society organizations that could continue to work for their schools and community would help to enhance the governance of the education sector and the resilience of the community.

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Chapter 12
International Cooperation: Interventions in Enhancing Disaster Education in Turkey

Tomoko Shaw and Fumio Kaneko

Abstract After Marmara earthquake in 1999, disaster education of formal education system in Turkey has been drastically changed in 2005. It includes more units dealing with disaster education in different subjects, as interdisciplinary approach. However, teachers at schools were not fully responding to the changes; teachers themselves were not confident enough to teach disaster education.

To improve the situations, concept is developed, and approaches were taken from three dimensions; human resource, tool, and system. Regarding human resource, basic trainings for gaining knowledge of disaster risk reduction, and workshops for preparing lesson plans, and demonstration classes were conducted, inviting several teachers from Japan. After the enhancement of the practical disaster education, a contest of lesson plans was conducted. Regarding tools, handbooks were prepared among core master teachers, which can be utilized in classrooms easily by teachers. Finally for the sustainability, system was proposed and some has been operated. How to cascade the teacher trainings has been precisely planned in each province and methodology of monitoring and evaluation was developed, and inspectors at provinces were trained. The evaluation and monitoring report are shared at Ministry's advisory group to reflect into their own policy for better implementation. At provincial level, the master teacher circle which intends to conduct demonstration classes for other colleagues was proposed. Inspectors in charge of disaster education are allocated, and core master teachers who instruct and advise other teachers for disaster education are proposed. At each school, one teacher being responsible for disaster education is assigned.

This chapter describes how lessons of Japanese disaster education were adopted and how the international cooperation was conducted.

Keywords Disaster education • International cooperation • Lesson plans • Turkey

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12.1 Background

After Marmara earthquake in 1999, disaster education projects have been conducted by Ministry of National Education. Major projects in the sequences were (1) Disaster Preparedness Education Project, from 1999 to 2000, in which children's books and cartoons on disaster awareness were produced, and (2) Basic Disaster Awareness in Turkish Schools under Basic Disaster Awareness Projects, from 2003 to 2005, in which more than 118 master trainers have been trained and 22,700 teachers are trained by the master trainers. A handbook and PowerPoint education materials, including visual materials for trainers, have been produced.

Both projects were jointly conducted by Bogazici University Kandilli Observatory and Earthquake Research Institute (KOERI) and funded by USAID.

Afterward, Turkish Red Crescent Society has been conducting comprehensive project from 2007 to 2015, setting three major target groups, namely, school teachers, religious leaders, and community leaders. As for teachers, teaching manual for teachers has been prepared. In this manual, correlating units in the school textbooks are mentioned in the appendix.

However, direct activities for improving disaster education curricula within the public education system have not been conducted.

Looking at the disaster education curricula, after Marmara earthquake, major reforms have been taken and drastic changes have been made in 2005. Disaster education has been included in more units in different grades and subjects.

"School-Based Disaster Education Project in the Republic of Turkey" has been conducted by Japan International Cooperation Agency (JICA) from 2010 to 2014. The project aimed for improving disaster education and school-based disaster risk management, enhancing teacher trainings on disaster education and improving the overall supporting system such as central and provincial organizational institutions, human resource, and budget allocations, considering incentives. However, in this paper, components of improving disaster education are focused.

While in Japan, after the Hanshin-Awaji earthquake, known for Kobe earthquake, disaster education has been drastically changed. Two months after the earthquake in 1995, revision works have been started. Three months after the earthquake, an exploratory committee for disaster education has been formulated, and under the committee, three working groups of (1) responsibilities and enhancing disaster risk reduction capacity of schools, (2) disaster education, and (3) psychological treatment have been engaged. In the working groups, cases reported by each school are analyzed and compiled into suggestions as disaster education policy. In Japan, most schools were used for community evacuation sites, and it was also teachers besides residents who made lots of efforts during emergency operations with evacuees, and even at the recovery and reconstruction phases, schools were still occupied by many evacuees. Thus, disaster education was more pressing issue in Japan, and teachers have recognized the necessity of reforming disaster education. In this reform, by making use of the disaster experience, new

disaster education, which eventually learns the true way to live life and way of life as a human being, has been promoted.

12.2 Revision of Disaster Education in Turkey

Ministry of National Education in Turkey has initiated curriculum reform since 2003, in response to information technology, full membership negotiation with the European Union, etc. It has constantly renewed education plans and acquisitions (Baker 2011), but revisions in 2005 were relatively major ones in the recent years, especially for disaster education (Turkmen and Tuzun 2010). As cognitive and constructivist approaches have been introduced in the education theory, new teaching methodology is being sought and is going to be penetrating at teaching level gradually.

Greatest characteristic of the reform in disaster education policy is to adopt interdisciplinary approach. Eight learning areas such as (1) disaster training and safe life, (2) entrepreneurship, (3) human rights and citizenship, (4) private education, (5) career consciousness, (6) psychological guidance and counseling, (7) health culture, and (8) sports culture and Olympic education are learned as minor acquisitions along with major acquisitions. It was a significant step forward that the disaster education is clearly stated in the education policy.

Looking at the new units of different subjects, there are newly created units whose major acquisitions are disaster education. Apart from such units, there are more units whose major acquisitions are something else, but minor acquisitions are related to disaster education. For example, in fifth grade Turkish class, while major achievement is "listens and reads in order to acquire information," minor achievement is set as "researches about dangers that may emerge during an earthquake." The subjects which deal with disaster education are mainly science, life science, social science, Turkish, mathematics, and physical education.

Contents themselves require some improvements; however, the possibility of conducting disaster education at school for the reform itself at policy level has been drastically increased.

12.3 Issues of Disaster Education in the Formal Education System in Turkey

12.3.1 Overall Characteristics

In recent years, Turkey has experienced major earthquakes such as Marmara, Van, etc.; however, disaster situations, disaster experience, and lessons learned have not been commonly shared among students. There are psychological tendency that sad

experience should be forgotten, and reviewing such experiences are not favorable for the mentality of children. It might be rooted in the cultural background or people's belief.

12.3.2 Curriculum

In the major curriculum revision in 2005, contents of disaster education have been increased very much. Before 2005, it was only four units, three units in science and one unit in social science, dealing with disaster education in the primary school curriculum. Whereas after 2005, it has increased to 11 units in total, 5 units for life science, 2 units for social science, 1 unit for science and technology, 2 units for mathematics, and 1 unit for Turkish. To look at the acquisitions, it seems to become more comprehensive than before; however, the negative side of disasters has been emphasized, and solutions were not enough mentioned. Linkage of disasters and professionals who have been engaged in solutions was less. The disasters can be taught in the characteristics of the areas, such as geography, history, social system, etc.

In the Ministry of National Education, there was also an opinion that subject of disaster education needs to be newly created; however, it remains only an idea.

12.3.3 Contents of Textbooks

There is a tendency that disaster education is limited to learn the way of protection and survival and responding capacities for emergency situations in Turkey. To look at the acquisitions, it seems more comprehensive than before; however, the contents have repetitions, grades after grades, especially the past disaster history and types of disasters and method of self-protection during disasters in life science and social science. More ingenuity is expected for presenting such same knowledge.

More descriptions are necessary about situation of past disasters and consequent scenario such as the way people reacted, lessons learned from disasters, how the public officials responded to the problems, what were the subsequent events and changing needs, and what were the problems after the disasters to visualize the image of disasters, so that eventually students can think of solution of how to countermeasure for the possible disasters. This process is partly the capacity enhancement of problem solving.

Furthermore, the essence of stimulating motivation for countermeasures needs to be included in the disaster education, since the ultimate goal of disaster education is implementing solutions. This can be achieved after convincement of the effects of the measures. Direct experience such as experiments is one of the effective ways for convincement. As for earthquake disaster risk management, enhancing building resistance is the only solution to save lives, and the necessity of countermeasures

needs to be recognized and ensure parents for the safety of your own houses. When the students become grown-up, if they are conscious enough to select resilient buildings for their own houses, the disaster education can be said successful.

Regarding contents of disaster education, the overall tone of the expressions is fearful and awful. Not only showing negative aspects but also positive aspects of disasters such as blessings from nature needs to be mentioned. For example, flood gives fertility to soil; volcano provides us hot springs and beautiful sceneries. Disasters should not be regarded as just fearful thing.

To make disaster education more sustainable and meaningful and give teachers more motivation of conducting disaster education, not only learning how to protect yourselves and responding capacities for emergency situations but also humanitarian approach can enrich the contents of disaster education. Highlighting spirit of cooperation during disasters, keeping orders and ethics during difficulties, learning preciousness of lives from victims, and sharing sympathy among people after sadness and sorrow can be character building education.

12.3.4 Teaching Methodology

Teachers are very much aware of the policy reform of the Ministry and have become conscious enough to improve teaching methodologies especially adopting constructivism. They have theoretical knowledge such as constructivist teaching fosters critical thinking and creates motivated learners. However, the theory has not yet been reflected in the teaching methodology, and practical adaptation has not been taken at classes. There were newly prepared instruction books for teachers, in which model class activities have been introduced. However, teachers complain that it is not so easy to conduct such activities due to time constraints of each class and shortage of time for preparation for teachers. Moreover, some activities do not seem attractive to teachers.

Teachers are eager to learn the new methodology; thus, if model lesson plans showing activities and methodologies are presented for teachers, there are high chances for teachers to adopt new teaching methodology. Therefore, conducting demonstration classes and providing interesting and practical lesson plans showing activities and methodology seem to be useful for teachers.

Practical training opportunities such as conducting demonstration classes and discussion among teachers for improvements have not been conducted routinely. Along with the lesson plans, necessary visual materials and experimental tools which will facilitate the attractive classes are expected to be developed.

12.3.5 Training of Teachers

Although the amount of contents on disaster education has been increased in the textbooks after 2005, most teachers told that they do not have enough knowledge or confidence to teach disaster education, and they tend to teach a little or skip the newly included contents.

One of the current issues was that the textbook has been revised; however, the capacity of the teachers, the most important communicators, was insufficient, and thus the important contents have not been transmitted to students. Therefore, in the training of teachers, enhancing knowledge on disaster education by utilizing improved contents of disaster education was the most priority issue.

There is tendency of adding new acquisitions by the ministry; however, from the teachers' side, it is not always easy to teach all the expected contents within the limited class hours. Some parents give pressure to teachers to conduct main subjects for the entrance exams for high schools or universities. Understanding the necessity of disaster education by parents is also necessary.

12.4 Ensuring Sustainability by Three-Dimensional Approach

The overall framework for upgrading disaster education is designed in three dimensions: *system*, *human resources*, and *materials*. Among them, system is somehow exists, so more operational improvements are expected. Analyzing current issues, *human resources* have much to be improved; especially the major bottleneck lies in teacher trainings, above all. *Materials* can be supplemental for the human resources (Fig. 12.1).

12.4.1 System

As for system, policy, curricula, and training system are designed for enhancement. Objectives of disaster education have been developed after studying Japanese disaster education policy and concepts at both national and provincial and municipality level. Objectives of disaster education were set as follows:

1. To make people believe in the importance and necessity of disaster education
2. To enhance awareness of DRM
3. To enhance capacity to save one's own life by oneself
4. To cultivate a culture of DRM by trickling down the acquired experiences to others

Fig. 12.1 Three dimensions

In the case of Turkey, firstly, importance of disaster education needs to be realized among teachers, parents, students, etc. After studying Japanese examples, higher level of aim has been set such as cultivating a culture of disaster risk reduction.

Furthermore, four important components of disaster education have been set, namely, (1) scientific knowledge, (2) response, (3) past disaster experiences, and (4) humanitarian hearts. Scientific knowledge and response were somehow existing areas, but blessing of nature, measures for disasters were added for scientific knowledge. In Turkey, disaster risk reduction has still been taken negative images, and there are notions that it revives trauma for the victims (JICA 2014). But those teachers who attended training in Japan and observed Japanese disaster education have become confident that it will not give negative impacts but rather become motivation for disaster risk management. As for "response," problem-solving capacities for changing and unexpected situations were added, which are hinted by blind drill whose scenario has not been informed beforehand to participants. These enhancing problem-solving capacities can coincide with the same direction with constructivism which Ministry of National Education recently promotes to adopt in teaching methodology. Learning from the past experience was new notion for Turkey. Learning real situation of disasters and its consequent scenario will enhance the imagination capacity and can create more realistic and concrete scenario. Eventually, students can respond to the disaster situations appropriately. Disaster education will nourish the capacity of persons who can overcome the disasters (Yamori et al. 2007). As is set in the objectives of disaster education that "handing over the culture of DRM," experience and lessons are very much recognized among counterparts to be informed from generations to generations.

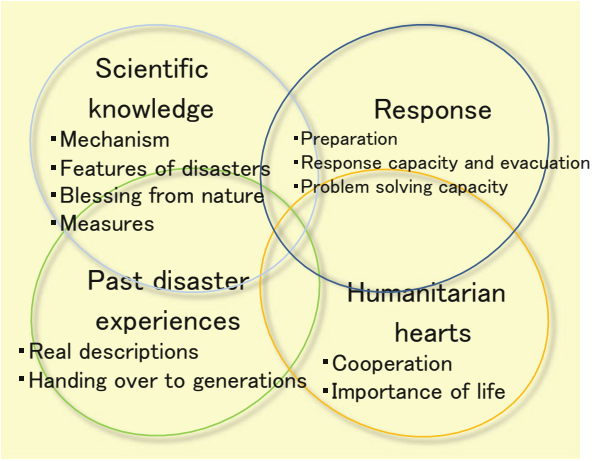


Fig. 12.2 Four important components of disaster education

Above all, nourishing humanitarian hearts such as spirit of cooperation, preciousness of lives, and cultivating the heart which respect others were recognized as the characteristics of Japanese disaster education. This was also included as the fundamental and essential components of the disaster education, since this can be the motivation of conducting disaster education. Counterparts have been recognized that disaster education is not superficial learning but should be in the center of the basic education of being human, and it should be identified as the basic starting points of human education.

Above newly added ideas are influenced by the academicians, ministry officials, and teachers who have been trained in Japan. If counterparts had not visited and observed Japanese disaster education, adding "past disaster experience" and "humanitarian hearts" would not have been possible. Seeing was believing (Fig. 12.2).

As for curriculum, repetitions were eliminated and improved acquisitions which cover wider ranges were suggested by considering development stage by subjects. Along with acquisitions, lesson plans which include activities and methodologies have been developed to crystallize the acquisitions.

Regarding training system, framework of training was established; training modules and standard training materials have been prepared, and both were tested in the actual training session. Inspectors were trained to evaluate the performance of school teachers for disaster education. Evaluation sheets were provided for the inspectors and build system of feedbacks of such evaluation to Ministry.

Since most teachers are not confident enough to teach disaster education, unit for disaster risk management was included in the annual in-service training curriculum. This has not been given authorization within the project period, but master teacher circle, which is the working group for teachers who promote and develop disaster education, was suggested at each province.

12.4.2 Materials

As for materials, a handbook has been prepared in which learning objectives, methodology, and learning outcomes are mentioned, and lesson plans have been prepared by subjects for practical use. In addition, standard training materials in PowerPoint with written explanations, visual materials of demonstration classes, video demonstration of preparing learning, and experimental kits were also prepared to facilitate the teachers to learn disaster education. Such materials are shared among master teachers through Ministry's intranet, which can facilitate the use of busy teachers.

As for disseminating means, exhibition and festival types of disaster drill are introduced for conducting attractive disaster education for students. Teachers, who observed the exhibition during their training in Japan, brought the idea back and conducted the similar exhibition for thousands of students as the province's event linking not just education department but all the related agencies on DRR such as governorship office, fire dept., Red Crescent Society, local university, local DRR NGOs, emergency medical group, etc. (Fig. 12.3).

12.4.3 Human Resources

As for human resources, training was the important components. Firstly, teaching methodology has been set and structured in the training program. An active learning method, emphasizing experience and experiments; project learning which nourishes research, analysis, problem solving, and presentation; and participatory and constructivist approach have been included in the training curriculum.

Fig. 12.3 Kuma Caravan

Master teacher training was designed and conducted in the sequence of (1) gaining basic DRR knowledge and participating workshops for lesson plans; (2) observing demonstration classes by Japanese teachers and Turkish master teachers and discussing feedbacks among teachers, conducting own classes for students; (3) developing further lesson plans; (4) presenting lesson plans at contest and for the selected teachers; and (5) training in Japan.

Among these, practical sessions of conducting demonstration classes were stimulating for teachers. Firstly, Japanese teachers who have been dispatched from Japan gave actual class to Turkish students, followed by classes by Turkish teachers. Training in Japan is conducted for academicians who promote and advice disaster education, experts of Ministry of National Education, selected master teachers, inspectors, and civil defense experts. During the training in Japan, practical knowledge has been enhanced by understanding system of promoting disaster education and actual situations of disaster education training for teachers in Japan, observing actual education fields by different actors such as school teachers, university students, disaster management professionals, disaster victims, researchers, and NGO focusing on DRR and understanding the reactions and responses of the students and participants.

Contests of presenting lesson plans of different subjects were useful platform for sharing knowledge and best practices. Teachers exchanged ideas regarding lesson plans. Some of the teachers have also shared the reflections of the students by showing trial lessons of video documentation. Competent teachers were selected for further training in Japan and have become core master teachers who have worked voluntarily to improve the lesson plans. The lesson plans have eventually been compiled in the handbook as a disseminating tool.

This selected core master teachers were suggested to the Ministry of National Education to be hired as full-time disaster education training experts to work for promoting disaster education at province. They are expected to supervise and get advice for the teachers who try to conduct disaster education at their own classes. Besides these teachers, inspectors and civil defense experts were assigned as evaluators and contributors for disaster education at provinces. They are assigned for supervising and evaluating the further cascading training for teachers.

In addition, networking the human resources was very useful. Master teachers were in the loop of mailing list and keeping constant communications, which encourage and motivate master teachers to conduct disaster education (Table 12.1).

Table 12.1 Activities designed in three dimensions

Dimensions	Subcategory	Contents
System	Policy	Concept: learning objectives
		4 main learning areas
	Curricula	Improvements of acquisitions
		Lesson plans
	Training system	Framework of training (training module, standard materials)
		Master teacher circle
		In-service training for general disaster risk reduction knowledge
		Training evaluation and feedback from provinces to ministry
Materials and means	Handbook	Theory
		Lesson plans
	Education materials	Standard training materials (PowerPoint)
		Video
		Learning kits
		In-service intranet knowledge sources
		One-stop service for acquiring information
	Disseminating means	Exhibition
		Festival type of disaster drill
Human resources	Training	Teaching methodology
		Active learning (experiments, experience based)
		Project learning (research, analysis, problem solving, presentation)
		Constructivist approach etc.
		Master teacher training
		Demonstration classes
		Developing lesson plans
		Contest
		Training in Japan
	Assigning key persons	Assigning training expert at provinces
		Assigning evaluators and contributors for disaster education at provinces (inspectors and civil defense experts)
	Networking	Master teacher mailing list
		Contest

12.5 Application of Japanese Experience in the Aspects of Applicability to Other Countries

12.5.1 Humanitarian Aspects as Part of Character Building Education

Table 12.2 shows the goals of Japanese disaster education at national and local government level. It can be observed that not only knowledge and skills of disasters and DRR but also humanitarian hearts so to speak ethical education such as cooperation with each other, respecting lives, recognizing different sense of values, etc. are highlighting as one of the major components. These are part of character building education. Importance of humanitarian aspects in disaster education was very much accepted and commonly recognized as the characteristics of Japanese disaster education by Turkish academicians, ministry officials, and teachers during the training in Japan. This makes disaster education more meaningful and lead to teachers' motivation to conduct not just teaching techniques or knowledge of disaster and disaster risk management but teaching human quality. Educators have recognized that it is the real education of life and how to live lives including protecting people safe.

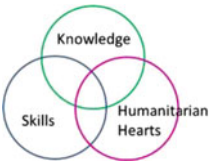
In many countries, there is ethical education or religious education; if the disaster education can be linked with character building, it can be appreciated among educators.

12.5.2 Enhancing Practical Competency Through Disaster Education

In Japan, the ultimate goal of education is set as acquiring "Zest for Living," which coincides with the direction of Programme for International Student Assessment (PISA)'s objectives for evaluating students' competency. Nowadays, in the society of sophisticated information technology and globalism, it is not enough just to apply learned knowledge and skills, but to nourish problem-solving capacities in order to utilize it in the current issues is the most important education attainment.

Therefore, it is important to search for practical ways of solving problems through interdisciplinary approach by judging various changing phenomena and analyzing and summarizing issues. In this way, disaster risk management has significant value of education, since it is closely linked with climate change issue which requires interdisciplinary approach to be tackled globally and internationally. Furthermore, DRR is experience-based learning in which cycle of constant improvements should be built.

Table 12.2 Goals of disaster education at national and local government level

Organizations	Goals of disaster education
Ministry of Education, Culture, Sports, Science and Technology (2013) (MEXT)	Not only at school and community but through various opportunities and places, the following competencies called "Zest for Living" are nourished to train human resources who can proactively contribute to disaster risk reduction
	1. Competencies for disaster preparedness and mitigation after learning characteristics of local disasters and local society and technologies on DRR
	2. Competencies for protecting yourself and for overcoming subsequent lives in case of becoming victims
	3. Competencies for maintaining safety of others and local community proactively
	4. Competencies for accomplishing recovery and establishing safe and secure society
Hyogo Prefecture Board of Education (2012)	In addition to ordinary disaster education for safety, Hyogo Prefecture, after reflecting lessons from disaster experience of Kobe earthquake, has added new components in the disaster education, which are importance of helping each other, spirit of living together in the society, the way of being human beings, and way of living
	Hyogo Prefecture set three components to nourish, namely, knowledge, skills, and humanitarian hearts
	Knowledge: 
	Understanding disaster history, countermeasures, types of disaster, and generating mechanism
	Skills:
	Practical skills for nonstructural measures, emergency response capacities, psychological care
	Humanitarian hearts:
	Sympathy to others, respects for lives, cooperation, volunteerism, contribution to society
Shizuoka Prefecture Board of Education (2013)	Basic concept of disaster education is to train students' *respective persons*
	Respective persons are expected to be:
	1. Self-reliant persons who can develop human quality and capacities
	2. Persons who can recognize and respect the various lives and sense of values
	3. Persons who can take actions for contributing for establishing better society as a society member

(continued)

Table 12.2 (continued)

Organizations	Goals of disaster education
	(a) To be able to act to secure their own lives at any disasters by judging appropriately based on the development stages
	(b) *To identify disaster education as education to nourish human nature of cherishing lives and to be able to serve for others and local safety proactively during disasters*
	(c) To be able to understand generating mechanism and history of disasters, natural environment of localities, and disaster management system by utilizing local materials and conducting disaster management drills in cooperation with local communities
	(d) To understand generating mechanism and disaster management measures to be able to respond appropriately
Kamaishi City Board of Education (2010)	To nourish the capacity of being able to protect one's own life by oneself for the expecting Sanriku offshore earthquake and tsunami
Kochi Prefecture Board of Education (2013)	Three competencies are expected to be developed
	1. Capacity to protect yourself (capacity for action)
	2. Capacity to judge appropriately by acquiring knowledge (knowledge/judgment)
	3. Capacity to contribute in the society (humanitarian hearts and attitudes)

Source: Relevant guidelines and implementation plan for Disaster Education of MEXT, Hyogo Shizuoka Kochi Prefecture, and Kamaishi City

12.5.3 Attractive Methodology for Learners and Convincing Disaster Education for Learners to Take Actions

1. *Active learning*

In Turkey, education methodology has been in the transition of shifting to constructivist approach. Teachers were very much motivated to learn different types of education approaches. While conducting disaster education, active learning and a project-based approach have been introduced.

In the active learning, teachers provide direct experience for students, and experimental kits of easy to be prepared were utilized. It became interesting and attractive for students and even for other teachers. It can be linked with science education. Liquefaction phenomena can be demonstrated by using simple tool of bottle of water, sands, and some pushpins. In Japan, a scientist, named "Dr. Nada Ranger" (meaning Dr. avalanche ranger) working for the national research institute of disaster risk reduction, wears funny costumes and demonstrates the scientific experiments in special disaster education classes at schools. Students are curious enough to know what the funny scientist will teach. Even difficult scientific phenomena can be presented interestingly. Teachers will stimulate the motivation of the students for learning.

Fig. 12.4 Dr. Nada Ranger, experimental kits for earthquake and erosion

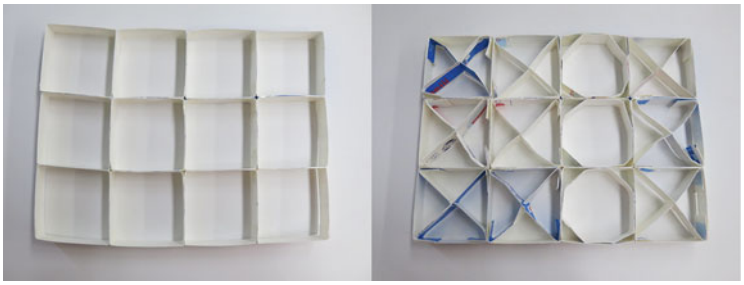


Fig. 12.5 Experiment of bracing

After introducing lesson plans of Japanese teachers and conducting demonstration classes by Japanese teachers from Hyogo Prefecture, teachers in Turkey have new notions that disaster education can be more interesting and attractive. Especially, active learning, utilizing experimental kits which were prepared with ordinary and easy-to-get materials, has drawn teachers' attention. It can be very effective for teachers to stimulate their motivation to introduce interesting and attractive method for teaching (Fig. 12.4).

To make disaster education more close to your own issues, active learning is effective. In case of learning building strengthening for earthquake disasters, effects of putting bracings can be learned by using just empty milk cartons. Students experiment and see the difference of shakings and understand the effects of just adding simple bars. This simple but direct feeling of the effects can encourage the motivation for making earthquake resilient buildings. In science, for example, teachers can encourage the "spirit of inquiry" by demonstrating such experiments (Fig. 12.5).

2. *Project-based learning*

As for social science, problem-solving capacity can be enhanced by linking local history and geography with local disaster history and disaster risk management system. Students research disaster risk management activities of fire-fighting bureau; disaster risk management activities of the local governments, experts, and local NGOs; etc. to identify issues to be solved. Considering the way of contributing to the society as a member of the community is a part of training for the future.

Project-based learning can be adopted (Fig. 12.6). In this method, students set themes and goals, finding issues, research, and find solutions. It is a self-learning

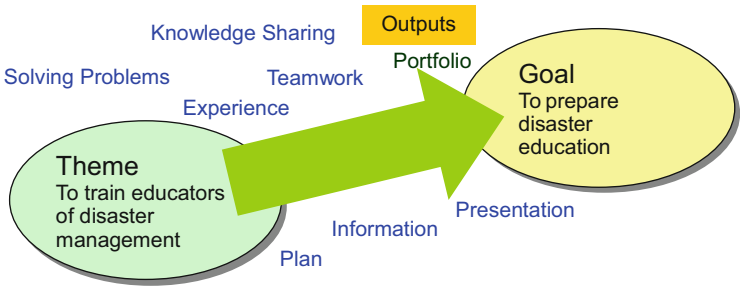


Fig. 12.6 Process of project-based learning after (Suzuki 2006)

process; teachers will guide and assist their learning. Students prepare an original research proposal. In the process, students research about disasters and disaster management to make a portfolio. The process of project-based learning is shown in the following figure. Through this process, students can enhance capacity for research, analysis, finding solutions, expressing the ideas, and making presentation. This method can be applied to any subjects.

3. *Attractive education media*

Card games and music related to disaster risk reduction were developed. There are tendency of avoiding negative memories like disasters, but by developing interesting and attractive education media, teachers' attitude has become different and adopt such education media.

Experience-based learning such as the Kuma Caravan was adopted in Turkey with appreciation (Fig. 12.3).

4. *Practical learnings by experts and disaster victims*

In the project, collaboration of local community with schools is sought. In Japan, one of the uniqueness of disaster management activities is collaboration with local community. There are usually neighborhood-based disaster management groups in the community. Schools are also a part of this neighborhood-based disaster management groups. Drills, games, seminars, festivals, and recreational activities on disaster management, such as experiencing to stay in the evacuation sites, preparation of survival meals, and building earthquake resistant kiosks, are conducted jointly with residents and schools.

Dispatching local resource persons such as survivors of the past disasters, and experts to special activities, and period for integrated study classes as a part of formal school curriculum on disaster risk reduction is commonly conducted. Not only school teachers but also practical experts and victims can make the class more unique and attractive.

12.6 Conclusion

The uniqueness of Japanese disaster education can be adopted in many different aspects. One of the fundamental ideas is related to objectives of the disaster education. Not only teaching emergency actions for disasters, nourishing humanitarian and ethical aspects and such as respect for others, cooperation with others, and respect for lives can be linked.

New methodology and approach can be adopted in teaching disaster education to make the activities interesting and attractive. Usually, people try to forget the misery and regard the disaster education something unpleasant. Thus, it is very important to encourage teachers' motivation to conduct disaster education. Active learning and experience-based learning are very useful, drawing attentions of both teachers and students.

Teachers are usually very busy. A one-stop service of centralizing the information, teaching kits, and education materials are necessary. The overall framework for encouraging disaster education is necessary. Contests of competing lesson plans, prepared by teachers, and conducting model classes were driving forces for encouraging teachers' interest.

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Chapter 13
International Cooperation: Grassroots Experience Sharing in Vietnam

Yasutaka Ueda, Eriko Matsumoto, Yuko Nakagawa, and Rajib Shaw

Abstract One of the key stakeholders in any development projects is nongovernment organizations (NGOs), which work at grassroots level. Many NGOs try to maximize the project impact to stay at the local level, and local context is considered during planning and implementation for the purpose. However, it is always a challenge to ensure local ownership and sustainability of the project. Technical transfer project on DRR education has similar challenge. This chapter looks at the experience of disaster risk reduction (DRR) education program in Vietnam and discusses what is important for sustainability in grassroots activity for DRR education through the case of a technical transfer project carried out by a Japanese NGO partnering with the local government. This chapter dealt with four (4) activities to transfer Japanese techniques of DRR education as follows: (1) installation of DRR core schools and teachers' training system, (2) implementation of training of trainers (ToT) and DRR classes, (3) development of teachers' guide for DRR education, and (4) implementation of Japan study visit. Consequently, this chapter showed the importance of network among teachers, educational officials, and NGOs for technical transfer of DRR education. Through the discussion, this chapter clarified that NGOs can play a vital role in the network as an organizer, a facilitator, an advisor, and an advocate who can secure the sustainability of DRR education.

Keywords Disaster risk reduction education • International cooperation • Grassroots activity • Network • NGO • Vietnam

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13.1 Introduction

There are different approaches, tools, and target groups of disaster education. Shaw et al. (2011a) emphasize the best starting point is children and students. Schools and particularly children play an important role in the development of a culture of prevention and in the dissemination of their knowledge widely as they can act as good channels for transferring the ideas to their families (Izadkhah and Hosseini 2005).

Success factors of disaster risk reduction (DRR) education are experience-based and action-oriented learning (Shaw et al. 2011a). DRR education should not be an event (like an evacuation drill) but should be a continuous process (Takeuchi et al. 2011). DRR education should be conducted as part of both curricular and extracurricular activities in order to increase the hours spent on the education and to sustain the education (Shiwaku and Fernandez 2011). It is also suggested that DRR education should be involved in nonformal activities that influence actions rather than mere knowledge (Shaw et al. 2004). For its purpose, the participation of different groups of stakeholders from students and teachers to government, nongovernment organizations (NGOs), the media, and private sectors is needed (Shaw et al. 2011b). Sendai Framework for Disaster Risk Reduction 2015–2030 also shows the importance of building the knowledge of government officials, civil society, communities, and volunteers, as well as the private sector, through sharing experiences, lessons learned, good practices, and training and education on DRR. One of the key stakeholders in any development projects is NGOs which work at grassroots level. NGOs are closer to communities and are familiar with the local context and easily grasp the importance of the community-based approach (Izumi and Shaw 2012). However, many of the NGO activities face the problem of sustainability (Izumi and Shaw 2014).

This chapter deals with the case of a grassroots technical transfer project on DRR education as extracurricular activities carried out by SEEDS Asia, a Japan-based international NGO (INGO), partnering with the local government in Danang City, Vietnam. SEEDS Asia conducted 2-year project on DRR education from September 2011 to September 2013. At first, this chapter overviews situation on DRR education in Danang City before the start of this project. Secondly, this chapter finds how Hyogo Prefecture improved its DRR education after the Hanshin-Awaji Earthquake or Kobe Earthquake of 1995, which became the base of current DRR education in Japan. Thirdly, the result of technical transfer project by SEEDS Asia on DRR education on the basis of the experiences from Hyogo is shown. Finally, NGOs' roles for sustainable DRR education in technical transfer project at grassroots level are discussed from the result.

13.2 DRR Education in Danang City Before the Intervention of SEEDS Asia

Danang City is located in the central region of Vietnam (see Fig. 13.1). The city is divided into seven (7) administrative districts which consist of six (6) urban areas and one (1) rural area. According to Danang Department of Statistics (2008), the city has 96 elementary schools and 50 secondary schools. Under the Department of Education and Training (DOET) in Danang City, the Bureau of Education and Training (BOET) in each district supervises 146 public elementary and secondary schools.

In Vietnam, floods are the highest cause of death among all natural disasters, of which children account for 80 % or more (Statistics by the Ministry of Agriculture and Rural Development of Vietnam 2011). Thus, there is high demand for DRR

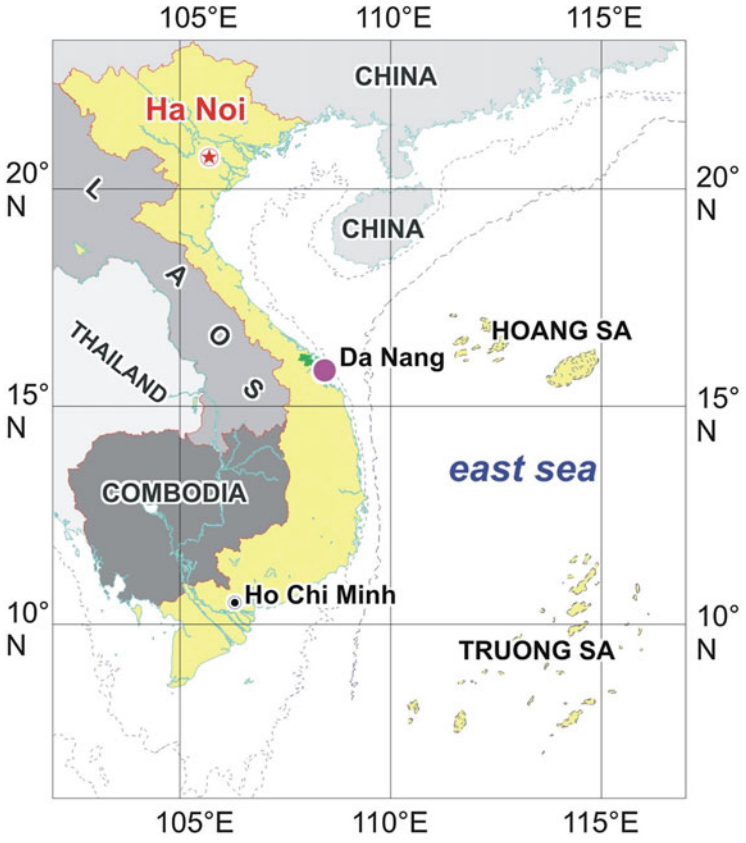

Fig. 13.1 Location of Danang City (Source: Department of Natural Resources and Environment in Danang City. Available at http://danangcoastalink.org.vn/English/images/Geographical_Map_of_Danang_City.jpg Accessed January 7, 2016)

education for children. In particular, typhoons, floods, and landslides have devastated in the central area by tropical low pressure system and monsoon. In 2006, Typhoon Xangsane caused tremendous damages, especially in the provinces of Quang Nam and Hue and Danang City, left more than 100 deaths in Danang.

According to the interview from DOET, in Danang City, though regular educational training for schoolteachers was not available, such training had been carried out when a significant revision of textbooks or improvement of educational policy had been carried out. Most of the schools provided DRR-related announcement or advice to their students before typhoon and flood season every year; however, it did not have experience to practice extracurricular classes on DRR. On the other hand, the national strategy on climate change enacted in 2011 emphasized to enhance DRR education as climate change adaptation. The Ministry of Education and Training (MOET) was launched to develop DRR education curriculum and textbook in 2011. This context led the DOET into requesting technical transfer project on DRR education to SEEDS Asia.

13.3 Hyogo Experiences in DRR Education

This section summarizes Japanese techniques on DRR education which have been developed from the Kobe Earthquake, which happened in January of 1995, based on the article written by Tokuyama (2005) and attempts to find elements for the promotion of DRR education.

According to Tokuyama (2005), Hyogo Prefecture hardly had DRR education on the preparedness for earthquake before the Kobe Earthquake. Newly DRR education developed in Hyogo after the Kobe Earthquake showed the basis and the model of DRR education in Japan. This was initiated from the recommendation "For education recovery of Hyogo" issued in October of 1995 by the committee for improvement of DRR education in Hyogo which was established in April of 1995. The recommendation included firstly building capacity of teachers for the promotion of DRR education who were trained to gain technical skills on DRR education. Based on the recommendation, the board of education (BoE) in Hyogo Prefecture launched teachers' training in 1997 to develop leading teachers for DRR education systematically and continuously. Secondly, the BoE allocated the trained teachers as promoters of DRR education at each education office in the prefecture in accordance with the recommendation. The promoters were assigned to provide trainings on DRR education to teachers and to research on the promotion of DRR education under the education office. Thirdly, newly DRR education which focuses on the transfer of lessons learned from the Kobe Earthquake was recommended. This newly DRR education was suggested not to be established as individual subject but to be integrated into school education to conduct comprehensively. Based on the recommendation, the BoE developed a supplementary reader for DRR education, namely, "Asu-ni-ikiru (Living Tomorrow)" in 1996 by the editing committee which consisted of the officials of the BoE and schoolteachers. It was

suggested that the supplementary reader include stories of the disaster experiences so that students can sympathize and knowledge on earthquakes related to science and social studies in consideration of development stage to be used frequently in the regular curriculum. Therefore, the editing committee listed up related parts to earthquakes from each subject of the curriculum guidelines and drafted the supplementary reader in consideration how to apply to the parts. Furthermore, the BoE developed teachers' guide which showed how to utilize the supplementary reader in 1997, the next year.

From the experience of Hyogo mentioned above, elements for the promotion of DRR education were found as follows: (1) capacity building for leading teachers to be able to promote DRR education as trainers, (2) teachers' training on DRR education by the trained leading teachers, (3) DRR education integrated into school education, and (4) development of a supplementary reader and/or a teachers' guide for the promotion of DRR education. In addition, it was found that the development should be conducted by the involvement of schoolteachers as well as officials from BoE and adjust to the curriculum guidelines. These technical approaches were applied to the project in Danang. The next session shows specific examples.

13.4 Practices of Technical Transfer on DRR Education in Danang

13.4.1 DRR Core Schools and Teachers' Training System

One of the elements for the promotion of DRR education in Hyogo Prefecture is capacity building of teaching experts for DRR education and implementation of teachers' training on DRR education by the trained experts. Similarly, in the first phase of the project, SEEDS Asia with DOET tried to build capacity of one school in each of seven districts in the city for DRR as DRR core school whose teachers have responsibility to become leading teachers to promote DRR education in the city. The roles of the DRR core school are developed as follows: to secure teachers and education materials for carrying out DRR education at school, to become a shelter in emergency, and to become a facility to offer information of hazard and DRR.

For selecting DRR core schools, SEEDS Asia with DOET conducted a questionnaire survey targeting BOET in each district and all 146 schools in the city. Based on the analysis of the questionnaire survey, 18 schools were selected as candidates of the DRR core schools. Through the interview to principals of 18 schools, finally seven (7) schools, one school in each district, were selected as DRR core schools, including five (5) elementary schools and two (2) secondary schools. In this screening, teacher's capacity and principal's motivation were prioritized in consideration of the sustainability of the project. Teachers of the core schools were provided DRR training program to transfer DRR education

techniques by SEEDS Asia. The number of the trained teachers reached totally 88. The result of this training focuses on the next session.

After that, SEEDS Asia organized a working group (WG) consisted of DOET, BOET, vice-principal, and teachers of DRR core schools. The purpose of the WG was to accumulate know-how and knowledge through sharing comprehensive information including from the national strategy to local DRR education. For its purpose, the Committee for Flood and Storm Control (CFSC) sometimes joined in the WG meeting as an advisor from the administrative of disaster risk management (DRM) to discuss how to improve DRR classes and spread to the citywide. In addition, this WG became a place for teachers to get knowledge and skills through presentation of cases of Japan by SEEDS Asia. Thus, the WG functioned as a main core group for technology transfer of Japanese experiences. The WG held regular meetings in target of every 2 months. About 40 teachers of DRR core schools and educational administrative officers participated in the WG to share outcomes and lessons from DRR classes.

In addition, members of the WG became DRR education trainers to conduct teachers' trainings for all of the schools in Danang. Some teachers from DRR core schools were selected as the leading trainers for this training. This means that network formation on DRR to learn between DRR core schools and other schools in the city was developed through the training (see Fig. 13.2). At the same time, the training developed the ability of teachers from DRR core schools who enable to provide DRR knowledge sustainable.

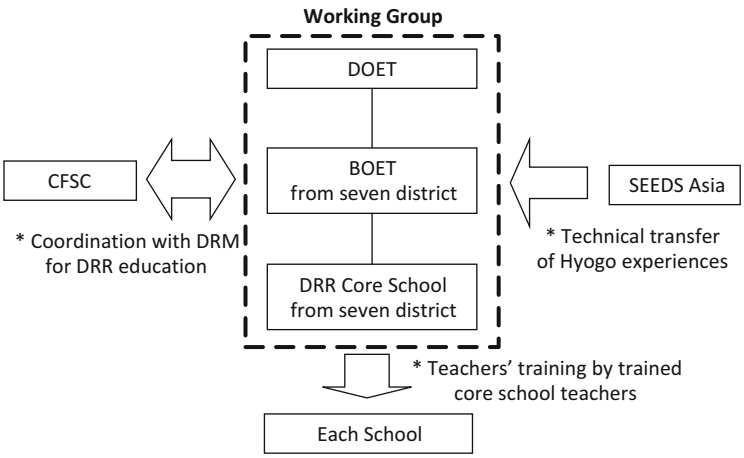

Fig. 13.2 Chart of network formulation on DRR education with DRR core schools

13.4.2 Training of Trainers and DRR Classes

This session focuses on the result of training of trainers (ToT), which was carried out for a total of 88 teachers and vice-principal of the core schools and BOET officials in April 2012. In this ToT, not only practicing the programs they would like to do for their students but also lesson plan making, demonstration of the lesson, and action plan making for the lesson were carried out. Implementation of the ToT was divided into three (3) teams and took totally 19 days. Afterward, DRR classes were carried out by the trained teachers two times at each core school. The first period was from November to December 2012, and the second was from April to May 2013. The trained teachers conducted at least twice of the classes in each period and the number of the classes aggregated 351 (177 the first class, 174 the second class). In the first class, the trained teachers focused on preparing lesson plans and creating their own teaching materials. Besides the first class, monitoring of the DRR classes was conducted by SEEDS Asia accompanied by BOET staff to promote understanding of educational administration agency on DRR education and its monitoring procedures. After the first classes, the teachers discussed further improvement of the quality of the classes based on the result of the monitoring in the WG. In the second class, the teachers improved their own skill based on their experiences, and it was found that all of the second class was more understandable than the first class. Thus, the teachers' understanding and ownership were increased.

For the analysis on the effectiveness of the second classes by the trained teachers, a knowledge test was conducted at DRR core schools, targeting 696 students of grade four (4) and five (5). The test consisted of questions on the knowledge regarding five (5) hazards, typhoons, floods, landslides, earthquakes, and tsunamis, and countermeasures of the five hazards. The average of the answer rate conducted before the classes was 83.8 %. The one conducted after the classes was 91.5 %. Thus, this result proves that practical lessons even in short term have effect to increase DRR knowledge.

The post-project evaluation by a questionnaire to teachers of DRR core schools and BOET staff was conducted. From the evaluation, it was clarified that all respondents had a demand for continuing their DRR classes by themselves even after the end of the project. As the reasons for this, 93 % of the respondents answered they wanted to save their students' lives from disasters, and in the next, 80 % of the respondents answered they acquired concrete method how to implement DRR education (see Table 13.1). The result of asking by which project activities you were enhanced to conduct DRR education is that 96 % of respondents answered ToT by SEEDS Asia. Moreover, 62 % of respondents were evaluated to get DRR knowledge and 58 % of them were evaluated to get know-how of conducting DRR education as the most beneficial learning in the project. The result that the respondents chose only one option about what is the most beneficial change/improvement is that 36 % of them answered "I feel more trust from students and parents" and 33 % answered "I find my professional goal to achieve as teacher."

Table 13.1 Result of post-project evaluation by teachers of DRR core schools and BOET staff ($N = 45$)

Question	Rate
1. Why do you want to continue DRR education in your school after the end of the project (multiple answers up to three options)?	
(a) Because I want to save lives of students through education	93 %
(b) Because I acquire concrete method of conducting DRR education	80 %
(c) Because my students really enjoyed DRR class during the project implementation	69 %
(d) Because my school has a plan to continue DRR education	20 %
(e) Because there have been requests/responses from parents to continue DRR education	13 %
(f) Because it is in line with the Vietnamese government policy	4 %
(g) Others	2 %
2. From which activities below your interests of conducting DRR are more encouraged (multiple answers up to three options)?	
(a) ToT training by SEEDS Asia (May–July 2012)	96 %
(b) DRR training to remaining 141 schools in Danang (July–Aug 2013)	67 %
(c) Working group meetings (every 2 months)	62 %
(d) Second DRR class to students (Apr–May 2013)	36 %
(e) DRR model competition (October 2012)	29 %
(f) First DRR class to students (Nov–Dec 2012)	27 %
(g) Visit to MOET in Hanoi (principal/vice-principal only) (March 2012)	20 %
(h) DRR training to College of Education students (June 2013)	4 %
(i) DRR training to education officials in Hue and Quang Nam (April 2013)	0 %
3. What is the most beneficial learning you get from this project (multiple answers up to three options)?	
(a) DRR knowledge itself	62 %
(b) Know-how to conduct DRR education in schools	58 %
(c) Teaching method (to provide more opportunities for children to think by themselves, e.g., using models/teaching aids)	22 %
(d) Network among other schoolteachers related to DRR education	0 %
(e) How to develop models and teaching aids	0 %
(f) Others	2 %
4. What is the most beneficial change/improvement you get after the project? (Single answer)	
(a) I feel more trust from students and parents	36 %
(b) I find my professional goal to achieve as teacher through the project	33 %
(c) Network among other schoolteachers	22 %
(d) I feel more teachers' ties at school after the project	9 %
(e) Closer communication with BOET	0 %
(f) Others	0 %

From these results, it is found that acquirement of DRR knowledge and the way how to teach it by ToT and its practice led to strengthen teachers' trust by students and parents or to set teachers' goal about DRR education. Such confidence or ownership is considered as the reason of increasing teachers' motivation for the sustainability of the project.

13.4.3 Teachers' Guide for DRR Education

Hyogo Prefecture has promoted DRR education based on the transfer of experiences and lessons learned from the Kobe Earthquake. On the other hand, one of the challenges is preparedness for not huge but frequent disasters. In this case, SEEDS Asia considered that a key was to enable to imagine situation after the disasters by experienced learning. Therefore, SEEDS Asia developed 21 DRR educational programs according to the KIDA tree model concept (see Table 13.2) and compiled 21 programs as DRR education handbook. The KIDA tree model is one of the knowledge-based methods for disaster education which was proposed by Shaw et al. (2009) in the book "1-2-3 of Disaster Education." KIDA means knowledge, interest, desire, and action. Knowledge, interest, and desire are necessary to promote to take action and actions are significant output of disaster education.

The next challenge was how DRR education would be integrated into school education. Vietnam did not have modules or guidelines for DRR education officially. Some schools conducted DRR education by their original way or the way from INGOs. To enhance school disaster education, it is important to explore how the school can provide disaster education in the current school curriculum and what kinds of disaster education programs can be provided both inside and outside the school (Shiwaku and Fernandez 2011). Therefore, SEEDS Asia conducted a survey of the official textbook in subjects of national language, English, science, society, nature and society, geography, moral, and home economics, in order to find curriculums related to climate change and disaster risk reduction. According to the survey result, the module described what DRR programs can be applied to the regular curriculum or ex-curriculum activities as the supplement of the regular curriculum in each grade. Thus, the module suggested the basic concept on lesson plan making in consideration of curriculum in the regular classroom.

The DRR handbook and module were developed with the discussion in the WG where DOET and BOET joined; therefore, DOET was familiar with these. Eventually, DOET made a decision to distribute these to all elementary and secondary schools in the city to utilize as the official guide to DRR education.

For the implementation of the developed DRR education programs in the handbook, educational materials with colorful illustrations were developed for students to be attracted and enjoy learning. There was a noteworthy unique case of creating educational material. This was a contest of materials created by the core school's teachers. Ahead of DRR classes for students at each core school, the teachers created the materials for enhancement of interest and understanding of students, and those materials were evaluated in the contest. Nineteen materials were submitted to the contest, which motivated teachers as well as woke attention of DOET and BOET. SEEDS Asia also joined in the contest as advisory staff. The evaluation by officials as supervisor and an expert NGO as a third party in a neutral way contributed greatly to increasing motivation of the creators. Finally, "picture-story show" and "card of emergency bag making" which got high evaluation in the contest were decided to distribute to all DRR core schools in response to their demand. Moreover, SEEDS Asia developed DRR simulation models

Table 13.2 DRR education programs developed based on KIDA tree concept (SEEDS Asia 2013)

No.	Program	Goals of the program	KIDA[a]
1	Lecture and video play	Students can understand the situation, phenomena, and mechanism through attending lecture and watching DRR video play	K
2	Preparedness and non-structure mitigation	Students can notice the necessity for preparations to mitigate disasters in advance	K
3	Drawing	Students can recognize and consider how to mitigate disasters through drawing a picture	I/D
4	Picture-story play	Students can learn the necessity of preparations against disasters through watching picture-story play	I/D
5	Card game	Students can study on preparedness against disasters and mitigation of disaster impacts through playing card game	I/D
6	Essay writing	Students can remember fear of disasters and try to think what to prepare and how to mitigate disaster impacts through essay writing	I/D
7	Emergency bag making	Students can consider what items are essential for survival when disasters strike through making emergency bag	I/D
8	Newspaper reading	Students can collect the information on disasters of both inside and outside of their country through reading newspapers	I/D
9	Newspaper making	Students can make DRR newspaper by gathering DRR information	I/D
10	Story from affected people	Students can gain knowledge on DRR by listening to people affected by disasters	I/D
11	Rain diary	Students can check weather reports with a small memo and gain basic knowledge about relations between rainfall and disaster impacts	I/D
12	Indigenous knowledge	Students can be enlightened about indigenous DRR by listening to legends/traditional stories and consider how to prevent disasters	I/D
13	Family meeting	Students can notice the importance of coping with disasters with their families	A
14	Fire fighting	Students can obtain skills to extinguish fire from fire fighting drills	A
15	Protection by sandbags	Students can understand the effects and importance of sandbags to reduce disaster impacts	A
16	Cooking	Students can study about emergency foods to cope with disasters and create recipes which they can cook	A
17	School walking and map making	Students can find vulnerable places to disasters through walking inside the school and make a DRR school map for evacuation	A
18	Town watching and map making	Students can find places vulnerable to disasters through research of the town and make a DRR town map for evacuation	A

(continued)

Table 13.2 (continued)

No.	Program	Goals of the program	KIDA[a]
19	Evacuation drill	Students can learn how to evacuate from disasters through evacuation drills	A
20	First aid	Students can gain basic medical treatment skills for injury and sickness caused by disasters	A
21	Sports festival	Students can meet community people through sports festivals and understand the need for mutual support to cope with disasters	A

[a]*K* increase of knowledge, *I*/*D* enhancement of interest and desire, *A* promotion of action

Fig. 13.3 "Picture and story show" which is created by a teacher (*left*), "DRR game: snake and ladder" developed by SEEDS Asia (*center*), and a DRR class with DRR simulation models which are made by students (*right*)

regarding five disasters (earthquake, tsunami, landslide, typhoon, and flood) and games for learning on disasters, with aims to input know-how which the teachers lacked and the NGO knew (see Fig. 13.3). Furthermore, some teachers tackled to have a class that their students created DRR simulation models to improve the students' understanding. Thus, those materials were enabled to have creative lessons in an enjoyable way for their children.

13.4.4 Japan Study Visit

Japan study visit is a way to learn Japanese techniques on DRR education directly and effectively. From July 7 to 12, 2013, of the second half of this project, the study visit was carried out in Japan. The purpose of this study visit is to develop a plan for continuing DRR education activity in Danang after the end of the project. For this reason, the participants included one vice-director of the Ministry of Education and Training of Vietnam who is in charge of policy making on climate change and DRR education at national level, one staff member of the People's Committee of Danang City who is in charge of budget determination for education in the city, one deputy director of DOET of Danang City, and one vice-principal of DRR core school. Thus, it was considered to involve key officials who are related to policy making,

Table 13.3 Study visit schedule conducted from July 7 to 12, 2013

Date	Activities
July 7	Move to Japan
July 8	Discussion on DRR education with board of education and education research teachers in Kesennuma City
July 9	Observation of two schools on DRR education in Kesennuma City
July 10	Observation of tsunami-affected areas and visit to tsunami museum in Kesennuma City
	Discussion on making action plan for DRR education in Danang among participants
July 11	Visit to hear DRR education in Japan from the Ministry of Education, Culture, Sports, Science and Technology, Japan
July 12	Move to Vietnam

management, and implementation of DRR education at national level to school level.

Visit schedule was arranged by SEEDS Asia as Table 13.3. The programs for the visit included observations of DRR education activities from national level to school level in consideration of the purposes mentioned above. Since the purpose of the study visit was to develop action plan for sustainable DRR education in the future, some programs included exchange activities to be discussed on the matter. In particular, in Kesennuma City, one of the affected cities by the Great East Japan Earthquake and Tsunami of 2011, education research teachers were organized to develop newly DRR education programs based on the experiences of the tsunami, similarly as Danang City. Therefore, sharing information regarding each achievement was conducted when the participants from Danang City visited the educational research teachers and board of education in Kesennuma City. Based on learnings the participants gained from information sharing by their visits, the participants discussed on action planning for sustainable DRR education in Danang during the study visit. Through the discussion led by the MOET, practical DRR education learned from the study visit was applied to the action plan which was based on the national policy of Vietnam. After this study visit, this action plan was reviewed in MOET and was formally approved as the decision of MOET. Based on the decision, DOET made a plan including the budget plan for continuing DRR education after the end of the project and the plan was also approved by the People's Committee, the authority for formulating the budget plan in the city.

13.5 NGOs' Roles for Sustainable DRR Education

This section discusses what is important for sustainability in grassroots activity for technical transfer project on DRR education and how NGOs functioned for this. Key findings for the sustainability of DRR education and NGO's roles through the case of the project in Danang City are summarized in Table 13.4.

Table 13.4 Key findings for the sustainability of DRR education and NGO's roles

Activities	Key findings for sustainability	NGO's roles
Installation of DRR core schools and teachers' training system	Development of leading teachers and co-learning opportunities among the leading teachers and others	Organizer to build the network among educational administrative and schools
		Facilitator for discussion among stakeholders
	Initiative of the educational administrative	Advocate for policy making and fund-raising
Implementation of training of trainers (ToT) and DRR classes	Development of human resources (trainers)	Advisor to transfer knowledge and technology
	Practical lessons in short term with flexibility	
	Monitoring with education officials	
Development of teachers' guide for DRR education	Participatory by teachers and appreciation by education officials and NGOs	Advisor to transfer knowledge and technology
	Guideline of DRR education in existing education system	Facilitator for the workshop on the localization of materials
	DRR education materials customized to adopt for the local culture for easy understanding	
Implementation of Japan study visit	Involvement of key officials who are related to policy making, management, and implementation of DRR education at national level to school level	Advocate for policy making and fund-raising
		Facilitate for the discussion on making an action plan for practical DRR education
	Making an opportunity to learn DRR education system from national level to school level	
	Making an opportunity to discuss on action planning for DRR education from national level to school level	

Firstly, it was found from the activity of the installation of DRR core schools that one of the keys for sustainable DRR education is the establishment of co-learning system among schools/teachers. In the case of this project, DRR core schools were set up and teachers in the schools were trained as leading teachers on DRR education. Besides, schools'/teachers' network was established by the WG as teachers' training system. Through the WG, the trained teachers discussed how to develop their DRR education methodology as well as materials. This discussion became co-learning opportunities for the trained teachers. The opportunity was spread to other schools to have a teachers' training for all schools in the city. Thus, schools'/teachers' network can provide co-learning opportunities. Another key is the initiative of the educational administrative. Ueda et al. (2014) stressed a key issue of education is working with local government and having trust with

schoolteachers and education administrative staff. In the case of this project, the WG in where education officials were involved was organized. Through the discussion among WG members, the members made a common sense of the direction of the project. For the sustainability of DRR education, strategy on DRR education including budget plan in the education sector is essential. By the WG, educational officials understood the needs of schools as grassroots level and the outcomes from the project. Finally DOET decided to allocate the budget for conducting DRR education at all schools in the city after the end of the project. Izumi and Shaw (2012) pointed out that one of the important roles of civil society organizations (CSOs) is considered as a facilitator and moderator among local stakeholders. Similarly, in this case, the NGO worked as an organizer of the WG, a facilitator to enhance their motivation and their relationship, and an advocacy to input the essential points into plan making on DRR education.

Secondly, due to the limited period of international cooperation projects by NGOs, capacity building to increase human resources is a key for the sustainability. As mentioned above, this project secured the human resources by ToT and the establishment of co-learning system. In addition, practical lesson in short term with flexibility is also an essential element, especially for DRR classes at schools. One of the challenges in DRR education of schoolteachers is that schoolteachers are always busy and this can be an obstacle for teachers to allocate their time to DRR education. In the project case, an adaptation of the KIDA tree model made it possible. Once the tools for disaster education are implemented, the next issue is on how those tools can be used sustainably over time. Long monitoring and evaluation is needed (Mulyasari et al. 2011). In this project, it was clear the issue to make the mechanism of PDCA cycle that the NGO and educational administrative staff conducted monitoring visits to DRR classes and fed back the results to the teachers for the improvement of their DRR classes. Again, one of the keys is cooperation of educational administrative and NGOs.

Thirdly, in case of this project, the teachers' guide was developed by mainly DRR core schools' teachers through the activities of the WG in which education officials and NGO staff participated. Repeatedly, the involvement of educational officials enhanced their understanding and evaluation of the project, and the involvement of the NGO brought knowledge and technology. It is known that CSOs can play a crucial role in providing trainings for local governments, teachers, students, and communities (Izumi and Shaw 2012). On the other hand, it is pointed out that formal, nonformal, and informal all three educations are important for DRR education (Shaw et al. 2011a). Normally, DRR education by schoolteachers was implemented in formal education or nonformal education at school. Such DRR education at school level always has the difficulty to allocate enough hours for DRR education as the first priority of school education has been the completion of regular school curricula. Thus, the sustainability of DRR education depends on how DRR education is integrated into regular school curricula in existing education system. In the project case, this was realized by a discussion among teachers as practitioners of DRR education and educational officials as supervisors of regular education system based on the result of the textbook survey which analyzed the relationship between

regular curricula and DRR classes. The NGO functioned as an advisor or a facilitator for this development. Incidentally, NGOs are frequently facing challenges and difficulties in the process of community-based DRR such as lack of localized approach (Izumi and Shaw 2012), especially in international cooperation projects. In particular, different approaches and information on disaster education are necessary in different cultures (Tanaka 2005). The development of DRR education materials by teachers links to be customized to adopt for the local culture for easy understanding. In the project case, a contest by teachers for the development of educational materials was introduced and this resulted in increasing their ownership for DRR education. Again, one of the keys is the involvement of the educational administrative and the NGO. Enhancement of teachers' self-confidence and motivation came from the recognition and understanding of educational officials as a supervisor and the evaluation by the NGO staff with expertise.

The case of Japan study visit in the project taught us two valuable points. One is the importance of the participation of key officials who are related to policy making, management, and implementation of DRR education at national level to school level. In addition, the study visit created an opportunity to learn a case of DRR education system in Japan. Consequently, participants were able to consider feasible way for the improvement of DRR education in their country from the standpoint of each position. Another point is to discuss action plan for DRR education among participants during the study visit. There is little opportunity to discuss on DRR education directly among practitioners from national level to school level in any country. Action plan making during the study visit gave feasibility at national level to school level. This accelerated motivation and ownership of participants for DRR education as well as enhancement of policy making for sustainable DRR education. Needless to say, these results came from the intervention of SEEDS Asia, which played roles of an advocate and a facilitator of the discussion as an NGO during the study visit.

13.6 Conclusion

This chapter discussed the sustainability of DRR education as an international cooperation grassroots project and the roles of NGOs for this through the case of technical transfer project on DRR education conducted by SEEDS Asia, Japan-based NGO, in Vietnam. This chapter dealt with four (4) activities to transfer Japanese techniques of DRR education as follows: (1) installation of DRR core schools and teachers' training system, (2) implementation of training of trainers (ToT) and DRR classes, (3) development of teachers' guide for DRR education, and (4) implementation of Japan study visit. As a result, this chapter showed the importance of network among teachers, educational officials, and NGOs for technical transfer of DRR education. Through the discussion, it was clarified that NGOs can play a vital role in the network as an organizer, a facilitator, an advisor, and an advocate who can secure the sustainability of DRR education.

Shaw et al. (2011b) concluded the key essence of disaster education is "tsunagaru" which is a Japanese word that means linking. This chapter emphasized the linkage with external organizations. The board of education in Kesennuma City, one of the heavily affected cities in the Great East Japan Earthquake and Tsunami of 2011, proposed a new concept of DRR network as N-help (Ueda et al. 2014). Capital "N" means network as well as NGO. In Kesennuma City, network with external built before the earthquake contributed to the education recovery as well as the innovation of DRR education based on their lessons learned. NGOs played a role to build the network as a linker and to create a new external link for the innovation of educational activities. International cooperation projects by NGOs can also make creativity in the context of local culture and sustainability in DRR education. The case in this chapter is the evidence.

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Chapter 14
Future Perspectives of Disaster Resilience of Education System in Japan and Abroad

Koichi Shiwaku and Rajib Shaw

Abstract Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030 was adopted in 2015 at the Third World Conference on Disaster Reduction, and education can be regarded as a crosscutting issue to achieve the four priorities in SFDRR. This chapter identifies the key issues and considers the contribution to SFDRR with the essences and suggestions based on the experiences of Japan in order to apply to other developing and developed countries for enhancing disaster resilience of education system. This chapter suggests the following: (1) curricula, contents, tools, and materials for disaster education, (2) teacher training, (3) school-community linkage and public awareness, (4) budgeting and investment, (5) multi-stakeholders' involvement and technical support by external organizations, (6) sustainable development and disaster risk reduction, and (7) governance system among national, prefectural, and municipal governments as crucial issues for enhancing disaster resilience of education system. Governance system plays significant roles for the four priorities of SFDRR.

Keywords Sendai framework for disaster risk reduction (SFDRR) • Education system • Disaster education • Education governance • Education sector

14.1 Introduction

As the framework for disaster reduction in the world level, after the International Decade of Natural Disaster Reduction (IDNDR), Hyogo Framework for Action (HFA) 2005–2015 was adopted in 2005 and Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030 as the post-HFA was adopted in 2015. Shaw et al. (2011) summarized the worldwide trend under IDNDR and HFA. Public education efforts emerged in many nations, and various educational materials for school children and the general public have been produced under IDNDR. Priority 3 in HFA clearly focused on education, and the key activities in this priority are (1) information management and exchange, (2) education and training, (3) research,

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and (4) public awareness. The disaster risk reduction campaign "Disaster Risk Reduction Begins at School," led by United Nations International Strategy for Disaster Reduction (UNISDR) from 2006 to 2007, emphasized formal education and community participation in order to achieve sustainability (Shaw et al. 2011). It is expected that new strategic campaigns or programs will be developed in the world to implement SFDRR post-2015. In SFDRR, education is a significant crosscutting issue across priorities, which is different conceptually from educational issue in HFA (Shiwaku and Shaw 2016a). Therefore, it is necessary to develop innovative methodologies and approaches in order to achieve SFDRR priorities. Based on the outcomes of Asian Ministerial Conference on Disaster Risk Reduction and the Third World Conference on Disaster Risk Reduction, Chatterjee et al. (2015) suggested local authorities to provide institutional support for children and youth groups, to involve them in decision-making process, and to raise their awareness level. The article also emphasized on the interrelationship among major groups such as local authorities, children and youth, science and technology, and business and industry, for achieving the objectives of SFDRR.

Disaster education has broadly two aspects: (1) education to nurture the sociality through the components on disaster risk reduction and (2) education to enhance the capacity of disaster risk reduction. In 2002, Maiko High School established Environment and Disaster Mitigation Course, which is a special course for disaster management and provides innovative programs of disaster education to high school students. The fundamental concept of disaster education in this course is based on the lessons of the Great Hanshin-Awaji Earthquake, to bring up people who can contribute to the society and can take action independently through raising awareness "Think globally, act locally." This education concept does not focus on bringing up specialists for disaster risk reduction but points out disaster education needs to be provided for enhancing skills, capacities, and awareness to contribute to the society, which is the first aspect of disaster education. As suggested by Shaw and Kaneko (2016), humanitarian aspect needs to be considered in disaster education. This is also considered as a part of the first aspect of disaster education. The second part of disaster education is capacity development to get practical knowledge and skills for disaster reduction. Disaster education at Maiko High School can interlink student's future vision and disaster risk reduction so that students can consider disaster risk reduction in their livelihood (Nakano et al. 2016). Disaster education needs to be reviewed, considered, and evaluated from the two aspects mentioned above. Education system also needs to be considered from education aspects and disaster risk reduction aspects, which emphasizes involvement of relevant organizations and institutions on education and disaster risk reduction and sequence from normal to emergency situation and from emergency situation to normal situation. The dimensions of disaster resilience are robustness, rapidity, and enhancement (Mayunga and Peacock 2010). The concept of enhancement includes not only enhancing mitigation level but also enhancing the level of livelihood. It suggests that the capacity of education system in both normal and disaster situations needs to be emphasized in order to enhancing disaster resilience of education system.

For enhancing disaster resilience of education system, this chapter identifies the key issues and considers the contribution to SFDRR with the essences and suggestions based on the experiences of Japan in order to apply to other developing and developed countries.

14.2 Key Issues for Disaster Resilience of Education System

This book focused on different aspects of education system and provided some emerging messages and directions for enhancing disaster resilience of education system shown in Table 14.1.

In Japanese education system, education at elementary school and junior high school is compulsory education. Recently, high school entrance rate is more than 97 %, and university entrance rate is more than 50 %. Since most of people enter high schools, continuous provision of education from elementary school to high school plays important roles for disaster risk reduction. Education at university should also be emphasized to train students with specialized skills and knowledge. Fujioka (2016) emphasized school disaster education in formal and nonformal education because of the complexity and diversity of the national territory of Japan and suggested that disaster education can be integrated with environmental education and ESD and emphasized relationship among science, technology, and society for problem-solving on disaster risk reduction. Nakano et al. (2016) showed innovative disaster education curriculum in high school with the lessons learned from the Great Hanshin-Awaji Earthquake and identified students that had been involved in disaster risk reduction activities even after their graduation. Their study also emphasized the opportunities that students realize disaster situations in various learning programs. Nakamura (2016) introduced a training project in higher education in the National Institute of Technology, Fukushima College, located in one of the worst-affected prefectures by the East Japan Earthquake and Tsunami (EJET). The college set up the project to train students so that they can contribute to recovery process after completing their studies in the college. To conduct disaster education at any level, teachers play multidimensional and important roles. Oda (2016) explained that teacher training system and disaster risk reduction training opportunities in Japan with the lessons of the EJET were delivered. It also focused on in-service and preservice training and suggested the necessity of disaster risk reduction program for students who want to be school teachers. Shiwaku (2007) pointed out that the important role of teachers was facilitation, which means teachers need to make opportunities for students to learn disaster management actively.

Education can be divided into (1) formal education, (2) nonformal education, and (3) informal education. In formal education, government policies and strategies directly influence school education and school disaster management. Sakurai

Table 14.1 Summary of key messages from each chapter

Chapter	Theme	Key messages
2 (Sakurai 2016a)	Governance in the national level	Reflection of past disaster lessons to the national system
		Supports to local education authorities by the national government
3 (Shiwaku and Shaw 2016b)	Governance in the local level	Originalities and uniqueness of municipal governments and schools
		Provision of standardized materials/programs by prefectural government
4 (Fujioka 2016)	School curricula	Integration with environmental education and ESD
		Relation among science, technology, and society
5 (Oda 2016)	Teacher training	In-service and preservice training
		Comprehensive training system
6 (Nakano et al. 2016)	School curricula	Sustainability of effects of education (students' contributions to disaster risk reduction after completion of education)
		Active involvement in education to be able to feel disaster situation
7 (Shiwaku and Shaw 2016c)	School-community linkages	Technical and fund supports by government
		Concrete concept and system on involvement of community
8 (Shiwaku et al. 2016)	Evaluation and decision-making	Utilization of scientific tools for PDCA cycle
		Multi-stakeholder discussion in decision-making process
9 (Nakamura 2016)	Higher education in affected area	Special course of regional rehabilitation
		Human resource development in recovery process
10 (Oikawa 2016)	ESD and disaster risk reduction	ESD-based disaster education
		Multi-stakeholder consortium in region
11 (Sakurai 2016b)	International NGOs	INGOs' coordination among local governments and schools
		Large-scale fund raising
12 (Shaw and Kaneko 2016)	Technical transfer	Sustainability through improvement of human resource, materials, and system
		Humanitarian aspect in disaster education
13 (Ueda et al. 2016)	Technical transfer	School network and co-learning system for sustainability of disaster education
		NGO's roles as advisors and facilitators

(2016a) explained the structure of disaster management and school safety in Japan and identified the roles of the national government with the evolution of the governance system and its relationship with the recent big disasters in Japan. This study identified improvement of the national system based on the lessons of past disasters and provision of supports to local education authorities including financial support as the roles of the national government. Shiwaku and Shaw (2016b) introduced local governance for school disaster education through case studies

from prefectural and municipal boards of education and concluded that municipal governments need to develop their own concept of disaster education and its implementation system through collaboration with resource organizations. To develop effective concept and implementation system, it is suggested that governments need to conduct proper assessment of schools so that the school and local conditions can be understood comprehensively. Shiwaku et al. (2016) introduced School Disaster Resilience Assessment. It is an assessment tool which can assist in the decision-making process. To conduce to more effective and applicable activities for enhancing school disaster resilience with consideration of the assessment results, this study emphasized multi-stakeholder discussion based on the results produced through application of scientific tools. Focusing on nonformal education, community plays important roles for schools. The importance of community and mutual help was recognized in Japan due to the Great Hanshin-Awaji Earthquake. Shiwaku and Shaw (2016c) showed three types of school-community linkages from three case studies from the disaster-affected areas in Japan. It was pointed out that the local government needs to provide technical and financial support for community-based activities and a concrete concept and system of community involvement for the sustainability of school-community linkage.

As the mainstreaming of disaster risk reduction is emphasized, disaster risk reduction needs to be considered as a part of sustainable development. Fujioka (2016) suggested integration of disaster education with environment education and Education for Sustainable Development (ESD). Oikawa (2016) introduced the new trend of ESD and disaster risk reduction from UNESCO ESD World Conference and the World Conference on Disaster Risk Reduction and suggested that ESD-based disaster education was able to bridge between sustainable development and disaster risk reduction through cooperation and participation of diverse actors like schools, local government, international organizations, private sectors, and others.

The EJET, which is the recent devastating disaster, showed the limitation of combination among self-help, mutual help, and public help. Oikawa (2015) analyzed the process of education sector recovery and emphasized the new type of help called as "N-help" in addition to existing three helps. "N" means NPO/NGO and network. Sakurai (2016b) highlighted the contribution of international NGOs to education sector recovery in the EJET. It was pointed out that INGOs played a supplemental role through coordination between prefectural board of education and municipal board of education and coordination between municipal boards of education and schools so that INGOs identified local needs. It is also mentioned that one of the benefits of involving INGOs was fund raising. Ueda et al. (2016) identified the role of NGOs, which were able to work at grassroot level in disaster education project supported as advisors and facilitators. It emphasized the network among teachers, education officials, and NGOs for technical transfer of disaster education. Shaw and Kaneko (2016) showed the technology transfer project from Japan to Turkey on school disaster education. Their project identified that one of the differences of disaster education between Japan and Turkey was that Japanese disaster education has humanitarian aspect and suggested that sustainability and

improvement of school disaster education needs improvement on human resource, materials, and system.

Based on the above discussion, this section lists the following elements as the key issues for disaster resilience system: (1) curricula, contents, tools, and materials for disaster education, (2) teacher training, (3) school-community linkage and public awareness, (4) budgeting and investment, (5) multi-stakeholders' involvement and technical support by external organizations, (6) sustainable development and disaster risk reduction, and (7) governance system among national, prefectural, and municipal governments.

14.3 Essences and Suggestions on Enhancing Disaster Resilience of Education System

This section is the concluding part for enhancing disaster resilience of education system based on the lessons and experiences of Japan. This section proposes the essences and suggestions for the future perspectives of disaster resilience of education system in accordance with the key issues and secondly considers contribution of the key issues to SFDRR.

14.3.1 Curricula, Contents, Tools, and Materials for Disaster Education

One of the main purposes of Japanese disaster education is to raise students who can contribute to the society with humanitarian hearts not only for disaster management but also for sustainable development as well as to save lives against disasters. The broad concept of disaster education needs to be developed because disaster education has link with ESD and environmental education. The broad concept can make it easy to mainstream disaster education in education curricula of elementary schools, junior high schools, high schools, and higher-education institutes. In addition to curricula, tool and material development are important in order that students understand contents properly and students' motivation is enhanced. When developing tools and materials, teachers' involvement is a key process which can enhance teachers' ownership so that disaster education can be sustained.

14.3.2 Teacher Training

Teachers play important roles in school disaster education and school disaster management. Therefore, disaster management contents need to be included in

preservice and in-service training. It is often considered that teachers are main providers of disaster education. But Shiwaku (2007) identified that teachers are facilitators for school disaster education. It is important for teachers to learn how to teach disaster education and how to facilitate disaster education programs. It is also suggested that university curricula should include disaster risk reduction as a part of training for future teachers because university students who want to be school teachers need to take specific credits in Japan.

According to the interview to the officers of municipal boards of education, especially in Japan, school principals have more power for school management than the board of education. The positive aspect on this is that the school can make its own strategy on school safety and school disaster education considering local contexts, but the negative aspect is that the board of education cannot improve school safety and disaster education directly. Therefore, training of school principal is also significant.

14.3.3 School-Community Linkage and Public Awareness

Even in disaster-affected areas, students do not have direct experiences of disasters several years after the disasters. After several decades, it is expected that some of the teachers do not have experiences. In such situations, community people who have experiences are useful for school disaster education so that students can feel disaster more closely. On the other hand, involvement of the school can contribute in making community-based activities for disaster risk reduction more active.

In Japan, community-based disaster management organizations are managed by emergency management divisions or related divisions of local government. Education for citizens is managed by lifelong learning division of board of education. Therefore, coordination between board of education and related divisions of local government and coordination in board of education are crucial to promote school-community linkage and enhance public awareness.

14.3.4 Budgeting and Investment

Schools do not have budget for disaster risk reduction and disaster education, and the board of education does not have plenty of budget for disaster education and school safety. Therefore, it is suggested that local governments put projects on school safety and disaster education in the annual plan and allocate budget so that school safety and school disaster education can be sustained in municipality and prefecture levels.

However, some of the local governments do not have enough budgets for school disaster management and school disaster education. It is also important for local governments to make a network with local/domestic/international NGOs,

universities, international organizations, and private sectors so that local governments can get technical and financial supports in pre- and post-disaster situations.

14.3.5 Multi-stakeholders' Involvement and Technical Support by External Organizations

As mentioned before, the network plays several roles. Oikawa (2015) suggested that multi-stakeholders' network in normal and emergency time in regional and local level should be transmitted for enhancing synergy of ESD and disaster risk reduction. Local governments are the main actors for disaster management in the local level, but the officers of local government are not necessarily professionals on disaster management. In such local government, external organizations play significant roles before and after the disasters. In the case of schools, the situations are changed year by year because, at least, students graduate from and newly enter schools once a year. Therefore, the annual plan for school management including teaching plan should be emphasized. To improve the school annual plan, universities and NGOs can help in any stages of PDCA cycle because they have knowledge, technology, and field-based experiences which can be applied in the school level. Involvement of external organizations and multi-stakeholders contributes to capacity development of local government and boards of education.

14.3.6 Sustainable Development and Disaster Risk Reduction

One of the significant challenges on disaster risk reduction is sustainability in prefecture, municipality, community, school, family, and individual levels, for instance, because it is difficult to keep people's motivation and awareness. On the other hand, Japanese societies have lots of problems including decline of local industry and economy, depopulation, aging of population, and welfare especially in small- and medium-size municipalities. These problems are expected to be more serious and to cause more serious problems in disaster situations. Community development from various aspects like economy, health, housing, and education should be considered as a part of disaster risk reduction in the community.

When the author visited the board of education in the municipality affected by the EJET, the officers told that school teachers need to know local contexts for recovery process. Disaster management system and disaster education should be acceptable considering local context. In disaster education and teacher training, local contexts need to be reflected to learning programs so that disaster education is more effective for disaster recovery process and pre-disaster situations.

14.3.7 Governance System Among National, Prefectural, and Municipal Governments

The importance of governance in national, prefectural, and municipal levels is recently recognized broadly. It is suggested to consider earlier six issues in governance system in each level. Shiwaku (2016a) pointed out that originality and uniqueness of schools and municipal board of education should be respected without giving standardized top-down policy although standardized policy which can be accepted by many municipalities is important. It means higher-level government needs to promote originality of school safety and disaster education policy of lower-level government and schools through providing technical and financial supports more effectively. To achieve it, it is suggested to develop governance system with appropriate assessment and evaluation system among the national, prefectural, and municipal governments so that both top-down and bottom-up policies effectively work.

14.3.8 SFDRR and the Key Issues on Disaster Resilience of Education System

This section considers contribution to SFDRR from the key issues on enhancing disaster resilience of education systems in Japan. SFDRR has four priorities as follows (UNISDR 2015):

Priority 1: Understanding disaster risk
Priority 2: Strengthening disaster risk governance to manage disaster risk
Priority 3: Investing in disaster risk reduction for resilience
Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction

Shiwaku and Shaw (2016a) compared the educational issues between HFA and SFDRR and concluded that education was a significant crosscutting issue for the priorities of SFDRR. Table 14.2 indicates the descriptions on education in each priority and the relationship between SFDRR priorities and the key issues suggested in this chapter. Governance system is related to all priorities and multi-stakeholders' involvement and technical support by external organizations, and school-community linkage and public awareness are covering three out of the four priorities, respectively. Thus, it is identified that SFDRR gives emphasis on investment, policy, implementation mechanism, multi-stakeholders, and mainstreaming disaster risk reduction. To achieve SFDRR priorities through enhancing disaster resilience of education system, it can be suggested that these key issues need to be improved and that good practices are expected to be shared for application to other areas.

Table 14.2 Relationship between SFDRR priorities and key issues

Priority	Education-related issues in SFDRR	Related key issues*						
		1	2	3	4	5	6	7
Priority 1	The following education issues are focused	V	V	V	V	V		V
	Promoting investments in innovation and technology development for educational challenges							
	Formal and nonformal education, civic education, and professional education and training							
	Promoting national strategies to strengthen public education and awareness							
	Developing effective global and regional campaigns as instruments for public awareness and education							
Priority 2	Education issues are not mentioned clearly, but the importance of raising public awareness and training initiatives in national and local framework is focused			V				V
Priority 3	It is emphasized to strengthen the design and implementation of inclusive policies and social safety net mechanisms through integration with education				V	V	V	V
Priority 4	Promoting the resilience of educational facilities is mentioned	V	V	V	V	V	V	V

*(1) Curricula, contents, tools, and materials for disaster education, (2) teacher training, (3) school-community linkage and public awareness, (4) budgeting and investment, (5) multi-stakeholders' involvement and technical support by external organizations, (6) sustainable development and disaster risk reduction, and (7) governance system among national, prefectural, and municipal governments as the key issues for disaster resilience system

Source: Shiwaku and Shaw (2016a) modified by authors

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