Rajib Shaw

Yukihiko Oikawa  *Editors*

# Education for Sustainable Development and Disaster Risk Reduction

Springer

# Disaster Risk Reduction

Methods, Approaches and Practices

# 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/is making gradual shift from pure basic research to applied, implementation oriented research. More emphasis is given on the multi-stakeholder collaboration and multi-disciplinary 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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# Education for Sustainable Development and Disaster Risk Reduction

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# Preface

Education for Sustainable Development (ESD) is a concept that has existed for several years but was boosted in the Decade of ESD (DESD) from 2005 onward. We understand the importance of sustainable development, but to make it a reality, we need specific action-oriented programs. In the first 5 years of the DESD, it was observed that there were significant numbers of conferences, workshops, and reports that led to little action. The mid-term review of 2009 pointed out the need for action-oriented programs in ESD that can be realized on the ground. For this reason, links with disaster risk reduction (DRR) and climate change adaptation are strongly recommended for the Asia-Pacific region.

The DRR concept drew significant attention globally after the 2004 Indian Ocean Tsunami, which took the lives of people of more than 65 nationalities in the affected coastal regions. In the following year, 2005, the United Nations member states adopted the Hyogo Framework for Action (HFA) (2005–2015) as the action agenda for DRR globally. The key focus of this action agenda is to look at risk reduction in a holistic and systematic manner. While the first 4–5 years have attracted the attention of national governments and international agencies, the mid-term review of the HFA emphasized local-level initiatives.

Thus, ESD and DRR have a natural synergy to focus on local issues and to link with local communities. Both the DESD and HFA come to an end by 2014 and 2015, respectively. Also, the Millennium Development Goals (MDGs) are ending by 2015, leading to new sets of Sustainable Development Goals (SDGs). At this important juncture, this book is an attempt to review the ESD and DRR linkages and try to assess what has been done especially in Japan, and how it influenced the global trends of ESD. Japan, being a strong promoter of ESD, also experienced a devastating disaster in 2011. The Tohoku region has the rich experience of establishing the linkage of ESD and DRR. Moreover, the end-of-decade conference will be held in Japan in November 2014. We hope that this book will provide some thoughts for the future direction of ESD and DRR.

This book is written for students and young researchers aspiring to a career in disaster risk reduction and environmental studies including sustainable development. We hope that they will find the book useful and relevant to their work.

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**Rajib Shaw** is a 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 Chair of the United Nations Asia Regional Task Force for Urban Risk Reduction, 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.

**Yukihiko Oikawa** is a Researcher of Miyagi University of Education, an Associate Researcher of the University of Tokyo, and Senior Advisor of SEEDS Asia, a Japanese non-profit organization. He was the former Deputy Director of Kesennuma City Board of Education. He has been promoting Education for Sustainable Development (ESD) over 10 years at regional and national level, collaborating with local sectors, universities, Japanese government, NGO/NPO and international institution such as UNESCO, United Nation University (UNU) and Fulbright Fund. Since the East Japan Earthquake and Tsunami (EJET) in 2011, he has been contributing to educational recovery of post-disaster in Kesennuma City utilizing the network of ESD, and to improvement of DRR Education based on lessons of EJET and the concept of ESD.

# Chapter 1
# Overview of Concepts: Education for Sustainable Development and Disaster Risk Reduction

**Rajib Shaw**

**Abstract**  Education for Sustainability is a lifelong learning process that leads to an informed and involved citizenry having the creative problem solving skills, scientific and social literacy, and commitment to engage in responsible individual and co-operative actions. On the other hand, disasters are among the biggest obstacles to achieving the UN's Millennium Development Goals for poverty reduction. Thus, reducing disaster risks and their impact has become an important development issue in its own right. ESD and DRR (disaster risk reduction) has natural synergy especially for the Asia-Pacific region, with emphasis on: (1) Strategy points are required to formidable challenges faced by the region: political and economic crises, as well as natural disasters, (2) Integration of climate change adaptation and disaster risk reduction and addressing the impact of food insecurity, and (3) To address these closely linked complex issues by adopting a proactive and holistic approach to resolve them. The common element of ESD and DRRE is the link with the communities. Both DRRE and ESD have demonstrated that an effective education is only possible when the education goes beyond the traditional boundaries of school and communities. For DRRE, experiential learning and linking school and communities are found to important and effective. For ESD, the same experiences have proved the commonalities of these two concepts.

**Keywords**  Asia-Pacific region • Community linkages • DRRE • ESD • School education

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## 1.1 Introduction

> Our biggest challenge in this new century is to take an idea that sounds abstract, 'sustainable development', and turn it into reality for all the world's people.
>
> Kofi Annan (Former UN Secretary General in 2004)

The United Nations Decade of Education for Sustainable Development (DESD: 2005–2014), for which UNESCO is the lead agency, seeks to integrate the principles, values, and practices of sustainable development into all aspects of education and learning, in order to address the social, economic, cultural and environmental problems we face in the twenty-first century. Governments around the world are invited to use the Decade to integrate education for sustainable development into their national educational strategies and action plans at all appropriate levels. Education for Sustainable Development (ESD) targets to the following:

- Learning to know: Recognizing the challenge
- Learning to do: Acting with determination
- Learning to be: Invisibility of human dignity

Education for Sustainability is a lifelong learning process that leads to an informed and involved citizenry having the creative problem solving skills, scientific and social literacy, and commitment to engage in responsible individual and co-operative actions. These actions will help ensure an environmentally sound and economically prosperous future. Education for Sustainability has the potential to serve as a tool for building stronger bridges between the classroom and business, and between schools and communities. Solving environmental problems and preventing new ones from arising will require an understanding and appreciation of the linkages between environmental well-being and human well-being. However, many of these linkages are not apparent at the first instance.

On the other hand, disasters are among the biggest obstacles to achieving the UN's Millennium Development Goals for poverty reduction. Thus, reducing disaster risks and their impact has become an important development issue in its own right. Since the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, in 1992, disaster reduction has been recognized as an integral component of sustainable development (Chapter 3 of Agenda 21). This conclusion and the cross-sectoral nature of disaster risk reduction were once again underlined in 2002 at the World Summit on Sustainable Development in Johannesburg. Furthermore the linkage between disaster risk Education and sustainable development is getting more and more visible on other international agendas.

HFA (Hyogo Framework for Action: 2005–2015) Thematic Area 3 focuses on strengthening networks and promoting dialogue and cooperation among disaster experts, technical and scientific specialists, planners and other stakeholders. It also emphasizes to include disaster risk reduction subject matter in formal, non-formal, and informal education and training activities. Kofi Anan in 2005 for the DESD (Decade of Education for Sustainable Development) mentioned: *"Our biggest challenge in this new century is to take an idea that sounds abstract – sustainable*

development – and turn it into reality for all the world's people". To turn sustainable development into reality, education is an important process, which can generate young professionals, which can provide important tools and methodologies of expert knowledge. And to enhance sustainable education, disaster risk reduction is an integral part of education.

## 1.2 Evolution of Concept and Mid-Term Progress of Decade

As pointed out earlier, it was rather a challenge to make this abstract concept into reality at the beginning. ESD provides an umbrella concept which can be desegregated into different other sub-components like environmental education, disaster risk reduction education, climate change education. It was until the mid-term review of 2009 that these linkages were unclear. The mid-term review had very specifically posed on the following four objectives:

1. To highlight the essential contribution of Education for Sustainable Development (ESD) to all of education and to achieving quality education ("Why is ESD relevant?")
2. To promote international exchange on ESD ("What can we learn from each other?")
3. To carry out a stock-taking of DESD implementation ("What have we achieved so far, what are the lessons learnt?")
4. To develop strategies for the way ahead ("Where do we want to go from here?")

To enhance the linkage between ESD and DRR, a special theme session was organized in the mid-term review conference in Bonn, Germany in 2009. The session was divided into five parts:

- Advocacy to policy makers
- Capacity building
- Formal education
- Non-formal education
- Educational infrastructures

It is recognized that all these five elements are inter-related, and therefore, the recommendation from one thematic session is also applicable to others, which is described below:

### 1.2.1 Advocacy to Policy Makers

It is discussed and agreed that advocacy should focus on vulnerability reduction, have specific local context and should be locally internalized. It should also contain

the positive aspects of risks, and cost benefit analysis of DRR education. To enhance advocacy, following means can be incorporated:

- Advocacy should target appropriate change agents depending on the needs and demand, and should have specific entry points, like climate change
- Media plays an important role in advocacy in terms of DRR education

Advocacy should have specific and targeted outputs and outcome as follow:

- Political commitments for safe schools (evidence based actions)
- Advocacy tools, guiding documents, policy notes, networks

Based on the discussion in the session, following key issues were emphasized and recommended:

- Build better links between DRR, Education, SD (sustainable development) and CC (climate change) communities—increase synergies between existing national mechanisms for DRR (disaster risk reduction), UNESCO Commissions and ESD.
- Develop a collective long-term educational strategy that encompasses key aspects of sustainable development around existing strategic frameworks consensually agreed upon at the international level, such as HFA and DESD.
- Build on existing ad-hoc commemorating processes and events to ensure continued long-term action and reflection to further promote DRR in the overall framework of SD.
- Encourage participatory approaches towards ESD through the involvement of key stakeholders such as Governments, local authorities, civil society, the NGO community scientific and technical institutions and the private sector. Media should also play a major advocacy role with policy makers in linking disaster situations to sustainable development.
- Bring coherence on terminology issue to include clear references to DRR, environmental protection, CC as part of ESD.
- Foster adaptation and localization of advocacy messages to target audiences.
- Recognize children's role as powerful agents for change—empower them through skill and competency-building processes—build hope by generating safe, friendly and happy schools
- Contribute to EFA by ensuring alternative schooling and educational contingency planning to avoid the education gap caused by disasters.
- Recognize DRR's contribution to SD—as such, DRR education implementation supports ESD and should be seen as a strategic priority for the second half of DESD

### 1.2.2 Capacity Building

Capacity building is defined as "Efforts aimed to develop human skills or societal infrastructure within a community or organization needed to reduce the level of risk." Capacity-building also includes development of institutional, financial, political and other resources, such as technology at different levels and sectors of the

society (UN ISDR). "Successful capacity development requires not only skills and organizational procedures, but also incentives and good governance. The prime responsibility rests with partner countries, with outside actors playing a supportive role (OECD DAC 2006)." Therefore, capacity building is not only an educational issue, it is also considered as a governance issue. HFA Words into Action focuses on the following steps as capacity building:

1. Identify key sectors to be involved in training, based on disaster reduction needs at national and local levels.
2. Identify women's and community groups, and professional associations or trade organizations that could contribute to/or benefit from training.
3. Identify, strengthen or develop standards or other systems for professional certification and/or licensing that can promote sustained disaster risk reduction knowledge and skills.
4. Develop, strengthen and invest in continuing national training programs and centers, as well as professional courses, seminars and workshops.
5. Produce training materials locally, by consulting with women and community groups to identify gaps and local resources for gender-sensitive disaster risk reduction training. Develop gender and context-specific training modules and make these widely available.
6. Identify or establish an information facility to compile exchange and expand information about available professional training for disaster risk reduction.

Capacity building should assess the existing capacities, build on context specific local knowledge/wisdom. It should contain practical examples and needs to be linked to implementation. There are specific means to capacity building programs. While it is important to focus on single coherent strategy of CB, it also requires context specific approaches. Thus, capacity building needs a balanced mix of global, regional initiatives, locally customized programs and blended learning programs. Specific outputs of capacity building program can be as follow:

- Guidelines, principles, modes and methodologies of CB programs
- Process oriented impact evaluation

## 1.2.3  Formal Education

Formal education session was introduced as an expanded notion of access to quality education for all. Within it a three tiered model of life skills basic and quality education was presented.

- Tier One: Formal education, an ideal of universal provision of LSBE for all children and audiences as called for in international commitments. Quality interventions at this level are structured.
- Tier Two: Other curricular based interventions and is offered outside of the formal school curricula.

- Tier Three: Life skills based interventions depended on addressing the specific of completing risk or need of a target population.

Skills to mitigate the impact of disaster risk reduction are the most important thing that the formal education system shall procure to children. A model of quality education which is life-skill based has therefore to be advanced in countries prone to disasters. Curricula development, teachers training and evaluations have to be aligned so as to test if relevant skills to DRR are provided to children to become more resilient to disasters. To achieve the goal of making communities more resilient to disasters Education for Sustainable needs to make the relevant balance between the provision of knowledge and skills and the end goal of DRR education has to be to provide skills. Following main issues were discussed:

- Need to integrate DRR into the entire curricula, although it is not an easy task. But there are many ways to achieve it: this can be integration as a stand-alone subject of its own (this is the case in Iran), this can be introduced within a carrier subject (like geography, civic education, geology, other) or this can be mainstreamed in different subject matters. The important point is that in disaster-prone countries children can get the necessary skills to mitigate the disasters through the education system.
- The economic argument is compelling for sustainable development.
- Training of teachers to bring momentum to reduce the risks of disasters and procure the right skills to children is necessary. However, in many countries where resources are lacking and teachers perceive only a tiny salary, the engagement onto those new forms of education, requiring more investments from their part might be too much (case of Indonesia where when required to invest more time to include DRR in their courses, many teachers confronted with small salaries resigned). A combination of relevant partnerships, of advocacy on the moral necessity to reduce the risk of disasters to save children rights or even lives, and of strong advocacy to policy-makers (cost of investment in DRR will be lower than the cost of disasters themselves without DRR) might help to overcome these difficulties. The challenge is for political will to obtain resources and support for the necessary key educational inputs.
- The need for coherent resource mobilization efforts to support quality education agenda especially for resource deficient school and poor educational environments- development and quality education are imperative. No progress on inclusion of DRR in formal education can be made without commitments of Governments. And in zones prone to disasters it is a duty of all states as duty-bearers (towards the convention of the rights of the child notably) to ensure the best possible conditions for the development of the child. Hence in those conditions DRR education is a necessity and a step forward on the road to sustainable development.

## 1.2.4 Non-formal Education

Non-formal education part started with examples of vulnerability, development and gap between knowledge and practice. Three key issues were pointed out as the core reasons of existing gaps in the sustainable development process:

- The cause and effect relationship between disasters and development has been ignored
- Disasters are usually seen in the context of emergency response
- The concept of sustainable development seems to be overlooking the aspect of "Safety"

It is argued that non-formal education is the entry point of education for sustainable development and disaster risk reduction education. It combines both the community level education as well as the indigenous and traditional knowledge existing in the communities over years. Following issues are emphasized in the non-formal education context:

- Understanding local context and culture is an important aspect of non-formal education.
- Non-formal education is more effective when it is linked to visual demonstration.
- Cause and effect relationship becomes part of non-formal education if it is linked to daily activities.
- Non-formal education can be done through continuous monitoring of daily environment

As the specific output of the non-formal education, following three issues were emphasized:

- Specific entry points to link to the DRR and ESD
- Targeting different segments of vulnerable population
- Quantifiable indicators for safety of school children to be included in ESD framework

## 1.2.5 Educational Infrastructures

In this session, it is argued that to concentrate DRRE on the Learning establishments educating and training collectively, it is a must to make the schools, universities and all training and learning establishments a safe environment. Experiences of past disasters showed that while teaching and spending resources one day, the other day (after disaster) all efforts are gone to find the children under the collapsed infrastructures and piles of rubbles. This destroys the sustainability one strives for along with the whole influential next generation of the educated and the trained craftsmen and women, the pillars of Disaster Risk Reduction and Sustainable

Development. School vulnerability strongly affects a country's ability to achieve the Millennium Development Goals (MDGs) of the universal right to primary education and the eradication of poverty, and the UNESCO led "Education for All" initiative, both only attainable when principles of resilient environments and school safety are made a priority.

The following conditions have to be met to ensure safe education centers:

1. Safe sites are defined in a detailed risk analysis.
2. New education centers are built for disaster resistance in compliance with building regulations.
3. Existing education centers are assessed and brought up to regulation standards through structural reinforcement and retrofitting as appropriate.
4. Minimum standards for regional building regulations are developed and applied.
5. Special attention is paid to educational infrastructure in land use and development planning.

Consequently there derived the prioritized collective series of 'global safe schools' and 'DR education' projects and initiatives. In 2005 the Coalition for Global School Safety established an international network of advocates and activists; 2007 saw the Ahmedabad Action Agenda adopted at the first pure International Conference on School Safety organized by SEEDS, identifying the need for: immediate and midterm priorities; Disaster Reduction Education in Schools; Disaster Resilient School Infrastructure; Safe School and Community Environment; Advocacy and government Policy on School Safety. It also identified stakeholder roles and responsibilities; this was followed by the 2008 International School Safety Conference in Pakistan organized by the Aga Khan Foundation with the 'Islamabad Declaration on School Safety' prioritizing DRR Education and the creation of resilient school buildings through new build coded implementation and retrofit and the use of PPPs Private Public Partnerships.

Based on the above context, following specific suggestions were made for educational infrastructures:

- Safe site selection and building safety for new infrastructures
- Ongoing assessments of the infrastructure, prioritization of retrofit
- Minimum standards for regional building regulations are developed and applied
- Special attention is paid to educational infrastructure in land use and development planning.

## 1.3   Implication to ESD DRR Linkages

As the summary of the mid-term review, especially on the ESD-DRR linkages, it was discussed and agreed that, "*DRR Education is one of the pillars to achieve ESD and a priority action to implement the second half of the UN Decade on Education for Sustainable Development*". To achieve this goal, and to enhance the synergy of

ESD and DRR education activities, policy advocacy, capacity building, formal and non-formal education (including school as well as higher education in DRR), and safe educational infrastructures are the key aspects and entry points. Specific emphasis should be given on:

- Local customization, culture and incorporation of local context
- Focusing on targeted educational outputs like "zero mortality of school children in disasters by 2015"
- Visualization and linking to daily lives can be effective means of DRR education and ESD

Following four basic questions need to be addressed for that:
Why DRR education in relevant to ESD?

- Disaster risk reduction is a development agenda
- DRR education with safe infrastructures, educational components (both school and higher education) is the key to the ESD
- Child-centered learning and quality education are key to ESD and DRR
- Local and traditional knowledge, non-formal education rooted in local cultural contexts are closely linked to the ESD

What can ESD and DRR learn from each other?

- Scope of learning can focus on conventional links of DRR and SD (poverty reduction, health, education issues), however needs to recognize emerging and complex risks, like climate change
- Non-formal education can be a very good entry point of mutual learning of ESD and DRR
- Safety of school children needs to be another common agenda of ESD and DRR

What is achieved so far?

- HFA (Hyogo Framework for Action: 2005–2015) ratified by the member states emphasizes the need of education and public awareness as on the five thematic areas
- Global and regional task forces and knowledge platforms have taken pro-active roles in risk reduction education with UN focal points (UNICEF, UNESCO, UN ISDR) and other partners, including governments, civil society and academic institutions
- Policy advocacy, tools, methodologies, guidelines and project implementation were done to promote DRR in both schools and higher education

Where do we want to go from here?

- Collaborative action program of DRR and ESD community in the mid-term review of the HFA, followed by targeted outcome of the end of ESD and HFA
- "Zero mortality of school children by preventable disasters by 2015" needs to be included in the ESD target

- Partnership based local projects and its proper evaluation needs to be re-emphasized
- DRR in ESD needs to have institutional and rights arguments.

Finally, there should be a realization that this is not a competition between agencies, concepts of ideas or between DRR and ESD; it should be a collaboration of efforts between everyone. After all, we are all striving to build a sustainable and importantly, a resilient community in which we all can live with equal opportunities of survival. Based on these recommendations, the future of the Decade has emphasized on the following (UNESCO 2010):

- Enhancing synergies with different education and development initiatives and strengthening ESD partnerships
- Developing and strengthening capacities for ESD
- Building, sharing and applying ESD-related knowledge
- Advocating for ESD, and increasing awareness and understanding of sustainability.

Especially for the Asia-Pacific region, it is emphasized that:

- Strategy points are required to formidable challenges faced by the region: political and economic crises, as well as natural disasters.
- Integration of climate change adaptation and disaster risk reduction and addressing the impact of food insecurity
- To address these closely linked complex issues by adopting a proactive and holistic approach to resolve them.

## 1.4  Book Outline

The book has total 11 chapters, with key examples from Japan. At first three chapters [Chaps. 2–4] provide some basics of different types of education: education for sustainable development (ESD), disaster risk reduction and climate change education. In Chap. 2, drawing lessons from Japan, as the key strategies for Promoting ESD at formal and informal education sectors, the projects of "Regional Centers of Expertise (RCE)" and "UNESCO Associated Schools Project network (ASPnet)" are described. The chapter also provides the survey results and significances of ESD in Japan beyond the Decade. Chapter 4 provides an overview of climate change education. Citing examples of Philippines and Vietnam, the chapter analyzes the current policy of climate change education, identifies the gaps and challenges and provides a framework to link the climate change education, ESD and disaster risk reduction education. Chapter 5 discusses the impacts of East Japan Earthquake and Tsunami on the ESD. Tohoku region had a strong emphasis on ESD, and had been pro-active for ESD for several years. The chapter categorically summarized the information gathered immediately after the quake and the tsunami. Then, the chapter described the status of the schools' restructuring 3 years after the

disaster, and discussed the implication of ESD in the recovery process. Chapter 6 discusses the policy perspective of the ESD. The chapter traces the mechanism of promotion of education for Sustainable Development (hereafter "ESD") both on the model suggested by the International Implementation Scheme (hereafter "IIS") and on the reality of Japan. As a conclusion, a possible model of the governance after the United Nations Decade of the Education for Sustainable Development (UNDESD, 2005–2014) was presented. Chapter 7 aims to reveal the issues surrounding Education for Risk Reduction and Education for Recovery conducted in RCE Greater Sendai region. RCE Greater Sendai is a regional network of organizations that promotes ESD and was recognized as one of the first RCE in 2005 by United Nations University. The chapter analyzes the issues of Education for Risk Reduction and the contents of Education for Recovery. Chapter 8 discusses how the UNESCO ASPnet youths in Asia were organized in international solidarity to respond to the East Japan Earthquake and Tsunami, first with message exchange and second in an international workshop. The international workshop was designed and implemented with DRR education in synergy with ESD. The chapter introduces how such workshop provided a learning experience for students and teachers to broaden the scope of DRR education. Chapter 9 analyzes DRR Education guidelines and manuals, and reveals that Japanese DRR education has several unique characteristics. Firstly, prefectural boards of education have been taking initiatives in promoting DRR education in line with the guidance by MEXT. There are significant differences of DRR education in different regions in the country. The chapter concludes that since the ability required for DRR education can be developed through ESD, linkages between DRR education and ESD should be further strengthen by integrating DRR education with ESD. Chapter 10 analyzes the responses of schools and Kesennuma City Board of Education (BOE) in Kesennuma city in Tohoku in order to reopen schools and to recover the school education in Kesennuma City. It also analyzes the framework and the method for improvement of DRR education based on experiences and lessons from EJET and ESD by introducing the research of BOE and some case studies of schools in Kesennuma City. Lastly, the chapter analyzes the perspectives for Recovery Education in Kesennuma City, which should be made best use of ESD concept. Chapter 11 described campus sustainability concept, which is rather new concept. In Japan, the initiative started after G8 summit of Hokkaido, which led infra/facility based approach. This gradually changed to softer aspects with involvement of students, faculty members and incorporation in curriculum. A network called CAS NET Japan was established recently to facilitate the process in the country, and to establish connection with abroad. A case study from Kyoto University is presented to highly campus sustainability initiative. Finally, the GET (Governance-Education-Technology) framework is presented to highlight the holistic approach of campus sustainability.

## 1.5   Future Perspectives of ESD DRR

Disaster risk reduction education (DRRE), education for sustainable development (ESD), climate change education (CCE) and environmental education (EE) are practicing in different areas in different context. While disaster risk reduction education and climate change education has higher commonalities, education for sustainable development and environmental education share common features in many cases. Figure 1.1 provides a conceptual diagram of these four core concepts and shows the commonalities and differences.

In the diagram, three basic levels of education are mentioned: primary, secondary and tertiary. In case of ESD, the focus is more on primary and secondary, and less on tertiary. While, in case of DRRE, there should be a balance of these three types of education. Environmental education focus should be more on secondary education, while CCE needs to focus more on tertiary education. The key words for these four types at primary level are mentioned. There are several key words, and it is found that community and culture becomes the common key words for all four types of education. Action is the key word for secondary education for all four types of education. In case of tertiary education, enhanced knowledge and understanding is the focus of ESD, professional development is the focus of DRRE and CCE, while behavior change is the key target of EE. Therefore, from concerned student,
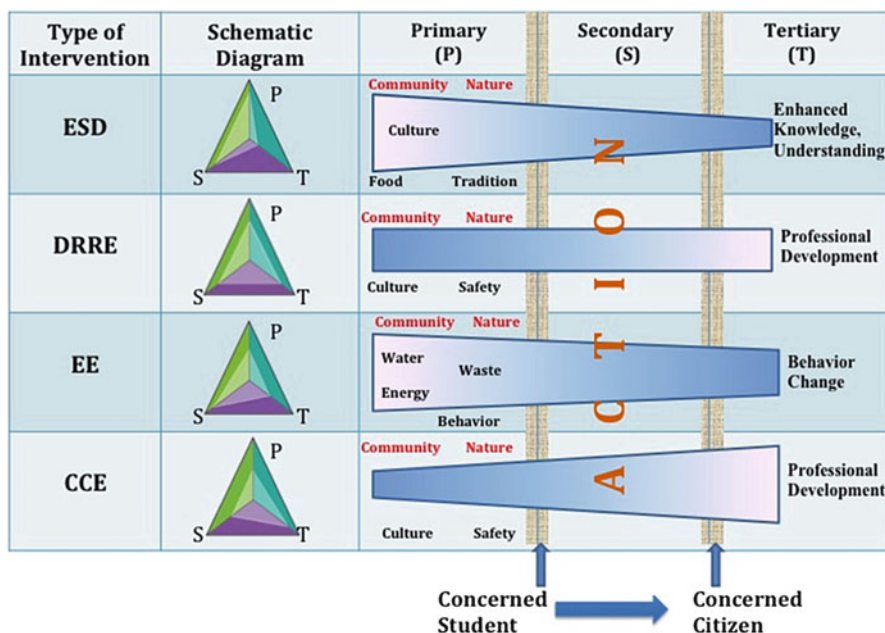


**Fig. 1.1** Conceptual diagram of ESD, DRRE, CC and CCE (*ESD* education for sustainable development, *DRRE* disaster risk reduction education, *EE* environmental education, *CCE* climate change education)

the target is to become concerned citizen through different levels of education process from primary to tertiary.

The common element of ESD and DRRE is the link with the communities. Both DRRE and ESD have demonstrated that an effective education is only possible when the education goes beyond the traditional boundaries of school and communities. For DRRE, experiential learning and linking school and communities are found to important and effective. For ESD, the same experiences have proved the commonalities of these two concepts. As observed in the East Japan Earthquake and Tsunami (EJET) that two cities: Kamiashi and Kesennuma have shown contrasting school based responses of disaster. In case of Kamaishi, the city, which was known for its excellence in DRRE, has been able to evacuate elementary and junior high school students in the Unosumai area. The result was very less casualty of the students, and is known as "Kamaishi Miracle." The credit goes to long-term collaboration between school and communities as a part of DRRE. On the other hand, the city of Kesennuma had long experiences of ESD with local communities and schools. During the disaster, several schools handed over the children to their parents, which was rather wrong decision. However, due to strong network of communities, most of those children were safe, and this is contributed to the strong school community linkage. Thus, for both the cases, it was the school-community linkage, which saved student's lives. Consequently, the ESD and DRRE share the commonness of community linkages and experiential education.

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# Chapter 2
# Education for Sustainable Development: Trends and Practices

**Yukihiko Oikawa**

**Abstract** This chapter analyzes the trends and practices of "Education for Sustainable Development (ESD)" mainly during UN-Decade of ESD. The concept of ESD was shared and its necessity was recognized among almost all countries around the world at the Earth Summit in Rio de Janeiro, Brazil in 1992. At the Earth Summit, the role of education was emphasized for achieving sustainable development in Chapter 36 of Agenda 21 which was launched then. Along with this trend, Japanese government proposed the "Decade of Education for Sustainable Development (DESD)" at the World Summit on Sustainable Development in Johannesburg South Africa in 2002. The proposal of DESD was adopted at UN general assembly in 2002. Pursuant to the resolution of United Nation, DESD has started around the world from 2005 to 2014. The Japanese government established the "Inter-ministerial Meeting on UN-DESD" in 2005 and decided an implementation scheme for the UN-DESD in Japan. The government also has been trying to incorporate ESD concept to reform of educational law and national curriculum. During the decade of ESD, two global networks have been taking prominent roles as the key strategies for Promoting ESD at formal and informal non-formal education sectors. One is "Regional Centres of Expertise (RCE)" launched by United Nation University in 2005, and another is "UNESCO Associated Schools Project network (ASPnet)" promoted by UNESCO since 1953. ASPnet functions at school (formal education) centered ESD along with community. On the other hand, RCE facilitates the ESD of not only schools but also non-formal and informal education sectors also collaborating with each community and region. To survey the strategies, system buildings and programs/activities of these networks gives valuable suggestions and visions for the sustainable development of ESD beyond the Decade.

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## 2.1 Trend of Decade of Education for Sustainable Development (DESD)

At the end of twentieth century, according as human beings had been facing a lot of crises of environment such as global warming, desert spreading, crisis of bio-diversity, disruption of ozone layer and rain forest, pollutions of water and air, and also social problems such as poverty in many developing countries, disputes in cause of religious and racial problems, gender problem and so on, all of those were not able to sustain society and future at 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 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 2012a, b).

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 towards sustainable development, and encompasses all streams of education, both formal and non-formal, basic education and all the key issues related to education for sustainable development (United Nation University-Institute of Advanced Studies (UNU-IAS) 2005). The four major thrusts of as identified in the Chapter 36 of Agenda 21 are:

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

In the process of negotiating a Plan of ESD Implementation of the World Summit on Sustainable Development in Johannesburg South Africa, 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 co-sponsors 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 Plan of Implementation. UNESCO was designated as the lead agency for the Decade, which developed a draft International Implementation Scheme for DESD.

In mid-term 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 Bonn Declaration of following 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 beginning of the 2nd half of the DESD, UNESCO stated three priorities in addressing global sustainable development challenges through ESD, by focusing on the following: climate change, biodiversity, disaster risk reduction and preparedness. They are key action themes for the second half of the DESD (2010–2015) as UNESCO strategy. (Interministerial Meeting on the "United Nation Decade of Education for Sustainable Development" Japan 2009)

Twenty years later from the Earth Summit in Rio de Janeiro in 1992, "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 the chapter of V. "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." (The United Nation 2012)

## 2.2 Decade of Education for Sustainable Development (DESD) in Japan

At the beginning of the "UN Decade of Education for Sustainable Development (UN-DESD), Pursuant to this resolution for sustainable development, in 2005, the Japanese government established the Inter-ministerial Meeting on UN-DESD" within the Cabinet to strive for close coordination among administrative bodies concerned with implementing the measures related to the UN-DESD and to promote the effective and comprehensive implementation of the measures. The Inter-ministerial Meeting has examined this matter while giving full consideration to opinions from various sources and has decided on an action plan for the UN-DESD in Japan.

### 2.2.1 ESD and Education Reform in Japan

There was an on-going reform in school education in Japan at the beginning of this century in Japan. In keeping up with a changing society, Ministry of Education,

Culture, Sports, Science and Technology in Japan (MEXT) had recognized the need to train students to be rich in heart and become able to contribute to sustainable society, acquire the basic skills for educating themselves, and cultivate their "Zest for Living." The Renewal Course of Study, in effect April 2002, in which the World Summit on Sustainable Development was held in Johannesburg South Africa, required schools to set aside time for integrated studies 105 lessons per a year. So that schools and teachers had possibilities to promote ESD program through subjects and integrated studies at each school level. In 2006, Organic Law of Education in Japan was reformed in 60 years, and it prescribed to drawing up the Basic Plan for Promotion of Education by the article of 17th. The Basic Plan for Promotion of Education states that the concept of ESD corresponds with the concept of renewal Organic Law of Education in Japan as well as Key competency of OECD. ESD fosters "Zest for Living (Ikiru-chikara)" to children. Therefore it is a very important educational idea which fosters global and local citizens who should shoulder sustainable future. ESD fosters abilities and attitudes such as critical thinking, system thinking, holistic thinking, ability of communication, ability for collecting and analyzing information, and ability of decision making and action. All of them are very important and indispensable abilities for future leader. On other hands, ESD also emphasizes the linkage and collaboration with community, other regions and institutions for promoting it. These bonds of ESD worked effectively on solving and overcoming the issues in each community or country, such as social, economical and environmental issues.

In 2013, the Basic Plan for Promotion of Education has been renewed as second term plan after the Great East Japan Earthquake. It also defined the significance and promotion of ESD in its chapters. The New Course of Study, in effect April 2011 also includes the concept of ESD to the objects and contents of each subjects at each school level. And it still requires schools to set aside time for integrated studies, so that schools and teachers are able to spread the possibility to promote ESD through each subject and integrated studies at each school level based on national course of study (NIER 2012).

### 2.2.2   Establish Linkage with Outside for Promoting ESD

In order for schools to realize and reap the benefits of these reforms, it is essential that teachers go beyond the school walls, establish links with community and professional organizations and institutions, and promote educational activities with the support of a broader partnership framework. In particular, with ESD programs such as environmental education and international understanding education, schools devise and implement their own original learning programs, creating and realizing distinct, unique educational activities. By involving community, universities and other professional organizations in this process, teachers can apply the latest expert knowledge, techniques, data, information, and research findings to their teaching and curriculum in pursuit of more in-depth and

comprehensive learning programs of ESD. When all parties form linkages, collaborate to create and implement learning programs, and cultivate these relationships, it should be realized that learning programs tailored to the individual learning styles and educational needs of each child, expanding possibilities and opening doors for students and education. Building this new education networks meets the needs of their future.

## 2.3    Role of Regional Centres of Expertise (RCE) for DESD

Flowing the resolution on the Decade of Education for Sustainable Development (DESD) of the UN General Assembly in 2002, which based on the Johannesburg Plan of Implementation, United Nation University Institute of Advanced Studies (UNU-IAS) launched the Education for Sustainable Development Programme in 2003 with funding support from Japanese government, in order to contribute the UN-DESD, spanning from 2005 to 2014. The programme of UNU-IAS focuses on advocacy and dissemination of education for sustainable development principals, strengthening of ESD activities in regions and at higher education institutions, and contributing to evidence-based policy dialogue through research, capacity development and strategic engagement with international processes. The programme should be to help in the creation of a Global Learning Space for sustainable development. It promotes research and actions to advance partnerships for ESD across geographic, knowledge and sectoral boundaries (United Nation University-Institute of Advanced Studies (UNU-IAS) 2005).

### 2.3.1    Regional Centres of Expertise (RCE): Regional ESD Initiative

"Regional Centres of Expertise" is a key project of the ESD programme of UNU-IAS. UNU-IAS assists in developing Regional Centres of Expertise on ESD (RCEs) all over the world. RCE is not a physical center or building, but rather a network of individuals, organizations and experts who are committed to using education as a tool for building a sustainable future. Each RCE is regionally-based and RCE members bring in-depth knowledge of the challenges facing their respective regions. RCEs aspire to achieve the goals of the DESD by building an innovative platform for multi-sectoral and interdisciplinary information-sharing, dialogue and collaboration at local and global levels. Their networks include formal learning institutions, like schools and universities, as well as informal learning establishments, such as museums, private enterprises, local governmental institutions, NGO/NPO and the media (Fig. 2.1). Collaborative undertakings within and across RCEs include policy work, research and development in the key thematic areas of ESD and sustainable development.
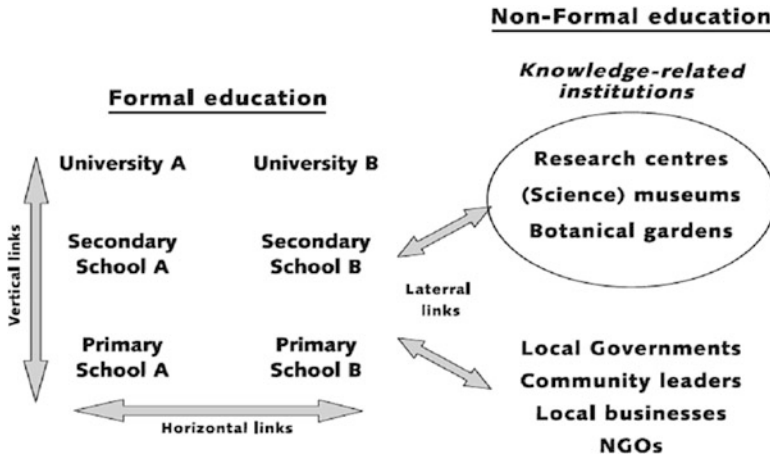
**Fig. 2.1** Structure of Regional Centres of Expertise/Source "Mobilising for Education for Sustainable Development" (United Nation University-Institute of Advanced Studies (UNU-IAS) 2005)



**Fig. 2.2** RCEs around the world [*Source*: UNU-IAS (2010)]

## 2.3.2   Spreading RCEs Around the World: History of RCEs

The first batch of seven RCEs was acknowledged at the UNU-UNESCO Conference on Globalization and Education for Sustainable Development in Nagoya, Japan, June 2005. These first RCEs, consist of Greater Sendai and Okayama in Japan, Toronto in Canada, Penang in Malaysia, Pacific Island Countries, Rhine-Meuse which is part of Netherlands, Belgium and Germany, and Barcelona in Spain. They are called "Initial Seven RCE". Five more RCEs followed toward the end of 2005

and early 2006. The Ubuntu Alliance, in its meeting in April 2006, established the Committee of Pears for the RCEs, to discuss ways to promote RCEs, to review applications and provide recommendations to UNU to acknowledge new RCEs. The Committee recommended UNU to acknowledge 23 new RCEs at its first meeting in December 2006 in Paris. The RCE network continues to expand and today there are RCEs in Africa, the Americas, Asia, Europe, the Middle East and the Pacific. There are 120 acknowledged RCEs as of October 2013 around the world (Fig. 2.2).

### 2.3.3  Core Elements and Functions Toward Goals of RCEs

There are four core elements of RCE. One is governance—RCEs is addressing issues of RCE management and leadership. Second is collaboration—RCEs is addressing the engagement of actors from all levels of formal (primary, secondary and higher education), and informal education sectors in RCE activities. Third is research and development—RCEs is addressing the role of research and its inclusion in RCE activities, as well as contributing to the design of strategies for collaborative activities, including those with other RCEs. Last is transformative education—RCE contributes to the transformation of the current education and training systems to satisfy ambitions of region regarding sustainable living and livelihood.

RCEs aim to achieve the goals of the UN-DESD from 2005 to 2014 both individually and collectively. While each RCE contributes to the DESD by translating its global objectives into the context of the local communities in which they operate, the worldwide network of RCEs is envisioned to constitute what "The Global Learning Space for Sustainable Development". The Global Learning Space is the articulation of a vision of the DESD put toward by UNESCO: "a world where everyone has the opportunity to benefit from education and learn the values, behaviors and lifestyles required for a sustainable future and for positive societal transformation".

As to the function of RCE, the RCE is a network of existing formal, non-formal and informal education organizations, mobilized to deliver ESD to local and regional communities. RCE builds an innovative platform for multi-sectoral and interdisciplinary information-sharing, dialogue and collaboration for promoting ESD among regional/local stakeholders. It also creates a regional/local knowledge base to support ESD activities. As an innovative platform for dialogue and local knowledge base, RCE promotes four major goals (four thrusts) of ESD, which the Chapter 36 of Agenda 21 described, in a resource-effective manner. (UNU-IAS 2010)

### 2.3.4  Case of Regional Centres of Expertise (RCE)-RCE Okayama

On the process of DESD, it should be introduced two cases of RCEs in Japan. One is Okayama RCE and another is Greater Sendai RCE. Both of them were
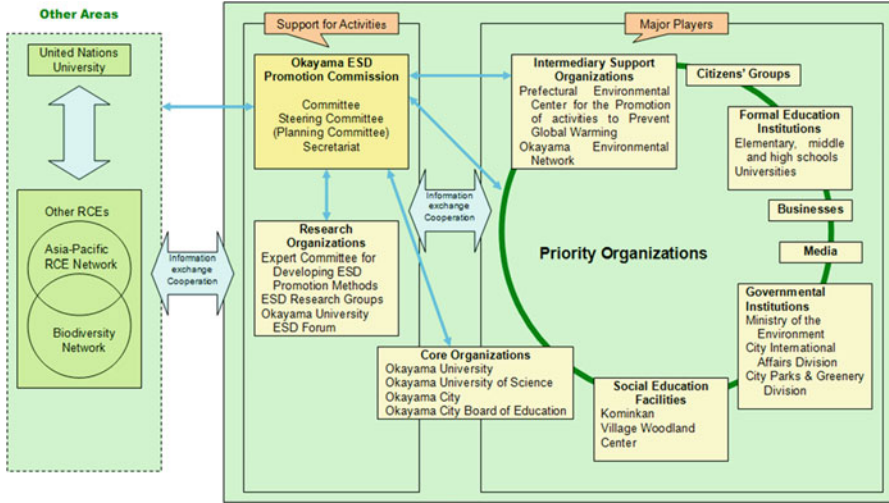
**Fig. 2.3** Structure of RCE Okayama [*Source*: Okayama ESD Promotion Commission (2013)]

acknowledged in June, 2005 and they are Initial 7 RCEs. Two RCEs have typical characters of RCE in the world, but backgrounds, experiences, strategies and practices of two RCEs make contrast each other.

RCE Okayama has been promoted by Okayama City. Okayama City is the capital of Okayama Prefecture in west Japan and it is located on the north shore of the Seto Island Sea within National Park. The city is a major hub of transportation as a gateway to Shikoku Island in Chugoku Area of Honshu Island. Okayama City is a city designated by ordinance, and it has a population of approximately 700,000 and the area of 790 km$^2$. Okayama City is recognized as one of the leading City of ESD promotions in western Japan. At the end of UN-Decade of ESD in 2014, the UNESCO World Conference on ESD will be held in Okayama City as well as Nagoya City of Aichi Prefecture, Japan.

In April 2005, at the beginning of DESD, "the Okayama ESD Promotion Commission" was established in order to propose to RCE. This commission consists of organizations and groups related to ESD activities. By leading of this council, "Okayama ESD Project Fundamental Plan" was formulated and launched the "Okayama ESD Project" for the purpose of promoting ESD in Okayama region as a role of Initial 7 RCE. The number of project participants has increased to more than 160 organizations by September, 2013. Okayama City takes a central role as a secretariat and has set ESD coordinators to help organizations that promote activities in relation to ESD in order to encourage local linkage and to build strong network. Based on these linkages through local and community center and junior high school districts, ESD activities are spreading widely and the practice is gaining attention around world (Fig. 2.3).

The goal of RCE Okayama is to promote ESD which reflects the nature of the region and to create of community where people learn, think and act together

towards realizing a sustainable society through collaborations among diverse individuals and sectors such as schools, universities, Konominkans (community learning center), enterprises and administrations those are involved in ESD. Multiple individuals and organizations within and outside the region, implement ESD with various themes focused on natural environment, international understanding, community development, agriculture, foods, energy, and so on. And objects of the ESD Project by RCE Okayama are as follows (Okayama ESD Promotion Commission 2013);

- Improve knowledge and understanding about sustainable lifestyles among people living in Okayama region.
- Expand the circle of people who take initiative in building sustainable programs throughout the local community.
- Develop each organization involved in ESD and enhance its capabilities.

The ESD activities and networks of RCE Okayama have been developed year by year. As "The Okayama ESD Model", RCE Okayama is trying to disseminate their good points, such as strategies and structures which they have practiced and established since 2005 when RCE Okayama was acknowledged by United Nation University.

There are five points to be noticed as good practices.

1. The first point is providing opportunities for diverse organizations and individuals to engage in ESD. That indicates that opportunities strengthen the network and platform for promoting ESD. These opportunities lead making dialogue and learning, so that they build supportive networks where various organizations can learn from each other. As a result, it leads to increasing the number of organizations and residents who engage in ESD and expanding area of activities.
2. Second point is promoting ESD continuously by government organization proactively. Basically, RCE Okayama is operated by Okayama City government, so that it is insured providing useful and reliable safety procedure, and building organizational power and strong networks. City Government announced ESD to residents as the new pubic issue, and tried to develop acceptance of ESD as a public measure by whole community. This top-down method is very effective on occasion, in order to disseminate ESD concept to not only residents and enterprises, but also formal sectors such as schools and public organizations.
3. Third point is support from ESD professional coordinators at secretariat. ESD coordinators provide continued support to individuals and organizations, for example, connecting various groups inside and outside community and building trusting relationships and cooperative networks with ESD parties. They are also researching new understandings by utilizing experiences of external professionals.
4. Forth point RCE Okayama is promoting ESD with Kominkans (Japanese Community Learning Center) as the central hub. Kominkans provide learning places for each community and Kominkan staffs also can build networks among NPOs,

citizens, and local organizations. According to the promotion of ESD by Kominkan as a central hub, Kominkan was re-acknowledged as a social educational organization and it gave new meaning to community activities.

5. Finally, universities in Okayama City is cooperating with practices of Okayama RCE and supporting local ESD activities, utilizing special perspectives to reevaluate community resources and uncover their true merits. That is the function of "Expertise", so that it is called RCE (Regional Centres of Expertise).

### 2.3.5  Case of Greater Sendai RCE

Greater Sendai RCE is a wide regional RCE, not only one city. At first, The Greater Sendai RCE consists of three areas, Sendai City, Kesennuma City, and Osaki City. In 2008, Shiroishi-Shichigashuku area also joined Greater Sendai RCE. Sendai City is the capitol of Miyagi Prefecture which has population of approximate one million people. It is located in the center of Miyagi Prefecture and it is also center of transportation, industry, commerce and politics in not only Miyagi Prefecture but also Tohoku Area. Kesennuma City is one of famous fishing port in Japan. It faces to Pacific Ocean and located in rias coast line of Shanriku Area which is north east of Miyagi Prefecture. Its main industry is related to ocean environment, such as fishing industry, processing industry, freezing industry and tourist industry, especially fishing industry of Kesennuma City is composed of all fields, coastal, deep-sea and fish-raising industry. Osaki City is located in Sendai Plan and its main industry is agriculture area. Rice field is spreading in the area and it is famous for a granary of rice in Japan. It also contains the wetlands which are acknowledged by the Ramsar Convention. More than 80 % wild geese gather to the wetlands in winter. Shiroishi-Shichigashuku area consists of Shiroishi City and Shichigashuku town. The area is located in south of Miyagi Prefecture and it contains mountain area and the dam which provide drinking and industrial water to urban area including Sendai City, therefore, this area is important as the catchment area of Miyagi Prefecture. As described above, Greater Sendai RCE is composed of various characteristic areas of urban, coast line, agricultural and mountain area, as compared with RCE Okayama.

In June 2005, the United Nations University RCE Promotion Committee was set up in Miyagi University of Education as a secretariat of Greater Sendai RCE, and at the same time, the activities of the Greater Sendai Area with Miyagi University of Education as the axis of cooperation were acknowledged first in the world (Initial Seven) as one of the RCEs for promoting ESD by United Nations University. The Greater Sendai RCE was expanded from three areas and one university to four areas and one university in October 2008. To promote the regional cooperation without eliminating the characteristics of each area, it was a challenge to develop common awareness of ESD by collaborative activities. The current regional cooperation of the Greater Sendai Area is a peaceful information exchange network where each area has one or two specialties and good point. At present, Miyagi University of

Education are trying to introduce the know-how of their specialties in each area to other areas, and to make ESD activities in each area comprehensive while considering the situation of each area. (Miyagi University of Education 2009)

In the ESD activities of the Greater Sendai Area, the areas forming the Greater Sendai Area practice the following activities respectively, connecting mutually the efforts for ESD in each area.

- Sendai City is conducting mainly environmental education/learning, aiming at a recycle-based society, initiated by Environmental Division of Sendai City Office.
- Kesennuma City is promoting the practice of classes of environmental education, food education, disaster education, education for international understanding, etc. in collaboration with elementary schools, junior high schools and high schools, initiated by Kesennuma City Board of Education.
- The Osaki/Tajiri Area is promoting sustainable agriculture and environmental education in the Kabukuri wetlands registered as a wetland designated by the Ramsar Convention initiated by Environmental NPOs
- The Shiroishi/Shichikashuku Area is working on the preservation of Satoyama that is a water source area, initiated by Shiroishi UNESCO Association and NPO.

Miyagi University of Education serves to connect these four areas, and has also been promoting the research and development of education, teacher training, and the development of human resources to create a new sustainable society.

The Greater Sendai RCE is administered by the Steering Committee consisting of 26 committee members representing four areas and two universities, Miyagi Prefecture, the Ministry of the Environment, United Nations University, companies, NPO, etc. Thirteen selected secretaries are in charge of organizing agenda, preparing documents, etc. for the Steering Committee. Each area has respective promotion committees, and in the Steering Committee held several times a year, representatives in each area report their activities (Fig. 2.4).

Kesennuma City Board of Education and schools have developed in-depth programs to implement a unique environmental learning-based "Education for Sustainable Development" (ESD) in partnership with local professional knowledge-providing organizations such as universities, local industries and government, NPO/NGO, Media sectors and so on. Using the local knowledge-base network, they are promoting locally based ESD focused on International Environmental Education Programs mainly.

Kesennuma RCE has been developing and expanding based on flowing five strategies and steps, initiated by Omose Elementary School and Kesennuma City Board of Education.
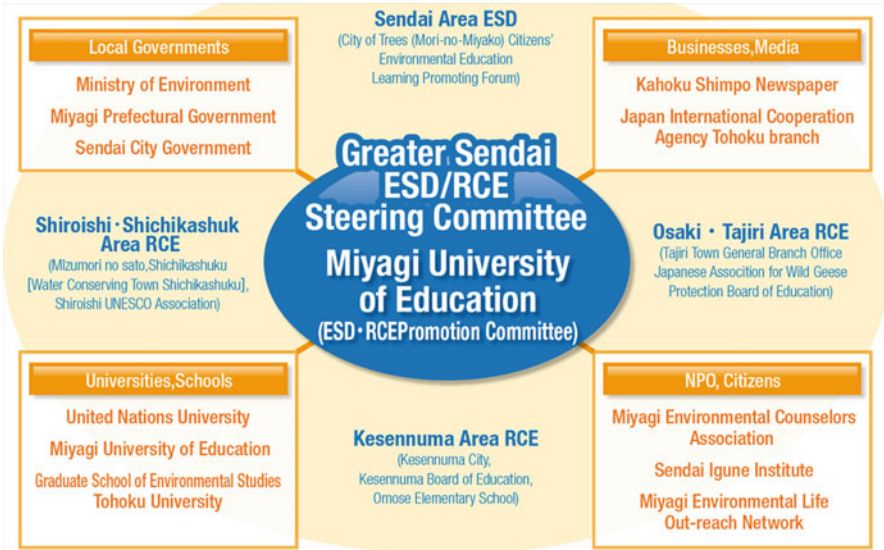
**Fig. 2.4** Main body and system for implementation of Greater Sendai RCE [*Source* "Linkage" 2009 (Miyagi University of Education 2009)

## Organization of Elementary, Junior High and High School Partnerships

Since 2002, in Kesennuma City, Omose Elementary School has participated in the Master Teacher Program (MTP) of the Japan Fulbright Memorial Fund administered by Japan-U.S. Educational Commission. In this program, the school developed a pair project at each grade level under the theme, "Water Environments and Effects on Human Life". These projects were conducted jointly with Lincoln Elementary School, Wisconsin, the United States, and implemented as exchange-based international environmental learning (Oikawa, Koganezawa & Mikami 2007). Following the success of Omose Elementary School's practice, Omose Junior High and Kesennuma High Schools joined the Master Teacher Program (MTP) in 2005, and began their partnership programs with Callisburg Elementary, Junior High and High Schools in Texas, the United States, to engage in international environmental education programs. Teachers from both regions visited each other and also have international exchanges over the internet. This joint opportunity provides an ESD anchoring environmental education from a global perspective. This partnership has enabled to conduct a systematic development and practice of elementary to high school level as ESD programs (Oikawa 2011).

**Hosting the Kesennuma Round-Table Conference for the Promotion of ESD**

In 2006, the Kesennuma Round-table Conference for the promotion of ESD was held to share the practices of Omose Elementary School's ESD practice based on environmental education programs with all other elementary and junior high schools in Kesennuma and high schools across Miyagi Prefecture. This forum grew out of the "Project Partnership Meeting" hosted by Omose Elementary School jointly with local universities and organizations as well as partner schools in the U.S. The meeting, held since 2002, aims to promote and improve environmental education. In this forum, participants had lectures and discussions on ESD to plan future programs and motivate the practitioners while sharing knowledge and experience with peers guided by ESD experts from universities and institutions.

**Establishment of Kesennuma RCE Promotion Committee**

In June, 2005, the United Nations University designated Greater Sendai region including Kesennuma as its Regional Center of Expertise (RCE) to implement the Decade of Education for Sustainable Development. In November 2006, Kesennuma City established "Kesennuma RCE Promotion Committee" to further promote ESD as a model region of the world. This committee consists of 28 organizations that play central roles in local ESD promotion, including schools, businesses, nonprofit organizations, museums, local governments as well as media organizations. These organizations are the leading actors in environmental education, international education, food education and disaster reduction education. Currently, each organization is sharing its own action plans for the partnership with local schools and nonprofit organizations.

**Training and Dissemination for Promotion of ESD**

In Kesennuma, Omose Elementary and Junior High Schools as well as Kesennuma High School, in partnership with the City Board of Education played a significant role in providing training to teachers engaged in environmental education. As of 2005, Miyagi University of Education joined this partnership, and began environmental education-related "Satellite Training Seminar," "Science Workshop," and "Friendship Project" with Kesennuma City Board of Education. Kesennuma City Board of Education also started many kinds of workshops and symposiums for the promotion of ESD since 2006. The City of Kesennuma has hosted approximate more than 100 teachers and school administrators from China, South Korea and USA since 2008 through "Korea/China Educator Invitation Program" of the Asia-Pacific Cultural Centre for UNESCO (ACCU) and "ESD Japan-US Teacher Exchange Program" of the Fulbright Japan. Similarly, teachers of Kesennuma

also visited these countries to deepen mutual educational exchanges. In February 2009, Kesennuma City hosted "UNESCO Associated Schools International Forum on ESD in Kesennuma 2009" where teachers and educational experts from China, South Korea and Japan were invited. Even then Kesennuma City suffered serious damages by Great East Japan Earthquake and Tsunami of March, 2011, Kesennuma held "National Research Seminar for Environment Education" in November, 2011 and "UNESCO School Regional Exchange Conference" in January, 2012, inviting educators from all over Japan and foreign country also. Through a variety of these information sharing programs, it was shared that ESD activities were carried out under an organic partnership in inside and outside of Kesennuma and deepened their Friendship, and it will be continued to strive for spreading ESD programs beyond the school and region (Mikami & Oikawa 2012).

### Establishing Vertical, Horizontal and Lateral Links for Whole City ESD Promotion

In Kesennuma, the City Board of Education took initiatives to establish three kinds of linkages and partnerships for promoting ESD throughout region. The first is a vertical partnership among elementary, junior and senior high schools and further universities based on systematic ESD program. The second is a horizontal partnership with other schools through the UNESCO Associated School Project Network (ASPnet) and other programs such as projects or programs of Ministry of Education, Ministry of Environment, UNESCO and OECD. And the third is lateral partnership with other non-formal and informal organizations in the community such as local governments, nonprofit organizations, industries and professional organizations through Kesennuma ESD/RCE Promotion Committee. This structure was built up in Kesennuma City for the first time in the world, advised and supported by United Nation University, so that the structure was adopted as the concept of RCE. Kesennuma is now trying to disseminate their good practices as "Kesennuma ESD Model" to the world through international conferences, RCE and ASPnet programs (Kesennuma City Board of Education & Miyagi University of Education 2009) (Fig. 2.5).

## 2.4  Role of UNESCO Associated School Network Project (ASPnet) for DESD

UNESCO (United Nations Educational, Scientific and Cultural Organization) has a network called the UNESCO Associated Schools Project Network (ASPnet). The system of UNESCO Associated Schools was started as ASPnet (Associated Schools Project Network) in 1953 for the implementation of the idea indicated in the UNESCO charter in schools. Each participating school must continuously make
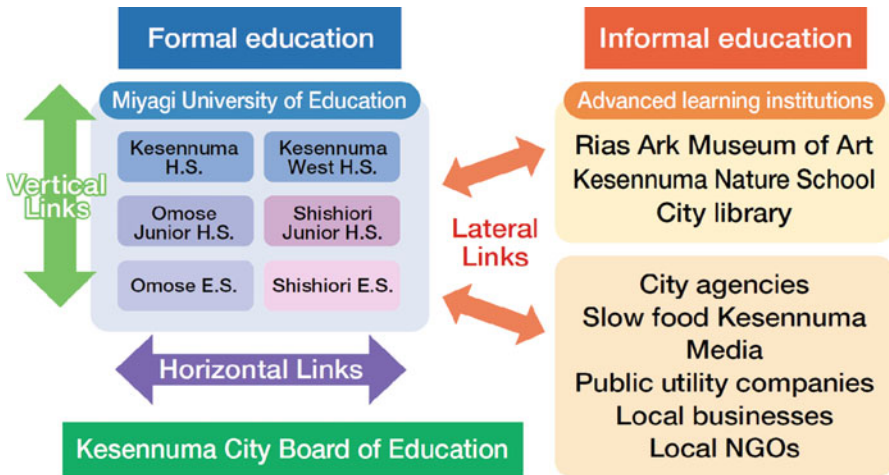
**Fig. 2.5** Structure of Kesennuma ESD/RCE Promotion [*Source*: Mobius for Sustainability (Kesennuma City Board of Education & Miyagi University of Education 2009)]

efforts in line with the ideals of UNESCO. In order to develop the contents and the methods of new education enabling young people to tackle global issues, they cooperate and exchange with other associated schools concerning their educational activities while making their own efforts in each associated school. When the network was started in 1953, there were 33 associated schools in 15 countries. The network is constantly expanding, so that now the number has been increased to about 9,700 schools in 180 countries, throughout the world (2013). Growth rate is 23 % during the last decade. It includes pre, primary and secondary schools as well as technical/vocational teacher training institutions. This year, 2013 is 60th anniversary and it was held International Forum for 60th anniversary of UNESCO ASPnet in September, 2013 in Republic of Korea.

ASPnet tries to refine its four themes of study, those are "World concerns and the role of the United Nation system", "Education for Sustainable Development", "Peace and Human Rights", and "Intercultural learning". In the sixth decade, goal of ASPnet is to promote quality education for all in pursuit of justice, liberty, peace and human development. There are five objectives of ASPnet. The first is reinvigorating a global network of school committed to over-all quality improvement in support of EFA. The second is focusing on and promoting quality education as a right of all learners. The third is reinforcing, disseminating and mainstreaming good practices. The forth is promoting local expression as beacon of UNESCO ideas. The last is contributing to sustainable socio-economic and cultural development, which is related to "Education for Sustainable Development (ESD)".

The plan of Actions was structured along the different levels. At international level, it is required as examples to strengthen International Coordination, reinforce ICT, to develop flagship projects, to provide resource materials, to mainstream good practices and to increase visibility. At national level, it is also required to

appoint National Coordinators, to mainstream ASPnet innovations into national education systems, to plan activities, to elaborate fundraising strategy and to involve national media. At regional level, it is indicated to develop training/capacity building and partnerships. Finally, at school level, it is recommended to involve all teaching staff, to draw up annual school plan, to establish participatory democratic approaches and to display ASPnet logo at school.

### 2.4.1 UNESCO Associated Schools (ASPnet) for Promoting ESD in Japan

In 2008, on the process of promoting DESD at national and international level, Japanese National Commission for UNESCO in Ministry of Education, Culture, Sports, Science and Technology in Japan (MEXT) proposed to UNESCO on the "Utilization of UNESCO Associated Schools for the promotion of ESD". According to this proposal, UNESCO Associated Schools (ASPnet) has become the center for Promoting ESD in formal education sectors. Especially in Japan, Japanese National Commission for UNESCO along with Division of Primary and Secondary Education, MEXT also notified all schools of same object as the proposal above.

In addition, MEXT tried to disseminate UNESCO Associated Schools to other schools in Japan by calling it "UNESCO School" shortly. The proposal and notification made Japanese schools and teachers recognize the system and role of UNESCO Associated Schools for promotion of ESD. As a result, the number of UNESCO Associated Schools is increasing year by after the proposal of UNESCO Associated Schools. Although there are only 20 UNESCO Associated Schools around Japan in 2006, it has increased drastically up to 615 schools in July, 2013. It's a remarkable dissemination of ASPnet in Japan (Fig. 2.6, Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT) 2013).

### 2.4.2 Characteristic of Japanese UNESCO Associated Schools (ASPnet)

Talking about trends of Japanese UNESCO Associated Schools (ASPnet), as for the component of Japanese ASPnet schools, elementary school account for 51.1 %, the ratio of middle (junior high) schools is 23.1 %, high schools' is 14.9 % and other schools' is 10.9 % (Fig. 2.7). That explains that the mainstream of UNESCO Associated Schools in Japan is elementary and secondary education. On the other hand, in world total, the component ratio of elementary/primary schools is 35.7 %
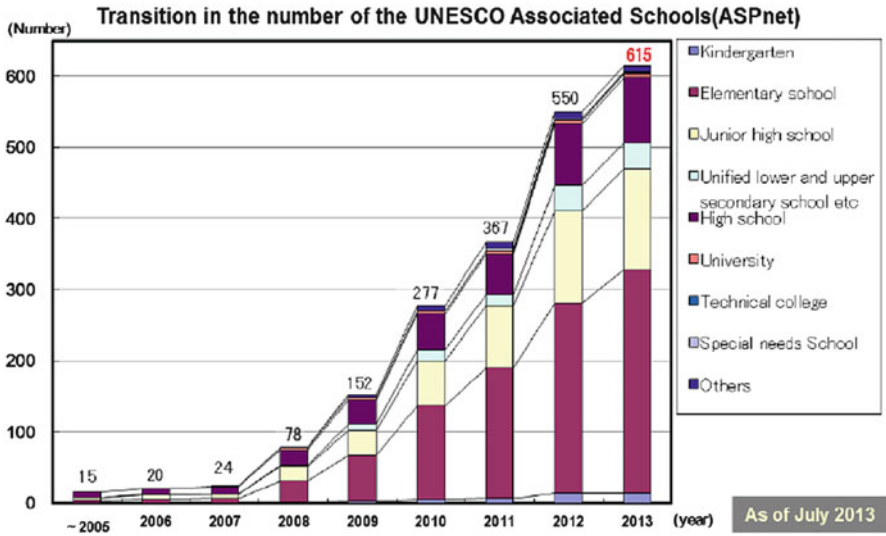
**Fig. 2.6** Transition in the number of ASPnet Schools in Japan [*Source*: Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT) (2013)]
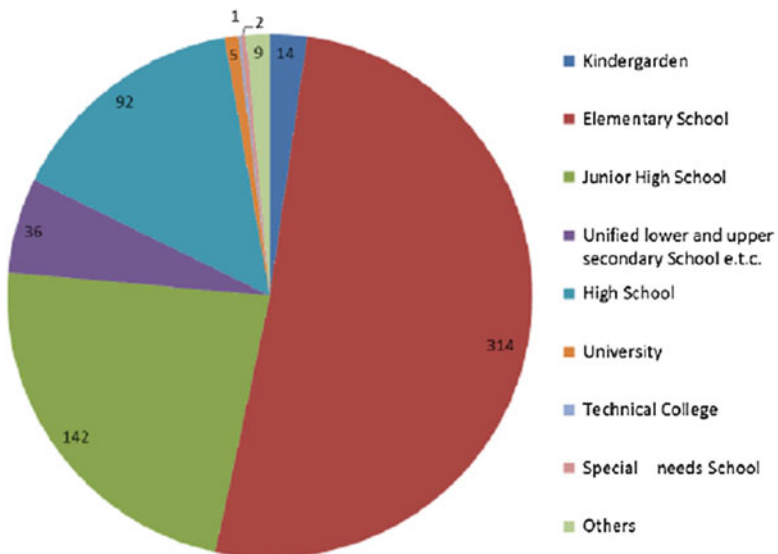


**Fig. 2.7** The component of Japanese ASPnet Schools [*Source*: Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT) (2013)]

and one of middle (primary/secondary) schools is 12.6 %, high (secondary) schools account for 42.0 %. Therefore, it can be indicated that the mainstream by elementary and middle school is one of the characteristic of Japanese ASPnet comparing with the world (Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT) 2013).

The second point which characterizes Japanese ASPnet is that Japanese UNESCO Associated Schools tend to be promoted and administrated by city government, especially, city board of education (BOE). This is the reason why the number of UNESCO Associated School has been increasing rapidly for a couple of years after the notification of MEXT in 2008. Accepting the notification, some BOEs such as Kesennuma City, Nara City, Kanazawa City, Tama City and Omuta City, noticed and recognized the concept of ESD and UNESCO Associated School Project network (ASPnet), and they tried to adopt this concept and system in order to improve their education and foster students who shoulder sustainable future, and also to solve issues and to enhance good points in their communities.

These BOEs also tend to integrate ESD with their characteristic practices which have been done in each city so far effectively, as UNESCO School activities. For example, Nara City Board of Education is integrating ESD into Word Heritage Learning, because Nara City is ancient capitol and has very rich world heritages around the city. They are going to enhance their good point trough the activities of ESD/ASPnet. Kesennuma City tried to develop ESD and UNESCO School activities based on International Environmental Education and to make a linkage with Slow Food Movement in Kesennuma City. Before DESD, Schools in Kesennuma, mainly Omose Elementary School, have been promoting international environmental education collaborating with schools in USA, supported by university, domestic and international institutions, and some regional organizations. Kesennuma City also declared as "Slow Food City" in 2003, utilizing rich nature, marine lives and culture (Kesennuma City Board of Education 2013). Kanazawa City also integrated ESD and their "Kizuna Education" which means linkage or bonds. Kanazawa is historical city and has a lot of traditional legacies and cultures. They also tend to make a linkage with foreign countries through exchange of cultures. So they are promoting ESD and UNESCO School activities through integrated study period as Kizuna Education. At present, Kanazawa is the city that has the largest number of UNESCO Schools in Japan. Omuta City used to be famous for coal-mining area in Japan, and contributed to Japanese industry development of modern period. But the colliery in Omuta was closed in 1997. Omuta City lost their main industry, so that population is decreasing year by year. In this situation, Omuta City Board of Education initiated that all of elementary and junior high schools as well as one special education school in Omuta City submitted UNESCO Associated School in order to promote ESD utilizing remains of colliery as Heritage of Industrial Modernization. In 2012, all schools in Omuta, 22 elementary, 11 junior high schools and 1 special education school, were acknowledged as UNESCO Associated Schools, so they call their city "The City of UNESCO School".

## 2.5 Way Forward

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 overcome 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 the "United Nation Decade of Education for Sustainable Development" Japan 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. Japanese ESD practices also have been getting good effects and fruits through good practices such as Regional Centres of Expertise (RCE) and UNESCO Associated School Project network (ASP). Those ESD practices have contributed to enhance the quality of education in not only school education but also non-formal and informal education, by changing values and idea for education. On other hand, ESD also have progressed to establish network and collaboration among diverse actors and sectors in the community, inter-community and in the world. That enhances the power of community for sustainable development.

Concrete outcomes of ESD extracting from ESD practices during the decade is as follows:

1. Improving the quality of education through developing integrated ESD programs and curriculums by interdisciplinary, inquiry based, hands on and problem solving learning methods and approaches
2. Constructing the system and teamwork at school and in community for ESD promotion
3. Establishing the networks and collaborations between schools and communities, among various stakeholders and sectors for ESD promotion
4. Fostering the abilities and attitudes of students, teachers and residents such as values of Sustainable Development, holistic thinking, critical thinking, system thinking, analysis of information, communication skill and leadership through ESD
5. Sharing and disseminating the significance of ESD concept and values among students, teachers, parents and residents.
6. Contributing to solve local & global issues taking actions and responses such as environment issues, economical issues, aging society, human security, food security and the disaster recovery like East Japan Earthquake and Tsunami

These results should be disseminated to world from Japan as evidences of ESD practices during DESD also in DESD World Conference in Japan, 2014.

As mentioned above, Japanese Regional Centres of Expertise (RCE) and UNESCO Associated Schools (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. ESD aims to solve global issue such as "Bio & Cultural-diversity", "Climate Change", and "Disaster Risk Reduction (DRR)", but ESD also should be promoted locally tackling local urgent issues and problems which are different depend on each community and region. By taking actions locally, ESD will be spreading and move forward to world. Although DESD will be finished in 2014, the world as well as each country and region will face more many challenges such as environmental, economical, social and cultural issues. It is crucial that diverse actors, such as educators, stakeholders and citizens in each region and country, should make efforts together to establish enriched learning to overcome local and global issues through participation and collaboration among beyond DESD, under the slogan of "Think Globally, Act Locally".

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# Chapter 3
# Disaster Risk Reduction Education: Issues and Challenges

**Rajib Shaw**

**Abstract** Disaster Risk Reduction (DRR) has gained its strong recognition due to the increased loss and damages of human life and economic assets caused by the impact of natural hazards and through the evolution of the international discussion on DRR. DRRE (DRR education) is local, and should be customized based on the local conditions. Some examples cited in the chapter shows innovations in DRRE. All the examples point out that there is need for a facilitator [either an individual or an organization], which can bring innovations in DRRE. The success of these innovations is in linking with the local government, which can take forward these activities in future. DRRE is not a stand-alone topic, it needs to be linked to the education governance. The chapter provides some examples of education governance and its measurement over a period of time. That helps in prioritizing the activities of the local education board base don the local conditions.

**Keywords** Action • Disaster risk reduction • Education governance • Innovations • KIDA model

## 3.1 Introduction

For the last several years, Disaster Risk Reduction (DRR) has gained its strong recognition due to the increased loss and damages of human life and economic assets caused by the impact of natural hazards and through the evolution of the international discussion on DRR. Looking back the past decade, there was a significant shift in disaster management towards a more comprehensive understanding of the reduction of disaster risks and towards the "development of a forward-looking and longer-term strategy for anticipating and managing risk".

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The following session will review through a brief history of international efforts on the development of DRR.

On December 11, 1987, the United Nations General Assembly declared the 1900s as "The International Decade for Natural Disaster Risk Reduction (IDNDR)". The objective is to contribute to technical and scientific buy-in and to make DRR agenda imperative. The World Conference Disaster Reduction (WCDR) in 1994 has been considered as one of the first international blueprint for DRR, which focus largely on social and community development. Principle 6 of Yokohama Strategy and Plan of Action for a Safer World states "Preventive measures are the most effective when they involve participation at all levels, from community to the regional and international level". As part of the effort on reducing risks, UNISDR (2004) developed one of the first frameworks for DRR, which describes the general context and primary activities of disaster risk management (UNISDR 2004). The framework is considered as a comprehensive DRR framework as it took into account various elements necessary for an effective DRR strategy. Consequently, the term of "Disaster Risk Reduction" or "Disaster Reduction" was defined as "The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development (UNISDR 2004). Synonymous terms such as "Disaster Risk Reduction" or "Disaster Reduction" have been used interchangeably in describing DRR however, the term "Disaster Risk Reduction" provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks (UNISDR 2004).

Disaster risk reduction education (DRRE) has been in the limelight for past several years (Petal et al. 2008; Petal 2009; Shaw et al. 2011a, b; Shaw and Takeuchi 2012; Shaw (2013) and references therein). The key challenge of the DRRE is how to link knowledge and action. There is no ones-top solution for this, and it needs to be customized based on the local context. The survey by Shaw et al. (2004) pointed out that in case of Japan, most of the students have high level of disaster knowledge and awareness. However, very few part of that knowledge is turned into action. This survey was done more than 10 years back with the high school students in Japan. The scenario of disaster risk reduction education has changed quite a bit over last 10 years. We have been approaching to more action oriented, realistic disaster education, which links the schools, homes and communities. Focus has also given on the institutionalizing the efforts in the government levels, mainly focusing on local governments board of education.

## 3.2 Evolution of Concepts

The importance of education in DRR has been emphasized in several international agendas, frameworks, conferences, UN programs, as well as others. Chapter 36 of Agenda 21, on 'Education, Awareness and Training' stated 'Education, including

formal education, public awareness and training, should be recognized as a process by which human beings and societies can reach their fullest potential'. The theme of "Disaster Reduction, Education and Youth" was introduced during the UN World Disaster Reduction Campaign in 2000. This priority has become integral to the 2005–2015 Hyogo Framework for Action as part of Priority 3, focusing on the "use of knowledge, innovation and education to build a culture of safety and resilience at all levels". At the World Conference on Disaster Reduction in Kobe, Japan, in 2005, the international community signed up to the HFA as 10 year DRR strategy (UNISDR 2005). The HFA sets out three strategic goals and outlines five priorities for action, which cover the main areas of DRR. It also suggests important areas for intervention within each theme.

The adoption of the HFA also provides a global linkage and follows the United Nations 1990s International Decade for Natural Disaster Reduction efforts. It proposed measurement of resilience is determined by "the degree to which the social system is capable of organizing itself to increase this capacity for learning from past disasters for better future protection and to improve risk reduction measures." While very broad, this definition contains two key concepts: (1) adaptation, and (2) maintaining acceptable levels of functioning and structure. While adaptation requires certain capacities, maintaining acceptable levels of functioning and structure requires resources, forethought, and normative action. Some of these attributes are now reflected in the 2010 National Disaster Recovery Framework published by the U.S. Federal Emergency Management Agency (FEMA) (Siembieda 2010).

In 2006, the UNISDR campaign "Disaster risk reduction begins at school" aiming to promote the integration of DRR into government plans for school curricula and to ensure that school buildings are safe from the impacts of natural hazards (UNISDR 2006). Activists connected with non-governmental organizations and scientific, academic and research institutions have worked with dedication to bringing this priority to life at both grassroots and policy levels. The Second Asian Ministerial Conference on Disaster Risk Reduction in 2007 in India, urged governments to make school safety and the integration of disaster risk reduction into school curricula a priority on the national agenda (UNISDR 2007). The Third Asian Ministerial Conference on Disaster Risk Reduction in 2008, in Malaysia recognized education as an essential contribution to effective implementation of disaster risk reduction and concrete impact tin terms of shifts in behaviors art the local level, where communities are most vulnerable to disasters. Last but not least, the UNESCO Education for Sustainable Development (ESD) program emphasized that 'Education is the primary agent of transformation towards sustainable development, increasing people's capacities to transform their visions for society into reality'.

The steps for that are good governance, use of risk knowledge to develop effective early warning systems, awareness raising and education, changing practices and conditions that aggravate risk, and disaster preparedness through contingency plans, emergency funds, and simulation exercises. In regards to awareness

raising and education, the HFA addresses, through its Priority 3, the following measures as relevant and necessary to accomplish its goal:

1. Inclusion of DRR knowledge is relevant in the school curricula at all levels and the use of other formal and informal channels to reach youth and children with information;
2. Implementation of local risk assessment and disaster preparedness programs in schools and institutions of higher education;
3. Implementation of programs and activities in schools for learning how to minimize the effects of hazards;
4. Development of training and learning programs in DRR targeted at specific sectors (development planners, emergency managers, local government officials, etc.);
5. Promotion of community-based training initiatives, considering the role of volunteers, as appropriate, to enhance local capacities to mitigate and cope with disasters;
6. Ensure equal access to appropriate training and educational opportunities for women and vulnerable constituencies; promote gender and cultural sensitivity training as integral components of education and training for DRR.

In order to find out an effective way to approach DRRE, Gwee et al. (2011) has proposed 16 tasks base on their relevance to the education. These 16 tasks are considered as one between two frameworks that will be used in the research to develop the educational disaster resilience assessment tool. The research studied an integrated approach, which helps to both incorporating DRR into school curriculum and into the education sector as a whole (Gwee et al. 2011). The approach considered education curricula and safe school buildings as critical and also addressed legislative measures such as having formal guidelines for implementation and funding) proper early warning systems and risk assessments, training of qualified professionals, promoting community involvement as well as measures taken to prepare community in responding to disasters. As from the description of the HFA in session 2.2.2 that the HFA set out five Priorities for DRR actions and 22 tasks that are expected to help central as well as local stakeholders in the implementation of HFA. Among the 22 tasks, Gwee et al. (2011) has identified and modified the tasks to fit the educational context, and is considered as E-HFA (Education in Hyogo Framework for action).

As an important result of the research, 16 tasks for application of HFA into the education sector have been suggested (Table 3.1). For each of tasks, a number of suggestions were given at community (or school level), local level and national level as well.

In summary, following are the trends of DRRE over years:

1. The awareness or perception on the needs of disaster risk reduction has enhanced over years. This is increasingly recognized by the governments, international agencies and other related stakeholders.

**Table 3.1** Proposed 16 Tasks relevant to the Education sector

| |
|---|
| Priority 1: Developing institutional base for disaster risk reduction in education |
| 1. Engage in multi-stakeholder dialogue to establish the foundation for disaster education |
| 2. Create or strengthen mechanism for systematic coordination for disaster education. |
| 3. Assess and develop the institutional basis for disaster education. |
| 4. Prioritize disaster risk reduction and allocate appropriate resources for disaster education. |
| Priority 2: Identifying, assessing and monitoring disaster risks in the education sector |
| 5. Establish risk assessments for the education sector |
| 6. Strengthen early warning in the education sector through effective communication and dissemination mechanism. |
| Priority 3: Building a culture of safety through disaster education |
| 7.  Develop public program to raise awareness of disaster risk reduction |
| 8.  Include disaster risk reduction in the education system |
| 9.  Develop disaster risk reduction training and learning at community level |
| 10. Enhance dissemination of disaster risk reduction information |
| Priority 4: Reducing the underlying risk factors in the education sector |
| 11. Environment: Understand sustainable ecosystem, environmental and natural resources management |
| 12. Establish measures to incorporate disaster risk reduction in urban and land-use planning |
| 13. Structures: Strengthen mechanisms for improved building safety and protection of critical facilities in the education sector |
| 14. Disaster recovery: Develop a recovery planning process that incorporates disaster risk reduction |
| Priority 5: Preparing for effective emergency response and recovery in education |
| 15. Build on disaster preparedness capacities and mechanisms in the education sector |
| 16. Assess disaster response preparedness capacities and mechanisms through strengthened planning |

2. The need of education goes beyond developing education awareness materials. The recent trend is to link the education part with governance sector, and look at the educational governance in holistic manner.
3. DRRE needs to be customized based on the local needs and context, and therefore, local board of education needs to develop their own system of DRRE based on certain guidance from the national authorities.

## 3.3   Examples of Innovations in Risk Reduction Education

In this section, a few innovations in DRRE are exemplified, followed by some analysis.

### 3.3.1 Development of Education Materials: Example of Vietnam

This example is from Danang, Central Vietnam, where, SEEDS Asia, a Kobe based Japanese NGO has undertaken an innovative approach of involving the teachers and the board of education to create their own disaster education materials and menu. The initiative was in the form of a 3 years project, funded by JICA (Japan International Cooperation Agency), as a part of grass-roots cooperation scheme. The project was conducted with the board of education of Danang city, where a core group of 40 school-teachers was selected and trained by SEEDS Asia. These groups of school teachers have gone through a unique approach of developing disaster risk reduction education menu for their students.

A framework was developed by SEEDS Asia to incorporate the menu developed by the teachers, which were categorized into the following:

– Lecture: Teachers will facilitate the classes and provide information and knowledge that help to raise their awareness.
– Presentation: Students will present based on group discussion, their findings, gathered information as well as their works.
– Practice: Students will practice by themselves to improve their skills to cope with disasters.
– Life-saving activity: Students will receive trainings and/or practice to take actions when they face an emergency situation caused by disasters.

These categories are linked with each other, and through each program, students would gain knowledge on disasters risk reduction, and gain skills to cope with disasters. Synthetic DRR programs will help students to raise their awareness toward disasters and build capacities on how to prevent disaster risks. For each of the menu, there were two pages, one page shows the details, like aims and excepted goals, summary of program, preparation, assignment etc. The other page shows sample lesson plan for the teachers, which has a specific breakdown of class, like introduction [5 min], lecture [20 min], group discussion [20 min] etc. This type of practical demonstration helps the teachers to conduct innovative DRRE with their students, and also generate interests among the students. Figure 3.1 shows the front cover of this document and the framework of different menu of programs, developed by the teachers.

### 3.3.2 Reaching out the Disaster Knowledge Through Mobile Center

At the aftermath of Cyclone Nargis of 2008 in Myanmar, which took a huge toll of around 140,000 people, the same Kobe based Japanese NGO SEEDS Asia [as mentioned before] started a unique program to reach out farthest villages and
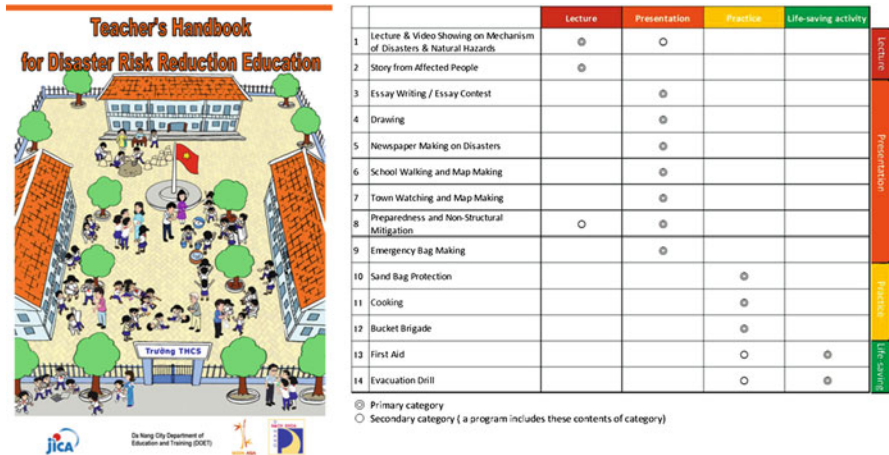
| | | Lecture | Presentation | Practice | Life-saving activity | |
|---|---|---|---|---|---|---|
| 1 | Lecture & Video Showing on Mechanism of Disasters & Natural Hazards | ◎ | ○ | | | Lecture |
| 2 | Story from Affected People | ◎ | | | | |
| 3 | Essay Writing / Essay Contest | | ◎ | | | Presentation |
| 4 | Drawing | | ◎ | | | |
| 5 | Newspaper Making on Disasters | | ◎ | | | |
| 6 | School Walking and Map Making | | ◎ | | | |
| 7 | Town Watching and Map Making | | ◎ | | | |
| 8 | Preparedness and Non-Structural Mitigation | ○ | ◎ | | | |
| 9 | Emergency Bag Making | | ◎ | | | |
| 10 | Sand Bag Protection | | | ◎ | | Practice |
| 11 | Cooking | | | ◎ | | |
| 12 | Bucket Brigade | | | ◎ | | |
| 13 | First Aid | | | ○ | ◎ | Life-saving |
| 14 | Evacuation Drill | | | ○ | ◎ | |

◎ Primary category
○ Secondary category ( a program includes these contents of category)

**Fig. 3.1** Handbook of DRRE (*left*) and framework of learning (*right*)

communities in the Irrawaddy delta region. The idea was to develop a mobile knowledge center. Two vehicles, one truck and one boat were converted and equipped with knowledge products of disaster risk reduction, and education programs were developed along with schools and communities.

The main lesson learnt from Cyclone Nargis was the need for better awareness on DRR at the community level in Myanmar so as to make community people to take action properly to prepare to mitigate disaster risks. In order to strengthen resilience of communities that are at risk of natural disasters, the need for a knowledge resource center was strongly felt and shared among the aid agencies. However the main challenge was the logistics of implementing and delivering effective training. After discussion with local counterparts, stakeholders and specialists, a unique DRR education project, called "Mobile Knowledge Resource Centre (MKRC) and Water Knowledge Resource Centre (WKRC)", with the mission of "Reaching the unreachable" was developed by SEEDS Asia with local counterpart Myanmar engineering Society. With the notion of school to family, and family to community, the project targeted awareness raising programs in the schools, with the involvement of Township Education Officers (TEOs) and government officials. It was also envisaged to be used for construction workers, as it also contained miniature models of construction to learn about safer buildings (Fig. 3.2).

The MKRC and WKRC is an attempt at sustainable learning for capacity building on DRR: First is the impact of an educational tool, which has a strong visual effect that enables people to understand easily and remain in their memory. Flyers and pamphlets as IEC materials for participants to learn continuously are also provided. The second is that the targets participants are mainly schools, and conducting train-the-trainer programs for teachers ensures the knowledge and skill for teaching mechanism, effects, and things to be prepared, are developed.

**Fig. 3.2** MKRC and WKRC activities in Myanmar

The teachers are expected to teach DRR to students continuously to make their community resilient. The third is synchronizing of existing school subjects, which is linked with topics that MKRC and WKRC introduces. Causes and effects of risks and hazards can easily be explained by utilizing the MKRC and WKRC. The forth is to provide trial visit service and renting service for other organizations. Trial visit service is to introduce MKRC and WKRC to an organization such as DRR-related NGOs or government agencies on request basis for the first time. If they find MKRC and WKRC useful to integrate with their own activities, they can rent the MKRC and WKRC on a per day basis. By establishing the institutional linkage among the DRR working group, MKRC and WKRC can cover a considerably larger area and reach more number of people to provide disaster education, compared to conventional approaches (Shikada et al. 2012).

### 3.3.3 Engaging Through Experiential Learning: Town Watching in Saijo

After the 2004 typhoon 21 and 23 damages, a small city called Saijo in Ehime prefecture in Japan started "12-years old" education program targeting the elementary and junior high schools in the city. Kyoto University facilitated this process with technical help to the committee formed with a group of ten committed teachers. The idea was to provide the school children practical and experiential

learning through bringing them to the field, and providing opportunities to interact with the local communities.

Saijo is a small city of 100,000 people with mountain area, narrow plain land and coastal areas. The city has several small rivers, and the upstream downstream relation in the river basin is found to be important during the typhoon disaster. A better forest management in the upstream is found to be effective to reduce the landslide during the typhoon induced rain. Therefore, it is for the sake of holistic disaster risk reduction education that the upstream downstream relation should be made explicit.

The town watching was conducted with the following steps: (1) explanation of the process, (2) town watching with the communities, (3) preparing map, and (4) making presentation. The key learning points are: (1) to learn together with the group, (2) teachers act as facilitator, not providing any lessons, (3) local community member becomes the key teacher and knowledge provider, and (4) town watching is not just finding the problems in the neighborhood, but to also find the good part of the community, on which people can be proud of. Thus, town watching is considered as an experiential learning process in the community.

Mountain watching is just like town watching and it is conducted in the mountainous area. Main target was children, and also residents in the mountain, teachers, municipal officials and forest workers were involved. The working field was upper area of a river along school. Participants watch the site damaged by the typhoon in 2004 and hear the story from victims. At the same time, town watching was implemented in the plain area. The main target was students and teachers, parents, Jichikai and municipal officers. They walked around the school zone and search for dangerous places, useful facilities in case of disasters and favorite places, which they don't notice otherwise in daily life. At first, town watching was implemented in five elementary schools and mountain watching in three junior high schools as "disaster education program", which was an activity of 12-year-old education project. The project started in 2005, and continued till 2007. From 2008 onward, the city education board took leading role in continuing the process in the implemented schools, and also expanded it to all primary and secondary schools in the city.

The experiences of mountain and town watching were combined to develop the town watching handbook for the teachers, and which then was disseminated to all the schools in the city. Even after the completion of 6–7 years, the same program is continued with the leadership of the board of education, with funding from city's own budget. This is considered as a great example of institutionalizing the efforts in the local government.

### 3.3.4  Classic School Safety Program: NSET Nepal

A classic school safety program is found in Nepal, which started in late 1990s, by a NGO called NSET [National Society for Earthquake Technology]- Nepal. The key

target was to raise awareness on earthquake risk in the country. To enhance awareness, the NGO started retrofitting schools in a participatory process, which provided training to the local masons, established school disaster management committee in the schools, and giving training to teachers. The program started with the hard measures of school retrofitting, which gradually evolved to a holistic school safety program with involvement of the education board, education ministry and students and parents. As part of the hard measures, the retrofitting of school buildings spread first to the Kathmandu valley, and then to the other parts of the countries. Changes in the building codes were made based on these retrofitting efforts.

On school education, like other countries, it is divided into curricular and extra-curricular education. The curricular education is the set of the fundamental subjects like Mathematics, Science and Social Studies, which are decided by the government. In extra-curricular education, the school provides some activities that students can participate in outside of their regular school time, like cultural programs. Extra-curricular education is dependent on the school principal and schools can organize programs as per their own wish. For disaster education in Nepal, no official special subject or program is established. One of the advantages of this is that the same education programs or contents can be provided to all students across the country. This is made possible when all schools follow a uniform standard curriculum.

After the 10th grade, which is the final grade of secondary education, students have to take an examination called "School Leaving Certificate (SLC)" to prove that they have sufficient knowledge and abilities as 10th grade students. Only after qualifying the SLC can they be permitted to enter Higher Secondary Level. At the Higher Secondary Level, students select one of three specialized courses: Science, Humanity, and Business. Hence, the Secondary Level (9th–10th grade) can be considered as the final education level in which students can take the same type of education in school together. Science textbooks mention disaster-related topics clearly but the range of disaster education is limited compared to in the Environment and Social Studies subjects. The Environment and Social Studies subjects have the possibility to increase the opportunities of school disaster education. These two subjects are significant for future school disaster education. In this section, three subjects are examined as disaster-related subjects. But any subjects can actually be utilized if disaster-related topics are included (for example, disaster statistics are sometimes discussed in the Mathematics subject) or if the teachers can create such topics. The main problems of the curricular education in Nepal in terms of disaster education are the following (Shiwaku and Fernandez 2011):

- The roles of the government or other institutions in any stage of the disaster management cycle are not shown comprehensively. It is difficult for students to know the specific problems encountered by the government or by other agencies.
- The lessons, problems, experiences and measures in the past disasters are not shown.
- The activities in the recovery stage are not included.
- The disaster management cycle is not explained.

However, the important part of the initiative that it started with the school awareness programs and retrofitting of school buildings, which gradually evolved to different types of holistic school safety programs.

### 3.3.5 Institutionalizing Community Efforts: BOKOMI in Kobe

After the devastating Great Hanshin-Awaji earthquake on 17 January 1995, which left heavy traces of destruction on various infrastructures and resulted in the loss of more than 6,400 human lives, the voluntary support of many surviving residents in Kobe in rescue operations highlighted the potential of well-functioning communities. The inherent characteristics of communities to provide a network among people, strengthen their social capital and ability to respond to potential disasters.

From the Hanshin Awaji-Earthquake, it is obvious that the age group of over 65 year-old is one of the most vulnerable groups in particular living in the density area with old houses. Learning from these findings, the Kobe City Government has been conducting an important initiative for developing "BOKOMI" with the aim to building resilience of its communities against disasters. BOKOMI is the short term of "Bousai Fukushi Community" [Disaster preparedness and welfare community], where the disaster preparedness is linked to daily welfare of the people. It was understood that the needs of the aged community is daily welfare. Therefore, to continue to the disaster preparedness activities, it is required to link this to welfare activities.

After the pilot phase in 11 districts, the BOKOMI concept was formalized in 1997 according to the Mayor's decision, and mainstreamed in all the school districts of Kobe City. BOKOMIs are established based on municipal elementary schools districts in Kobe City (Matsuoka et al. 2012). The total number of municipal elementary schools is 191. The number of BOKOMI steadily increased and reached 100 % coverage in 2008. The reason why BOKOMIs are based in elementary school districts is because 'welfare-community' groups were already established in each elementary should district and thus, disaster prevention activities could be integrated into these existing groups. In addition, elementary schools are designated as evacuation sites for communities in emergencies in Japan. These are the key reasons why BOKOMIs are established in each elementary school district.

The process of establishing BOKOMI in a district is based on multi-stakeholder consultation in the district. Firstly, the establishment of a BOKOMI is discussed and agreed by local government organizations, including the local city office (ward office) and fire station, together with leaders of local residents and other local multi-stakeholders. BOKOMI is a community-based organization comprised of local residents' associations, women's associations, elderly associations, child committee member, youth associations, PTA, local fire station, and local business entities.

In order to support activities of BOKOMIs, the Kobe City Government provides various support measures like small funding, materials for community activities, rescue tools, training by fire professionals etc.

Main activities by BOKOMIs have two perspectives; disaster prevention and risk reduction activities and welfare related activities. These activities are combined and carried out together. Disaster-prevention and risk reduction activities by BOKOMI:

- Disaster drills and training
- DRR education program with schools
- BOKOMI junior team (fostering children's teams to lead and work on DRR activities)
- Public awareness event
- First-aid seminar, checking emergency materials and equipment
- Town watching and preparation of community safety map, risk reduction activities with rescue workers and fire fighters (identification evacuation root, removal of object blocking these roots, fixing furniture etc.)

Combining with welfare activity:

- Regular communication within communities to form their unity, so that they can take action, when emergency/disaster happens, considering needs of vulnerable groups such as elderly and disabled people
- Leaning how to support the people with special needs during disasters (elderly people and handicapped people).

The key aspect of this example is to link the community based disaster risk management activities to local daily needs like health and welfare activities. The example shows that BOKOMI was formed in all 191 school districts in Kobe, and is still continued, even after 18 years after the disaster.

### 3.3.6   Measuring Progress in Education Governance: SDRA

Adapting the 16 tasks of HFA for the education sector developed by Gwee et al. (2011), Tong et al. (2012) defined the five dimensions on the measurement of climate disaster resilience of schools based on the local context of Central Vietnam including physical conditions, human resources, institutional issues, external relationships, and natural conditions. Because of the unique characteristic of the public education system as being a non-profit entity, economic issues are excluded. The questionnaire covers five dimensions (Physical, human resources, institutional issues, external relationships, and natural conditions) with each dimension consisting of three parameters. Each of the parameter is then represented by five variables measuring parameter in more details. As such, there are seventy five variables are selected to define the resilience of a particular educational system; whereby, each variable ($x_1$ $x_2$ ... $x_5$), allows five different choices with the score of 1 being the worst ranked, poor or not available/non-existent and a score of 5 being the best, very good.

The same methodology (School Disaster Resilience Assessment: SDRA) was applied to the Hue city in 2011 and 2013, and it was found that the SDRA value is decreased over these 2 years, with a major contribution to drop of natural resilience value. Thus, while other aspects showed some level of increase or improvements, the increasing natural hazards of the region [in terms of frequency and severity] has contributed significantly in terms of lowering of SDRA value.

This methodology has a significant contribution in measuring holistic preparedness of education sector as a whole. The DRRE play an important role here with enhancing teacher training and community relationship.

## 3.4 Prospects and way Forward

Table 3.2 provides a summary of the examples on DRRE. It shows that in most cases, there is a need of a facilitator, which can create and enhance DRRE in close cooperation with local governments. The facilitator can be NGO, university or the city government disaster risk reduction departments. The key point of sustainability of the efforts is the link to the local governance system, especially with the board of education.

In terms of education, the key point of DRRE is link to community. Therefore, experiential learning plays a significant role in enhancing knowledge level of the students. In order to realize the aim that students will be able to take appropriate measures to prepare for emergency, the KIDA (Knowledge-Interest-Desire-Action)

**Table 3.2** Summary of the examples on DRRE

|   | Programs | Facilitate by | Comments |
|---|----------|---------------|----------|
| 1. | Development of education materials (Vietnam) | NGO (SEEDS Asia) | Teachers prepared their own disaster education materials through consultation and training |
| 2. | Reaching out disaster knowledge through mobile center | NGO (SEEDS Asia) | Developed mobile knowledge centers and linked with schools to disseminate knowledge |
| 3. | Engaging through experiential learning | University (Kyoto University) | Developed town watching handbook through participatory neighborhood watching of students |
| 4. | School safety program | NGO (NSET-Nepal) | Started from school retrofitting and then expanded to the holistic school programs |
| 5. | Institutionalizing community efforts: BOKOMI | Local government (Kobe City) | Community efforts linked to school district, merged with welfare activities |
| 6. | Measuring progress in education governance: SDRA | University (Kyoto University) | Working with local government, the effort developed a measurable index for holistic preparedness in education governance |

tree model can be adapted. The KIDA approach is based on the AIDMA (Attention-Interest-Desire-Memory-Action) model, which is being used in the field of advertising to consider the process of the consumer attraction to, and purchasing of, a product. DRR requires people to have appropriate knowledge, and to take action. KIDA emphasizes knowledge, interest and desire to promote action, and actual actions are significant outputs of disaster education. The common link of the DRRE and ESD (Education for Sustainable Development) is the link to the local community, where both type of education focuses on establishing better link to the people, and having exposure to real life problem, linked to taking actions.

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# Chapter 4
# Climate Change Education: Recent Trends and Future Prospects

**Glenn Fernandez, Tong Thi My Thi, and Rajib Shaw**

**Abstract** Education is a critical element in our response to climate change. Climate change education (CCE) can help us plan and implement adaptations with respect to current and future impacts of climate change. In this chapter, we will review the status of CCE in the Philippines and Vietnam, two of the countries that are most at risk to climate threats. In order to address the complex climate change problem, CCE curricula should be informed by dialogue between the academe and those most likely to be affected by the impacts of climate change, in a transdisciplinary approach. Out-of-school settings for CCE should be explored and utilized. By providing several avenues for CCE, we might be able to engage learners in discussing the causes and urgent implications of climate change and what needs to be done and achieved. Learners need to develop the knowledge, attitudes, and skills to make informed decisions and to act upon these decisions. In addition, CCE developed within the overall context of Education for Sustainable Development (ESD) and closely aligned with disaster risk reduction (DRR) education can contribute to safeguarding development gains and building resilience in countries vulnerable to the negative impacts of climate change.

**Keywords** Climate change education • Disaster risk reduction education • Education for sustainable development

## 4.1 Introduction

Climate change is one of the most serious challenges facing humanity today (McCright et al. 2013; Marcinkowski 2009). Climate change is an enormous threat to human development and is already compromising efforts to reduce extreme

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poverty (UNDP 2007). Climate change has hampered attempts to achieve the Millennium Development Goals (UNDP 2007). Climate change presents a global challenge the magnitude of which we have not encountered previously (Bangay and Blum 2010). Its impacts have implications on socioeconomic and political stability and security from local to international levels.

Education is a critical element in the response to climate change that should not be overlooked (Bangay and Blum 2010). Education has a key role to play in understanding, mitigating, and adapting to changing climate (UNESCO 2009). Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC) calls on signatories of the convention to develop and implement educational and public awareness programs on climate change and its effects. Climate change education (CCE) can help us plan and implement adaptations with respect to current and future impacts of climate change (Pruneau et al. 2013).

According to Koichiro Matsuura, former Director-General of UNESCO, "climate change education is about helping learners understand and address the impacts of global warming today, while at the same time encouraging the change in attitudes and behavior needed to put our world on a more sustainable path in the future" (UNESCO 2009). CCE must: (1) address the root causes of climate change; (2) happen within interdisciplinary and multidisciplinary frames; (3) include social justice education; (4) be both local and global while embracing key human family values; (5) embrace a social and holistic learning process replete with emergent, contextual curricular approaches; and (6) build a culture of learning which respects that uncertainty about the future inspires transformation, rather than provoking paralysis (Kagawa and Selby 2009).

In the context of climate change, there is a need to reconsider existing approaches to education, especially the potential to provide learners with education and training that will help them to respond to diverse situations in a rapidly changing world. Climate change education covering a wide range of relevant topics and content areas needs to be incorporated at all levels (primary, secondary, tertiary, and adult education) and delivered through diverse modes (formal, non-formal, professional development) (Bangay and Blum 2010).

## 4.2   Climate Change Education: Two Case Studies

According to the World Bank (2009), two of the countries most at risk to climate threats are the Philippines (for storms) and Vietnam (for floods, storms, and sea-level rise). In this chapter, we will review the status of CCE in these two countries. The two case studies are based on national reports originally prepared for UNESCO to assist in the development of policy guidelines on CCE (Fernandez and Shaw 2013; Thi and Shaw 2013).

**Table 4.1** Top 10 Natural Disasters in the Philippines for the period 1900–2014

| Disaster | Date | Total affected (million) |
|---|---|---|
| Typhoon | 8-Nov-2013 | 16.1 |
| Typhoon | 4-Dec-2012 | 6.2 |
| Typhoon | 12-Nov-1990 | 6.2 |
| Typhoon | 24-Sept-2009 | 4.9 |
| Typhoon | 21-Jun-2008 | 4.8 |
| Typhoon | 29-Sept-2009 | 4.5 |
| Flood | 6-Aug-2012 | 4.5 |
| Typhoon | 21-Oct-1998 | 3.9 |
| Typhoon | 27-Sept-2006 | 3.8 |
| Typhoon | 20-Nov-1973 | 3.4 |

*Sources*: CRED (2014), NDRRMC (2014)

### 4.2.1 Climate Change Education in the Philippines

Climate change impacts in the form of extreme weather events, changes in precipitation that affect agriculture and water supply, and sea level rise will be formidable challenges for the Philippines (World Bank 2010). Climate-related risks accounted for almost half of deaths and about 80 % of economic losses in past disasters (Jose 2011). Particularly alarming is the possibility that 43 % of Philippine territory is likely to be affected by climate change-induced droughts, floods, and landslides in the years ahead, leading to negative economic impacts such as water shortages, decreases in agricultural productivity, infectious diseases due to heat stress, residents in low-lying coastal areas becoming "climate refugees," coral bleaching, disappearance of small islands, and a decline in livestock production (Strietska-Ilina et al. 2011). The Philippines is among the Top 10 countries most vulnerable to climate change according to the Climate Change Vulnerability Index 2012 (Maplecroft 2011). Climate change is putting the Philippines' already vulnerable environment and economy at even greater risk (UNICEF 2012).

In 2011, the Philippines endured a harsh typhoon season and was severely hit by Severe Tropical Storm Washi (local name Sendong) in December which claimed over 1,600 flood victims (Harmeling and Eckstein 2012). Toward the end of 2012, Super Typhoon Bopha (Pablo) made landfall on Mindanao, the same island hit by Washi, and caused more than 1,000 fatalities, with more than 800 still missing. In November 2013, Super Typhoon Haiyan (Yolanda), one of the strongest typhoons ever recorded in history, hit central Philippines and killed 6,268, injured 28,689, with 1,061 still missing (NDRRMC 2014). A total of 16 million persons were affected in 44 provinces. For the period from 1900 to 2014, seven of the Top 10 natural disasters in the Philippines in terms of the number of people affected happened in the last 7 years, all caused by hydro-meteorological hazards (Table 4.1).

#### 4.2.1.1　Formal Climate Change Education

After the First National Conference on Climate Change Adaptation in 2007, the resulting Albay Declaration signed by the delegates called for the introduction of climate change education into the school curricula (Peralta 2008). When the Climate Change Act of 2009 (Republic Act 9729) was passed, it explicitly directed the Department of Education (DepEd) to "integrate climate change into the primary and secondary education curricula and/or subjects, such as, but not limited to, science, biology, civics, history, including textbooks, primers, and other educational materials, basic climate change principles and concepts."

In response, DepEd issued a standing order (DepEd Order 82 series of 2010) entitled "Reiteration of Related Implementing Guidelines on Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) at the School Levels," directing schools to revitalize the various programs and projects on DRR and CCA (Reyes 2011). Various memoranda have also been released to support such standing order, such as DepEd Memo 276 series of 2010 which orders the integration of CCA and DRR with Environmental Education into elementary and high school curricula. A memorandum was also issued to all accredited publishers of educational materials to authorize them to publish approved instructional materials on DRR and CCA.

College-level and graduate school-level subjects that deal with certain aspects of disasters and disaster management are offered in a few universities such as the tertiary degree course in Disaster Risk Management in Camarines State Agricultural College and as an area of concentration for a masteral degree in Public Management in Bicol University (NDCC 2009). Starting from academic year 2008–2009, Central Bicol State University of Agriculture (CBSUA) has been offering its ladderized Master of Science in Disaster Risk Management (this means that half-way through the program the students can earn a graduate diploma) (Binoya et al. 2010). With the enactment of Republic Act 9729 and Republic Act 9512 (National Environmental Awareness and Education Act of 2008), CBSUA intends to integrate CCA concerns into the existing program and come out with a Master of Science in DRM and CCA program.

Integration of CCE into the school curriculum is one of the activities under the Knowledge and Capacity Development strategic priority in the NCCAP (Fig. 4.1). Preparation of elementary and high school textbooks, college courses, and training of teachers in CCE are expected to be done from 2011 to 2016 (Fig. 4.2).

Many government officials noted the convenience and utility of linking school-based climate change initiatives to existing environmental agendas. DepEd has been doing work in environmental protection, biodiversity, road safety, peace education, and disaster risk reduction for more than 10 years now, and its strategy is not to set up new initiatives on climate change, but to use the existing language of Environmental Education. There is also recognition by the DRR and climate change communities that climate change and disaster risk reduction are "closely interrelated and effective DRR will enhance climate change adaptive capacity" and thus "the State shall integrate disaster risk reduction into climate change programs
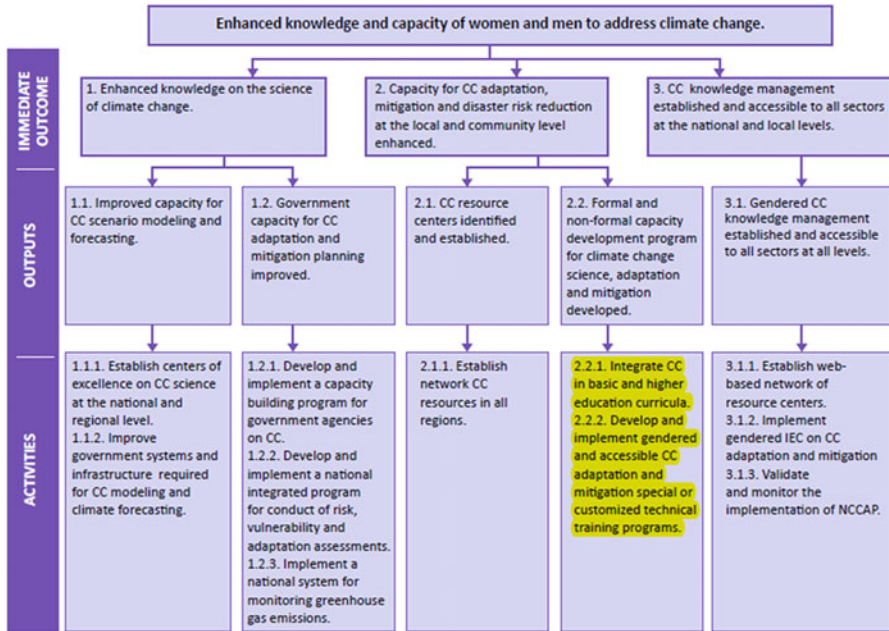
**Fig. 4.1** Strategic Actions on Knowledge and Capacity Development from 2011 to 2028 (CCC 2011)

and initiatives" (OCD 2011). Recently, a Memorandum of Understanding has been signed by the National Disaster Risk Reduction and Management Council (NDRRMC) and the Climate Change Commission (CCC) to forge formal institutional ties and "strengthen, integrate, consolidate and institutionalize government initiatives to achieve coordination in the implementation of plans and programs to address climate change in the context of sustainable development."

#### 4.2.1.2    Nonformal Climate Change Education

There are also CCE initiatives beyond the formal school curriculum. With the passage of the Climate Change Act of 2009, the National Economic Development Authority (NEDA) is developing training modules for cities, municipalities, and provinces to enhance capacity to develop, manage, and administer climate change programs. In fact, a Climate Change Academy is in the works to ensure sustainability of climate change-related IEC efforts (UNISDR AP 2011; OCD 2011).

In Bulacan province, the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) has partnered with DepEd in training and mobilizing students in the task of monitoring precipitation through the use of PAGASA-supplied rain gauges in a project called SHINE (School-based Hydrometeorological Information Network). The students (members of science clubs in

| Output Area |
|---|
| **2.2.** Formal and non-formal capacity development program for climate change science, adaptation and mitigation developed. |

| Indicators | |
|---|---|
| **7200.2.1** | No. of textbooks for pre-elementary, elementary, high school and alternative learning system with CC concepts integrated. |
| **7200.2.2** | No. of higher education curricula with CC subjects integrated. |
| **7200.2.3** | No. of specialized non-formal training programs on CC adaptation and mitigation developed. |

| Institutions Involved |
|---|
| **Lead Government Agencies:** DepED, CHED, TESDA, DILG, LGA |
| **Coordinating Government Agencies:** All NGAs, academic and training institutions |

| Activities | Outputs | 2011-2016 | 2017-2022 | 2023-2028 |
|---|---|---|---|---|
| **2.2.1.** Integrate CC in basic and higher education curricula | | | | |
| **a.** Review and revise, as necessary, current textbooks, modules and exemplars for pre-elementary, elementary, high school, and alternative learning system for CC content and gender-sensitivity. | Textbooks for pre-elementary, elementary, high school and alternative learning systems reviewed for CC content and revised as necessary. | ■ | | |
| **b.** Develop CC college and graduate curricula and courses | Undergraduate and graduate CC curricula and courses developed. | ■ | | |

**Fig. 4.2** Knowledge and Capacity Development output indicators and target dates (CCC 2011)

nine Bulacan public high schools) report or feed the information collected to a flood warning system that PAGASA has put in place in upland, riverine, and lowland communities at risk of inundation especially during typhoons when excess water is released from the Angat Reservoir, a huge multipurpose dam located in a mountainous section of the province. The SHINE project which started in 2008 was vital in facilitating quick decision-making for evacuation by communities at risk of flooding at the height of Typhoon Ketsana (Ondoy) in September 2009. SHINE is one of initiatives selected as good practice under an 18-month joint Oxfam-AusAid documentation project that begun in June 2009 (Oxfam 2010).

Under the Climate Change Act of 2009, local governments are entrusted with the responsibility to take a leadership role in educating citizens in climate change mitigation and adaption as well as in measures aimed at protecting communities against other various environmental risks (Ofreneo 2010). Given the number of local government units across the country, this is expected to be a massive undertaking for providers of climate change education.

### 4.2.1.3 Teacher Training in Climate Change Education

Providing skills to teachers for the effective delivery of CCE curriculum involves a combination of training in CCA and DRR content and training in facilitation of active forms of learning. However, thus far such training has taken place in the Philippines as a one-off event with no follow-up or teacher aftercare (Selby and Kagawa 2012).

At the regional level, "Integrating Climate Change Issues in Southeast Asian Schools Teacher's Guidebook" is an initiative by the Southeast Asian Ministers of Education Organization (SEAMEO) to provide teachers with useful initial resources to facilitate the capacity building of young people on the issues (Abdullah 2010). This guidebook, which covers a range of related climate change concerns such as poverty, health and nutrition, and food security, would be particularly helpful to assist teachers to prepare students in experiencing and dealing with the effects of climate change. At the moment, there is no available information on how the lesson exemplars in the guidebook have been used by teachers in the Philippines and in other ASEAN-member states.

Teachers must be equipped with knowledge, skills and attitude on the basic concepts of Education for Sustainable Development, Environmental Education, Climate Change Education, and DRR Education. Teachers have pivotal responsibility to make their learners aware of the nature of every disaster, their impacts on health, agriculture, and fishery and on society at large. At the earliest age possible, young people must become aware and should be prepared to cope with these at all times. If pre-service education can adequately prepare all would-be teachers to teach the concepts, this will mean tremendous savings in-service training cost (UNESCO Jakarta 2011).

### 4.2.1.4 Potentials of Climate Change Education in the Philippines

In a resource manual prepared by UNICEF in 2012 entitled "Climate Change Adaptation and Disaster Risk Reduction in the Education Sector," five mechanisms of support are identified that can help build an enabling environment for CCE in the Philippines to be successful. First, strong local leadership is needed in pursuing school-based initiatives to tackle climate change. This is especially true given the highly decentralized nature of the Government of the Philippines. It is crucial to first demonstrate effectiveness on a small scale and only then advocate at the policy level. The cultivation of leadership through training and sharing of knowledge and best practice is needed to promote successful initiatives at the subnational level. The most effective local champions may be politicians, since they control budgets, but others—for example, professors, other prominent members of civil society, or even passionate students—could also fill this role.

Second, school support networks are necessary. Schools lack the resources to implement climate change initiatives on their own. Thus, partnerships and sponsors

are needed to sustain such projects. For example, DepEd established an Adopt a School program in which private sector companies, NGOs, and civil society organizations partner with public schools to provide support, including facilities, infrastructure, textbooks, computers and other electronics, science laboratory equipment, teaching and skill development. A broader range of partners and networks were identified to sustain climate change-related endeavors; these included emergency forces such as the fire department and military officers to train students in disaster management, utility companies to promote public education on energy and water reduction strategies, and NGOs to provide environmental and community organizing expertise. National efforts were ineffective without local support or community-based initiatives. In order to ensure a broad and diverse base of resources and input, school officials should reach out to local emergency agencies, government committees, service organizations, parent-teacher associations and businesses to support their climate change activities. An earlier DepEd program, Child Friendly Schools (CFS), should be used as models because the holistic approach draws support from a variety of sectors, NGOs and community-based organizations. The main challenge of this strategy is developing productive relationships while avoiding fragmentation and duplication. But school support networks should also not detract from government obligations. Brainstorming strategies to find complementary activities and avoid this potential dilemma should be conducted in the early stages of planning processes.

Third, primary and secondary schools should develop partnerships with tertiary schools. For example, currently Albay Province is jointly piloting a climate change study with the College of Forestry and Natural Resources of the University of the Philippines and the University of the Sunshine Coast of Australia. DepEd also harnesses the resources of various universities to support primary and secondary school teacher training, with an emphasis on child-centered approaches and the inclusion of a climate change curriculum. There is a general understanding that more can be done to take advantage of the financial and human capital of tertiary schools to support child-centered climate change initiatives. Tertiary schools can also tap elementary and high school students as research data collectors or actual subjects. Government coordination and the provision of grants could be used as incentives to strengthen partnerships.

Fourth, the potential of using new media should be explored. The Internet and mobile phones are popular in the Philippines and especially utilized by children. The number of Internet users in the Philippines rose 1,100 % from 2000 to 2009, reaching 25 % of the population. The country is also one of the most prolific text messaging centers of the world. Even in poor rural areas, it is not unusual to observe people using cell phones, and the majority of students have some means of access to a mobile phone. The use of new media to implement climate change programming depends on the infrastructure and resources of local communities and schools, as well as on children's access to such devices as mobile phones and computers. In areas where technology is scarce, schools and governments should partner with private corporations or seek charitable donations. For example, in 2007 Manila Observatory's Klima Climate Change Center partnered with PAGASA, DepEd, and

Smart Communications, Inc. (SMART) on Project Rain Gauge, which introduced rain gauge data collection and education in the context of climate change monitoring and disaster risk management. Children were taught how to collect and gauge rainfall in an effort to advance their environmental education and ensure their participation in disaster risk reduction. SMART donated mobile phones to support data collection in 44 schools.

Fifth, a cross-sectoral approach should be used. Climate change is not an issue confined to one specific sector, so addressing it effectively requires inputs from a wide variety of stakeholders. For example, links between health and education can lead to mutually beneficial outcomes for both sectors. In 2007, the Philippines Education Cluster was created as the primary mechanism for inter-agency coordination for emergency preparedness, strategy planning and relief. The cluster is led by UNICEF and Save the Children, both of which support the DepEd. The cluster helps appoint contacts, divide the work and prevent overlap, and it has been the entry point for school-based climate change activities. While cooperation between government agencies dealing with health, the environment, education and emergencies is particularly relevant for national policy coordination, NGOs must also have a strong cluster presence. Such organizations often have the capabilities to pull in resources beyond the reach of government. They may also have a better understanding of what is needed at the local level or on the ground. Because this strategy comes with transaction costs and coordination obstacles, appointing an efficient coordinator is crucial.

### 4.2.1.5 Challenges to Climate Change Education in the Philippines

Among Asia's developing countries, the Philippines is considered relatively advanced in terms of legislation related to various environmental challenges such as reforestation, biodiversity conservation, air and water quality regulation, solid waste management, renewable energy development, natural disasters, and adoption of mitigation and adaptation measures related to climate change. However, there is a wide gap between the enactment of laws and the enforcement of the laws (Strietska-Ilina et al. 2011).

Given the cross-sectoral approach to tackling climate change and disasters, there is an urgent need to pursue coordination mechanisms among various actors. The challenge is to harmonize different plans and initiatives under a strategic framework which integrates CCA, DRR, and other related initiatives (OCD 2011).

DepEd recognizes the need to set-up a monitoring and evaluation system of its programs and projects in order to improve them (OCD 2011). However, resource constraints such as budget and lack of dedicated staff to work on mainstreaming DRR and CCA into the curriculum are barriers to this. Further, personnel handling DRR and CCA are borrowed from different offices in the department, who have their regular workload. Hence, mainstreaming programs may suffer from lack of focus and permanency of personnel. The sustainability of capacity building and training programs also has to be ensured.

In terms of livelihood, there is no coherent national skills program responding to climate change and environmental degradation (Strietska-Ilina et al. 2011). It is fair to state that restructuring of a green Philippine economy is still at its incipient stage. The green economic shift requires the alignment of education, skills development and training with the labor requirements of green and greener industries. Additional strategies are necessary for environmental conservation and for communities that are vulnerable to climate change risks. DepEd, especially in its K to 12 program, and the Climate Change Commission should include anticipation of these kinds of skills changes as part of the national action planning on climate change.

The list of climate change education initiatives presented above is admittedly not comprehensive, as information is highly fragmented, an indication of an overall coordination issue among numerous actors like DepEd, CCC, NDRRMC, etc. Nevertheless, with a very conducive enabling environment in terms of legal and policy bases and institutional frameworks at the national, regional, and local level, the outlook for climate change education in the Philippines is promising. Strengthening the capacities of schools and teachers should be the next immediate step in order to put all these policies and plans into practice and eventually result to less vulnerabilities and more resilience to climate-related disasters. While progress so far has been slow, we can expect more outputs in the next few years when the comprehensive K to 12 Basic Education Program is already in full swing and all the other pieces in the education jigsaw puzzle have already been placed in their proper position.

### 4.2.2 Climate Change Education in Vietnam

The economy of Vietnam grew at an annual rate of around 7 % from 2000 to 2005, making Vietnam one of the world's fastest growing economies. Growth remained strong even in the face of the late-2000s global recession, holding at 6.8 % in 2010. According to an estimation of the International Monetary Fund, Vietnam's nominal GDP reached USD 135.4 billion, with a nominal GDP per capita of USD 1,498 in 2012.

However, these socioeconomic achievements are threatened by the impact of climate change in Vietnam. In 2007, an assessment by the World Bank listed Vietnam as one of the five countries in the world potentially most affected by climate change because much of its population, infrastructure, and economic production are located in coastal low-lands and deltas (GFDRR 2013). As defined in the Second National Communication on Climate Change submitted to UNFCCC, Vietnam is "particularly vulnerable to the adverse effects of climate changes" (MONRE 2010). According to the Climate Change Scenario developed by the Ministry of Natural Resources and Environment (MONRE) in 2009, the average annual increase in temperature, changes of rainfall, sea level rise, and saline water intrusion are examples of climate change-induced stresses that will cause vast damages in Vietnam. Over the past 50 years (1951–2000), average temperature has increased about 0.5–0.7 °C. Annual temperature average over the past four

decades (from 1961 to 2000) is higher than the annual average temperature of the previous three decades. In all regions, changes in average rainfall in the past nine decades (from 1911 to 2000) are not uniform. There have been periods of increased rainfall and periods of reduced precipitation. According to monitored data of the least 50 years, sea level has risen about 20 cm. These scenarios indicated that climate would significantly change over all regions of Vietnam. By the end of the twenty-first century, average temperature in Vietnam is expected to increase about 2.3 °C; total annual rainfall and rainy season's rainfall would increase while dry season's rainfall would decrease; sea level is expected to rise about 75 cm compared to the average for 1980–1999 (MONRE 2009). This set the initial orientation for the Ministry of Education and Training (MOET) to assess the possible impacts of climate change on the education sector and to develop and implement action to adapt and minimize the potential impacts of climate change in the future.

MOET (2011) reported that the education sector is one of the most vulnerable to climate change as it covers a large number of people, accounting for nearly one quarter of the country's population. The impacts of climate change on the education system vary from physical damage to infrastructure, economic losses, direct impacts to human lives and health or indirect effect to educational quality. Some parts of the central provinces, floods cause students to leave school for a month, badly disrupting the process of teaching and learning.

Aware that children will be the most vulnerable to the effects of climate change and natural disasters, MOET has gone far ahead than institutional commitment and yielded good results from some programs and projects from the primary level ("Education project for poor primary school children"), to the secondary level ("Project to bring secondary school to the remote areas"), and even to higher level ("Bring educational programs on marine meteorology and hydrology into many universities and other communication activities"). Another education project on energy savings and efficiency has been implemented as effort of education sector in combating climate change. Besides, MOET has developed an action plan for the education sector response to climate change from 2011 to 2015 with a project focusing on the integration of climate change into the national curriculum. Following this, the instruction document for management and direction of the sector related to climate change and a number of programs have been set up to compile teaching content related to climate change in schools. In March 2011, MOET held a workshop on "Sharing experiences and strengthening cooperation on climate change education" as an initiative to implement the action plan of the education sector response to climate change.

In addition, there are about 50 on-going projects on CCE being carried out by international organizations, NGOs, private sector actors, university, media, and others (Live & Learn, Plan Vietnam and Australian AID, 2013). The main topics of these projects and programs are the provision of basic knowledge on climate change, sustainable use of energy or renewable energy, resource management, sustainable consumption and production. The approaches being used are mainly integration of climate change into the curriculum and extra-curricular activities such as knowledge contests, clubs, forums, participatory films, photo voices, etc.

#### 4.2.2.1 National Target Program in Response to Climate Change (NTP-RCC)

In the last 10 years, there have been approximately 300 projects related to climate change in Vietnam by about 70 organizations which had been carried out, are being implemented, or are in the planning stages. In 2008, the Government took an important step forward with the important decision to start the National Target Program in Response to Climate Change (NTP-RCC). This gives implementation instructions, indicates the objectives to be achieved, and identifies the tasks that need to be planned and implemented in all sectors and localities following the principle of sustainable development. It also stresses that investment in response to climate change is an important factor to ensure sustainable development. Principally, the implementation of NTP-RCC at all levels must be in compliance to the State's direction, policy, and legal system and must protect sustainable development of the country. Its general objectives are to assess climate change impacts on sectors and regions in specific periods and to develop feasible action plans to effectively respond to climate change in the short-term and long-term to ensure the sustainable development of Vietnam.

Currently, NTP-RCC is the strategic framework for all activities dealing with climate change in Vietnam. It has four overall goals and eight specific objectives, of which four objectives relate to education and training: (1) to promote scientific and technological activities to establish the scientific and practical basis for climate change response measures; (2) to enhance public awareness, responsibility and participation; and develop human resources to respond to climate change; (3) to mainstream climate change issues into socio-economic, sectoral and local development strategies, plans and planning; and (4) to develop and implement action plans of all ministries, sectors, and localities to respond to climate change. For each of these, the role of the education sector is clearly defined with a number of tasks and solutions to be targeted by 2010 and 2015.

As defined in NTP-RCC, responding to climate change is the duty of the entire society and should be implemented with consensus and determination, at all levels: local, regional, national, to global. The task of responding to climate change must be reflected in the strategies, programs, planning and development plans of sectors and localities, been institutionalized in the legal documents and be consistent thoroughly in implementation. Accordingly, all ministries, including MOET has developed action plans to respond to climate change. Also, NTP-RCC has set for the education sector the mission to strengthen propaganda and education and raise awareness and social responsibility on climate change, promoting human resource development. Particularly, the introduction of knowledge on response to climate change in the national education system is recognized as an indispensable component of NTP-RCC. This creates a strong basis for the development and implementation of the project "Integration of climate change response contents into education and training programs 2011–2015."

To organize the implementation of NTP-RCC, MOET is appointed as one of the members of the Executive Board to lead the project "Develop education and

training programs on climate change in school curricula" in cooperation MONRE and to support the Ministry of Information and Communication (MOIC) in establishing thematic channels on public media (newspaper, radio, television, Internet) for climate change information exchange.

In August 2012, the Prime Minister approved the National Target Program to Respond to Climate Change in the period 2012–2015. It highlights the CCE approach in formal and non-formal education. One of its main components is to disseminate the basic knowledge about climate change, the impacts of climate change for the vast majority of public employees, 75 % of students, and 50 % of the communities.

### 4.2.2.2 National Climate Change Strategy (NCCS)

In 2011, the Prime Minister issued Decision No. 2139 approving the National Climate Change Strategy (NCCS), which again emphasizes the inter-linkages between climate change and sustainable development by stating that responding to climate change must be associated with sustainable development. It also acknowledges the role of the education sector in mitigating the impacts of climate change and contributing to sustainable development in Vietnam. One of the key objectives of NCCS is strengthening human and natural system resilience to climate change. Developing community capacity and scientific and technological basis to respond to climate change are defined as two important strategic tasks that are related to the education sector. The roles of education in enhancing community capacity to respond to climate change are clearly defined as to raise awareness and engagement of governmental officers and communities in climate change issues; to develop suitable approaches to disseminate climate change information to different communities using a variety of media; to disseminate the impacts, risks and opportunities of climate change to people, especially in the vital areas; to bring climate change sciences into educational programs and develop human resources in the relevant fields to climate change adaptation and GHG emission reduction; to raise community awareness and involvement in preventive and recovery activities to disaster, promote a climate-friendly way of life and behavior for communities and encourage people to adopt climate change response activities. These tasks support and complement the tasks of the education sector as defined in NTP-RCC, especially the integration of climate change issues into education and training programs.

### 4.2.2.3 Action Plan of Education Sector Response to Climate Change from 2011 to 2015

In 2010, the Action Plan of Education Sector Response to Climate Change from 2011 to 2015 was approved by MOET and followed by the formulation of the project "Integration of climate change response contents into education and training

programs in the period 2011–2015." The general objectives of the action plan are raising awareness, the ability to cope with climate change of the education sector in each specific period to ensure educational sustainable development, preventing and mitigating the threat of climate change, and contributing proactively to the implementation of NTP-RCC. Specific objectives include: (1) raising awareness of managers, teachers, researchers, and students on the reality of global, regional, and domestic climate change; (2) assessing the impact of climate change on the education sector, in different regions on the basis of National Climate Change scenario; (3) proposing guidelines and developing educational policies to cope with climate change; (4) integrating corresponding activities of the Action Plan into the development plans on education and training; (5) consolidating and strengthening institutional capacity to direct, administer, and implement action plans to respond to climate change; and (6) developing plans for training, scientific research, international cooperation, and human resource development to respond to climate change.

For each of specific objective, a number of tasks and solutions are defined with set targets, time frame, funding, and indicators for evaluation. Both structural and non-structural measures are taken into account as approaches to promote CCE. Structural components include the development of climate-proof school models in the affected regions and improvement of school equipment and learning tools for CCE. Non-structural approaches focus on improving the governance capacity and implementation ability and the inclusion of information on climate change in the national education system.

### 4.2.2.4 "Integration of Climate Change Response Contents into Education and Training Programs in the Period 2011–2015" Project

The inclusion of climate change issues in education and training programs has been stressed in NTP-RCC, which is reflected as one main component of the action plan of the education sector response to climate change. The project sets a number of specific targets to be achieved by 2015: (1) 80 % of leaders, managers, teachers, and lecturers in education sector will have raised awareness on climate change and climate change response; (2) 100 % of teachers and lecturers will be trained on climate change and climate change response; (3) 100 % of curricula, textbooks, and reference materials for teaching and learning on climate change and climate change response will be developed, endorsed, and distributed to schools; and (4) 100 % of students will be educated on climate change and climate change response.

The main approach for incorporating climate change contents into education and training is top-down approach whereby MOET will be mainly responsible for the review and evaluation to include and expand the existing educational programs related to climate change issues. Aside from this, activities to raise awareness and develop skills for educational managers, teachers, and lecturers will be carried out to enhance capacity in adopting new educational programs.

For early childhood education, there will be books for teachers (including guidebooks on climate change response for infant education programs, collection of poems, songs, games on CCE) and books for kids (including comic books for kids to recognize right and wrong actions related to CCE, and drawing books to help kids get to know climate change and climate change impacts).

For primary and secondary education, the integrated approach will be conducted in both curricular and extra-curricular activities. Particularly, specific carrier subjects have been assigned for each grade of education. For example, in grades 1, 2, and 3, climate change contents will be integrated into Science and Social Studies, Art, and Ethics and in grades 4 and 5 into Science, History, Geography, Art, and Ethics.

For higher education and TVET, there will be special textbooks dedicated only for teaching and learning about climate change issues.

For continuing learning centers and community learning centers, there will be special books or manuals on climate change response.

### 4.2.2.5  Challenges and Recommendations

Despite the fact that Vietnam has built a strong institutional basis and framework for the promotion of ESD and CCE, there are challenges which were not clearly addressed in the existing policies: (1) research-informed or evidence-based approach; (2) concrete guideline on the integration of relevant contents; and (3) mechanism for implementation. The following discussion provides support for this argument.

Firstly, it is observed that there is a gap between set targets and the current capacity of the education sector. This is partially due to the fact that the policy framework of ESD and CCE was built on a weak foundation that was not research-informed or evidence-based. Especially for CCE policy, in order to be credible, it is important to carry out further studies of current climate change issues apart from the scenarios of climate change and sea level rise in Vietnam. In addition, intensive research and more information sources are needed for better understanding of education quality and capacity assessment to provide policy-makers with adequate evidence to develop appropriate long-term strategies. Without being informed by concrete research, the existing policy framework on ESD and CCE is unlikely to be able to achieve the set targets in responding to climate change and contributing to sustainable development.

Secondly, the separate inclusion of issues on sustainable development, climate change, energy, and disaster risk reduction into the national curriculum system is a risk. At first, including such a huge volume of knowledge has the potential to harm the curriculum and impact negatively to training activities and burden the students. Also, as the education system in Vietnam has a national curriculum system, the integration which targets only a number of vulnerable groups of people will have effect on nearly 15 million students in public schools. Therefore, mainstreaming sustainable development and climate change issues into education and training

should be flexible and school-based whereby the centrally developed approach is an option. It allows the identification of core messages, key concepts, key knowledge and, especially, key competencies and skills to be built into the curriculum at the central level. On the other hand, planning and implementing further steps are laid out deliberately, based on experience and evaluation at the local level.

Furthermore, the multi-dimensional content of ESD and CCE remains one of the barriers in selecting and smoothly integrating them into existing curricula in Vietnam. Especially for CCE, there is little mention on updating, integration, and combination of knowledge in CCE in relevant subjects and textbooks with close coordination with educational contents such as 'Environment,' 'Life skills,' 'Control of accidental injuries,' 'Disaster risk reduction,' 'Minimum standards on education in emergencies' as well as 'Psychological support to children in education during emergencies' to avoid overlap with other courses and overload the students. Therefore, concrete guidelines on ESD and CCE as a tool for teaching and learning are needed.

Thirdly, there is a lack of mechanism for implementation, division of work and responsibilities, as well as the establishment of the committee responsible for leading and coordinating the implementing units both at the national and local levels. At the central level, there is a lack of mechanism for collaboration between MOET and other ministries as well the relevant units under the MOET itself. This has the potential to erode the steering capacity of the MOET to carry out activities to attain the set goals. At the local level, the top-down centrally-based approach has prevented the participatory engagement of local departments of education as well as the involvement of educators, teachers, students, and communities. The role of local department of education has not been reflected in the central action plan. However, it is clear that without decentralized supportive measures, national policies will not easily result in changes in instructional practices. Therefore, it is necessary to develop supportive structures and guidelines and to stress the responsibilities of local education departments to translate these guidelines to educational plan at the local level.

## 4.3   ESD, CCE, and DRR Education

At the UNESCO International Seminar on Climate Change Education in July 2009 in Paris, there was a general agreement of the urgent need for climate change education (UNESCO 2009). UNESCO is promoting climate change education within the overall context of Education for Sustainable Development (ESD) (UNESCO 2013), to help learners develop the knowledge, attitudes, and skills to make informed decisions and to act upon these decisions. In addition, closer alignment of CCE with disaster risk reduction (DRR) education contributes to safeguarding development gains and building resilience in countries vulnerable to the negative impacts of climate change (UNESCO 2013).

In the Philippines, the main topics addressed under ESD include climate change, DRR, indigenous knowledge, and national plans for sustainable development (Didham and Ofei-Manu 2012). For the Philippine programs on ESD, CCE, and DRR education to move forward in a truly harmonized fashion, a steering group or an interagency consultative group has been suggested to be constituted (UNESCO Jakarta 2011). It should be composed of representatives from the DepEd, Commission on Higher Education (CHED), Technical Education and Skills Development Authority (TESDA), CCC, NDRRMC, Department of Environment and Natural Resources (DENR), Department of Science and Technology (DOST), UNESCO National Commission, civil society, and the private sector. The steering group should then plot the linkages between the national ESD, DRR, CCA, and other relevant frameworks, goals, targets, and indicators for the approval of and with the support of high-level officials from relevant line departments, from the civil society, and from the private sector.

Developing countries like the Philippines, which are still grappling with their sustainable human development concerns, have to increasingly deal with the looming realities of climate change and disaster impacts. The Philippines is therefore implementing an integrated approach to systematically factor disaster and climate change risks into all national and local development planning, programming, and relevant regulatory processes. CCE, together with ESD and DRR education, is in the heart of these initiatives.

In Vietnam, at ministerial level, policies on ESD and CCE have also been introduced in order to keep driving further efforts aimed at improving the capacity of the education sector to handle climate change and sustainable development. The education sector is considered as one of the priority areas for investment to achieve an important goal for Vietnam's socio-economic development in the coming years: lay the foundation for accelerating industrialization, modernization, and development of the knowledge economy, i.e., to continuously increase the knowledge content in all socioeconomic development activities and to bring about fundamental changes in education and training. Currently, there is an on-going process of developing institutions and policies on ESD and CCE which covers central to local levels. The Education Strategy 2001–2010 has been finished. Practical educational development of the country has confirmed the correct direction of the strategy but has also shown that there should be additional adjustments in the context of global climate change and sustainable development. The Education Development Strategy for 2009–2020 has been continued to make the more important transition of education over the next decade, the decade of information technology and education for sustainable development and climate change. This has set a foundation for the integration of climate change and sustainable development issues into the educational policies such as the National Target Program of Education and Training in the period 2012–2015, the Action plan of Education Sector in the period of 2011–2016, and the National Strategies on Educational Development in the period of 2011–2020.

The formulation of the National Action Plan of Education for Sustainable Development of Vietnam (2010), the establishment of Committee Board of
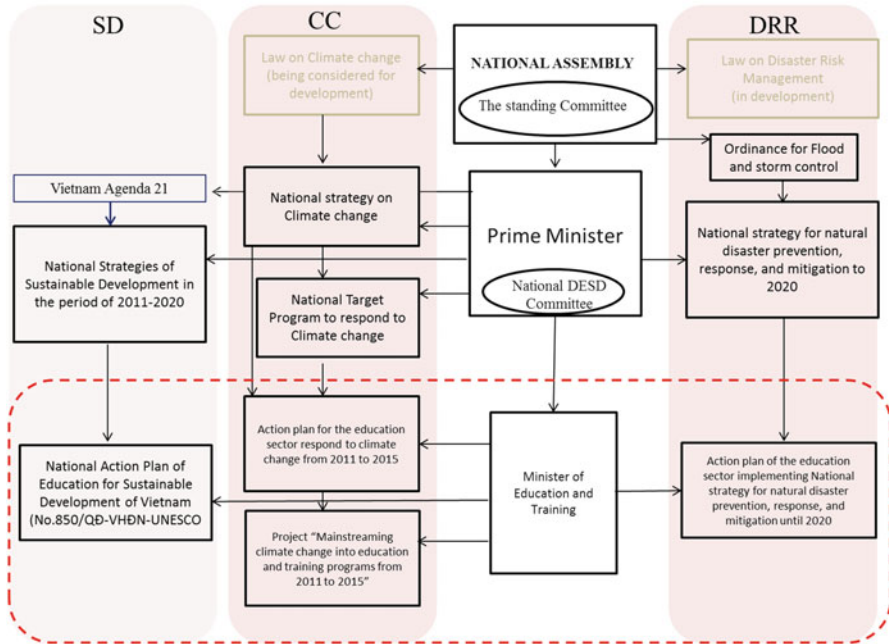
**Fig. 4.3** National policy framework of ESD, CCE, and DRR Education

Education Sector responding to climate change in the period of 2009–2015 (2008), the Action Plan of Education Sector Response to Climate Change from 2011 to 2015 (2010), and the project "Integration of climate change response contents into education and training programs" in the period 2011–2015 (2010) are the most important progress in the promotion of ESD and CCE in Vietnam (Fig. 4.3).

A review of ESD and CCE policies and initiatives in Vietnam indicates that these two systems are supportive and complementary. One of the main goals of CCE is to contribute proactively to the implementation of NTP-RCC whereby ensuring sustainable development is a crucial factor. In addition, both documents on ESD and CCE are oriented toward the promotion of prescriptive learning at the same time empower students' role in responding to climate change and contributing to the goals of sustainable development. The inclusion of issues on sustainable development and climate change is considered as fundamental initiative in approaching ESD and CCE. Accordingly, the advance of curricular and extra-curricular activities, textbooks, reference materials, and tools for teaching and learning in ESD and CCE is employed at all levels from pre-school through higher education, science education, and technical and vocational training using diverse types of education from formal, informal, and non-formal education. Aside from this, building capacity for educational staff, educators, teachers, and lectures is considered as an indispensable part of the ESD and CCE polices. The role of science and technology education which is highlighted in larger national policies

as one main target "to promote scientific and technological activities to establish the scientific and practical basis for climate change response measures" has been comprehensively reflected in educational policies, especially in CCE policies. All of these create a platform to open up the possibility of simultaneous application of ESD and CCE within and across all or most types of education. However, the issues of how these two complex concepts can be joined together in a holistic and integrated framework remains as question.

## 4.4   Future Directions of Climate Change Education

Simply teaching the science of climate change is often insufficient to change attitudes and behavior (Dickinson et al. 2013; Grajal and Goldman 2012; Cordero et al. 2008). Introduction of new educational inputs (e.g., curricula, textbooks, training programs, etc.) will likely not result in significant individual and systemic change (Bangay and Blum 2010). An important general principle of learning is that people build up what they know and understand through direct, personal experiences and formal, non-formal, and informal educational experiences (Grajal and Goldman 2012). Effective climate change education should emphasize the compelling personal connection between the student and climate change using active learning methods as a means of engaging the student and encouraging interest in taking personal action (Cordero et al. 2008). One method of active learning is problem-based learning (PBL), which requires students to focus on problem analysis, knowledge application, and cooperative work around relevant issues (McCright et al. 2013). To be successful, CCE will have to form cognitive bridges between learners' prior experiences and objects to which they are attached, as well as using physical analogies that allow them to imagine the consequences in the future if climate change continues (Dickinson et al. 2013). If we want to establish a new behavior, we have to practice it until it becomes a habit (Kollmuss and Agyeman 2002).

   Formal and non-formal educational approaches should be used together to provide rich, in-depth learning (Grajal and Goldman 2012). In order to address the complex climate change problem, CCE curricula should be informed by dialogue between the academe and those most likely to be affected by the impacts of climate change, in a transdisciplinary approach (McGregor 2010). Out-of-school settings for climate change education, like zoos and aquariums (Grajal and Goldman 2012); botanical gardens (Sellmann and Bogner 2013); TV weather reports, news media coverage, and Internet use (Zhao et al. 2014); citizen science (Dickinson et al. 2013); etc. should be explored and utilized. By providing several avenues for CCE, we might be able to "engage learners in openly debating and discussing the roots, personal meanings, and societal implications of climate change scenarios and what needs to be done and achieved" (Kagawa and Selby 2009).

The effort needed for comprehensive climate change education is far greater than any one education sector actor can handle. Recognizing a need to synergistically combine efforts, there is a necessity for a collaborative community to work together and coordinate actions toward a successful CCE initiative. Resources must be shared, and communication among various members of the emerging CCE community should be facilitated.

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# Chapter 5
# Disaster-Affected Schools and School Districts After the East Japan Earthquake and Tsunami: Issues for Recovery Education

**Tomonori Ichinose**

**Abstract**  During the period after the East Japan Earthquake and Tsunami, which occurred on March 11, 2011, many schools produced and submitted records of the earthquake and their recovery process. The purpose of this paper is, based on the records of the East Japan Earthquake and Tsunami, to present universal information for local disaster prevention.

First, this paper categorically summarizes the information gathered immediately after the quake and the tsunami. Next, this paper describes the status of the schools' restructuring 3 years after the disaster.

These schools are separated into three types: Schools directly affected by the disaster and therefore isolated, schools located between the affected and safe areas, and schools located in the safe zone but near the affected area. Although the third type of school had no damage, these schools acted as relief suppliers and bases of operation.

Schools directly affected by the disaster were later abolished. It was necessary for the schools located between the affected and safe areas to serve as temporary housing for a long period of time. Schools located in the safe zone near the affected area played a core role in school recovery.

Finally, this paper introduced a new design of the disaster risk reduction drill on the basis of the relationship between the school and local community.

**Keywords**  Combination of schools • Disaster prevention drill • Disaster-affected school • Education for sustainable development

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## 5.1 Introduction

From 2011 to 2013, the post-quake recovery has accelerated. During this period, many schools produced and submitted earthquake and tsunami records and their recovery processes. The records contained many pieces of information useful for school disaster prevention and provided much information about how schools could play a role in the local community during and after a disaster.

The purpose of this paper is to present information that is universal and useful for local disaster prevention, focusing on the relationship between the school and local community.

First, this paper will categorically summarize the information gathered immediately after the quake and the tsunami. Next, this paper will describe the condition of the school combination 3 years after the disaster. This paper also introduces the new design of the disaster risk reduction drill on the basis of the relationship between the school and local community.

The Ministry of Education, Culture, Sports, Science and Technology recognized the importance of the disaster prevention function of schools by collaboration between the school and community. For this reason, they formed steering committee concerning strengthening the issue of school disaster preparedness in collaboration with the local community.

The final purpose of this paper is to describe the condition of the disaster-affected schools and school districts after the East Japan Earthquake and derive a plan for the recovery of education in the future.

## 5.2 Formation of the Disaster-Affected Schools and School Districts

### 5.2.1 Condition of the Schools and School Districts Immediately After the East Japan Earthquake and Tsunami

Many disaster risk prevention drills for students were formed after the Hanshin Awaji Earthquake 1995 and East Japan earthquake and tsunami 2011 in Japan.

The school disaster prevention plans and study materials provided information about what each school and each individual should do at the time of a disaster. For example, The Ministry of Education, Culture, Sports, Science and Technology formed the School Disaster Prevention Manual (earthquake and tsunami), the first national manual containing a plan of East Japan for earthquakes and tsunamis. However, it does not provide information about how the schools should work together in taking action against disasters.

Looking back on the schools at the time of at the time of the 2011 disaster, they contained three divisions: the ones in the middle of the flooded area, the ones on the

verge of the flooded area, and the ones in the hinterland. The following sections, Category 1–Category 3, were presented at the symposium, Ichinose (2012).

**Category 1: Schools Directly Damaged by the Tsunami**
Category 1 contains schools to which students and local residents were evacuated as a protection against the tsunami. However, the first and second floors of the school buildings were submerged, and thus people became isolated.

- Although evacuation from the tsunami was announced over the community wireless system after the earthquake, people were not able to hear what was being said.
- Mobile telephone lines were tied up immediately after the quake and no wireless station was available. There was no communication method to seek assistance from police, fire stations, or the school board, so the people became isolated.
- When the floods came, citizens witnessed tragedy firsthand. Their houses or family members were swept away by the tide, and teachers made painstaking efforts to keep such dreadful scenes away from children's eyes.
- Local residents were evacuated to the school. Relief supplies, including blankets, emergency food, drinking water, and flashlights, were insufficient, and therefore, they were not supplied to all evacuees.
- It snowed, but no heating was available. Evacuees used newspaper and curtains to ward off the cold.
- They had to fight against not only submerging in the water and isolation, but also against secondary disasters, including burning, floating debris and forest fires.
- While they were waiting for rescue, evacuees panicked in the psychology of crowds (in fear of explosions of gas holder and electric leakage).
- The toilets could not be flushed, so establishing temporary toilets (e.g., using water from swimming pools) became essential.

**Category 2: Schools that Became Shelters**
Category 2 schools were located between a flooded area and a safe area and accommodated many evacuees, including local residents who escaped from the flooded area.

- A contingency planning manual states that a shelter shall be established by persons dispatched from a city office when a disaster strikes. However, no transportation was available, no one was dispatched to support the shelter, and the school had to accommodate a number of evacuees on its own.
- It was difficult for school staff members to operate shelters. Whether evacuees, themselves, (i.e. the members of local residents' organizations,

(continued)

including residents association and fire-fighting teams) could voluntarily operate them determined the quality of the operation.
- The amount of stocked relief supplies, including blankets, emergency food, and drinking water, was not nearly enough compared with the number of evacuees. Whether stores and residents in the vicinity of the school worked together to provide food, blankets, etc., also determined the environment of the shelter.
- Because it was too cold in shelters with no heating equipment, some shelters asked evacuees to stay in cars parked in schoolyards to ward off the cold.
- Measures to prevent the spread of infection were required when a number of residents stayed together in school buildings.
- Mutually supportive relationships were key to the smooth operation of shelters. Examples include the help of local residents to reestablish school systems and the support of residents by the pupils of the junior and senior high schools that were used as shelters.
- Accommodating all local residents included accommodating people with mental diseases and the homeless. In addition, precautions against crime were required.
- Some schools in the heart of a city or along railroad lines had to accommodate as many as 2,500 evacuees.

**Category 3: Schools that Did Not Act as Shelters**
Category 3 consists of schools outside the area flooded by the tsunami where no local residents came to be sheltered.

- Some schools  outside the disaster-stricken area had no damage and did not need to provide shelter. They assumed the function of a relay point for relief goods at first. Later, after the Self-Defense Forces had arrived, they became lodging areas and bases of operation.
- Corpses were transported to the schools that served no other function and were vacant, and many of them had to be used as mortuaries.

### 5.2.2   Model of the Formation of Local Schools and School Districts

The schools listed above are the results gathered immediately after the earthquake and tsunami in 2011. These experiences clarified a method for establishing corroboration between schools and the community at the time of a disaster. Schools are
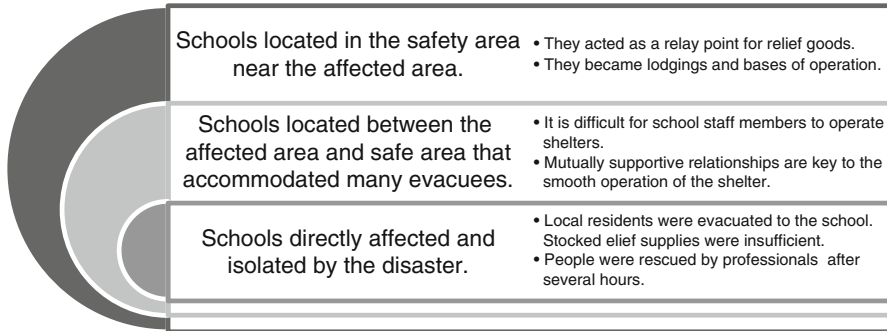
**Fig. 5.1** Model of school formation during a disaster

separated into three types: (1) Schools directly affected and, therefore isolated by the disaster; (2) Schools located between the affected and safe areas; and (3) Schools located in a safe vicinity near the affected area (Fig. 5.1). Once a natural disaster occurs, it is necessary to acknowledge the difference of the position and the role. For example, although the category 3-type schools experienced no damage, these schools acted as relief suppliers and the bases of operation. After the disaster, schools needed to contact each other immediately and ensure they are fulfilling the role of their school.

## 5.3 Combination of Schools for the Recovery of Education

### 5.3.1 Loss of Local Community and School Districts

Several months after the disaster, many residents moved into temporary housing in remote areas or into new houses that they chose, themselves. As a result, it became difficult to maintain the school district and the school, itself. Some schools were abolished because the school buildings were submerged and the surrounding communities were lost.

### 5.3.2 An Example of the School Combination in Miyagi

To consider the relationship between local communities and schools during and after a disaster, the following five areas were chosen as examples: Kesennuma City, the mouth of the Kitakami River, the Higashimatsushima area, the Onagawa area, and the Yamamoto town area.

The Figures (Figs. 5.2, 5.3, 5.4, 5.5, 5.6, and 5.7) below indicate the geographic relationship between the areas flooded and submerged by the tsunami and local schools.
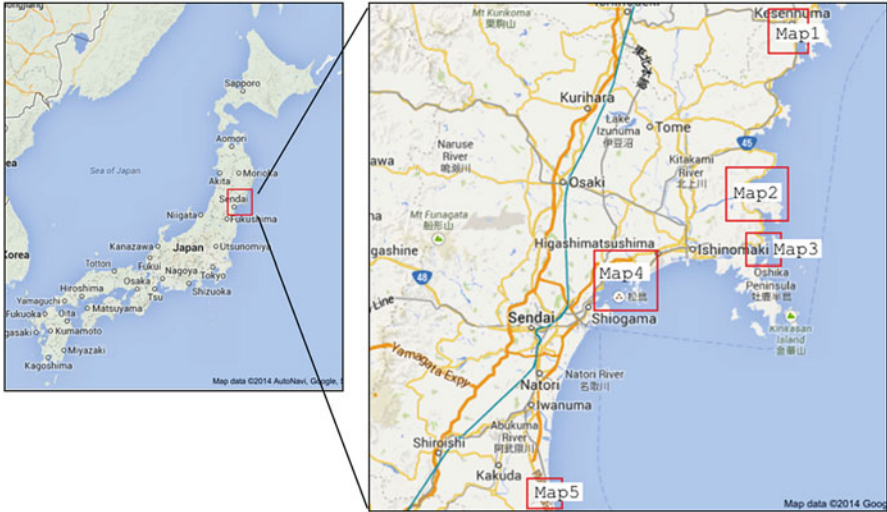
**Fig. 5.2** Location of Miyagi and the disaster-affected schools and school districts



**Fig. 5.3** Kesennuma city (Inside the *red line*, submerged area)

In Kesennuma city, the local area along with the Okawa river were submerged. Kesennuma City-run Minami Kesennuma Primary School lost its school district. As a result, the primary school was closed and integrated into Kesennuma Primary School located in the hinterland.

The mouth of the Kitakami River was severely is known for the devastating damage caused by the Tsumami, many of the towns and villages along rivers were lost their land. As a result, many schools lost their school district.
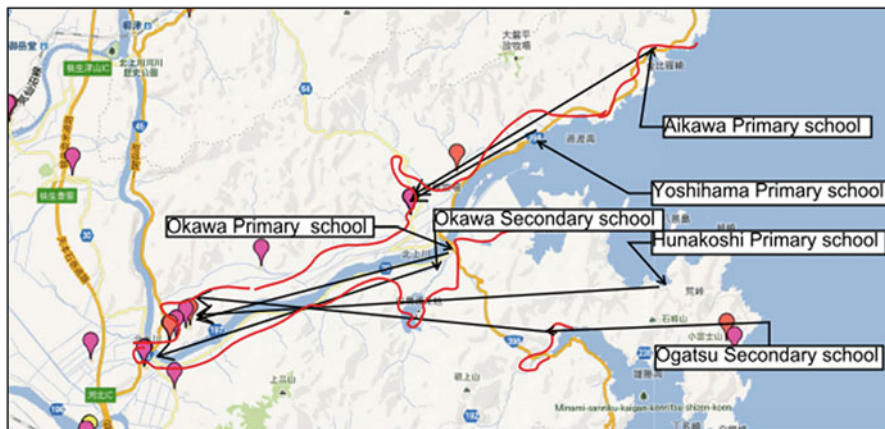
**Fig. 5.4** The mouth of the Kitakami River



**Fig. 5.5** The Onagawa area



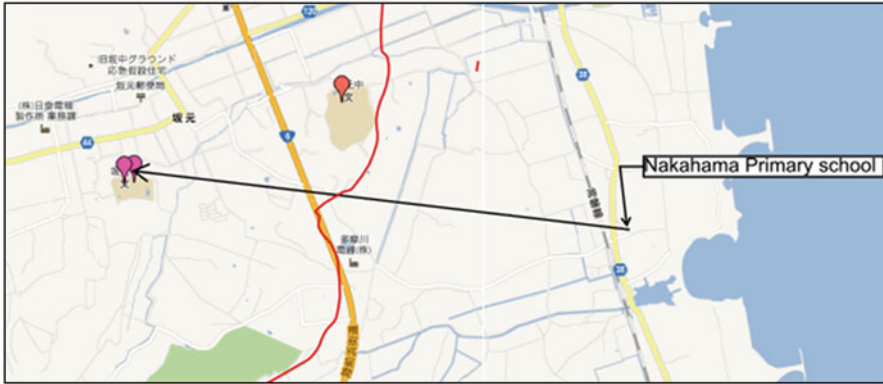**Fig. 5.6** The Higashimatsushima area

**Fig. 5.7** The Yamamoto Town area

Ishinomaki City run Hunakoshi Primary School was integrated to Ogatsu Primary School. Aikawa Primary School and Yoshihama Primary School were integrated into Hashiura Primary School. Hashiura Primary School changed its name to Kitakami Primary School, and Okawa Secondary School was integrated into Kahoku Secondary School

In the town of Onagawa, the population decreased to 23.7 % compared to the population before the earthquake. Many local schools closed in this area. In the Izushima area, all residents moved to another district outside Izushima after the tsunami. As a result, one primary school and one secondary school moved to the surrounding area of Onagawa Town. Onagawa Town-run Onagawa Daini Primary School was incorporated into Onagawa Daiichi Primary School. Onagawa Daiyon Primary School was integrated into Onagawa Daiichi Primary School. Onagawa Daiichi Primary School changed its name to Onagawa Primary School. Onagawa Daini Secondary School was integrated into Onagawa Daiichi Secondary School. Onagawa Daiichi Secondary School changed its name to Onagawa Secondary School.

A big part of Miyato Island was submerged and small villages were lost. Ono Primary School and Naruse Secondary School were abolished and moved to the hinterland along the Naruse River. Higahimatsushima City-run Ono Primary School was integrated into Hamaichi Primary School. Hamaichi Primary School changed its name to Maruse-Ouka Primary School. Higahimatsushima City-run Naruse Daini Secondary School was integrated into Naruse Daiichi Secondary School. Naruse Daiichi Secondary School changed its name to Naruse-Mirai Secondary School.

Large parts of the lowlands were flooded. Examples include the Sendai Plain, Natori City, and Yamamoto-Chou area. There are no hinterlands in this area. Local residents were displaced and the schools near the seacoast were all closed. Yamamoto Town-run Nakahama Primary School was integrated into Sakamoto Primary school.
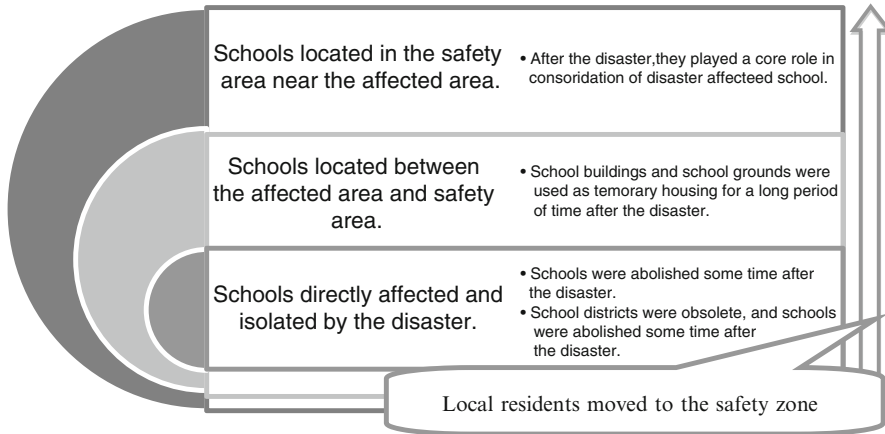
**Fig. 5.8** Model of school formation after the disaster

As described above, submerged areas experienced an outflow of local residents, causing the problem of a declining population. Most of the submerged schools lost their school district and were integrated into schools located in the safety zone. In the Japanese school system, considering the feelings of the students in the affected areas, it was decided not to use the original school's name, and instead to create a new school name. From this information, a chart of school districts after the big disaster can be formed (Fig. 5.8).

## 5.4  New Additions to the Disaster Prevention Drill

### 5.4.1  Example of Hashikami Junior High School, Kesennuma

This chapter introduces the improvement of and the new challenges for the activities concerning disaster risk reduction. The following summarizes the report (Kesennnuma Board of Education 2013).

Hashikami Junior High School was famous for the DRR before the East Japan Earthquake. Previously, drills were carried out following the themes of "Self-Help," "Mutual-Help," and "Public-Help" in three-year cycles. However, after the East Japan Earthquake, the program was changed to three-year cycles of "Self-Help," "Self-Help/Mutual-Help," and "Self-Help/Public-Help" built on the basis of "Self-Help-protecting one's own life first of all."

With the cooperation of local neighborhood associations "Hashikami Junior High School District Disaster Preparedness Promotion Committee" was newly established and the school carried out evacuation drills jointly with neighborhoods.

Through primary evacuation drills conducted by neighborhood associations in collaboration with the Hashikami Junior High School District Disaster Preparedness Promotion Committee, students were able to learn how to make disaster preparations and take action together. When the tsunami warning was issued on December 7, 2012, students were able to take the initiative in setting up and performing evacuations in collaboration with the local community.

### 5.4.2   Collaboration with the Local Community in Miyagi

The Kahoku Newspaper Company inquired about the current evacuation drills of 56 schools in Miyagi Prefecture that were affected on May 2012 (Kahoku Shinpo, June 9, 2012).

This research revealed that out of 11 elementary schools and 3 junior high schools, a total of 25 % of the public schools stricken by the tsunami planned a disaster drill in corroboration with local residents. For example, at Higashimatsushima Elementary School, the 700 number-scale, joint evacuation drill was held with local residents. Kesennuma Oya Primary School (215 students), in which the first floor was flooded by the tsunami, performed a joint disaster drill with a kindergarten and junior high school. Thirty local residents living in temporary housing in the schoolyard also participated in this drill, walking to the hinterland 15 min away from the school with Oya students.

In the Sanriku coastal area, escaping to the hill behind the school became a key survival point. After the earthquake and tsunami in 2011, in collaboration with the local society, maintenance on the evacuation route to the hill behind the school was begun. Kitakami Elementary School is located in the opposite direction of Okawa Elementary School and Okawa Secondary School, which is known for the devastating damage caused by the earthquake. Out of 108 children evacuated to the schoolyard, 70 were dead and four were missing (as of January 23, 2012). The forest behind Kitakami Elementary School was maintained through cooperation with the Miyagi Forest Instructor Association. The forest was maintained, the public square was opened and the escape route for evacuees was secured. Thus, the hill became a place of disaster reduction and disaster prevention.

### 5.4.3   ESD's Contribution to Relationship-Building Between Local Communities and Schools

The idea of the sustainable development of society proposed by the United Nations provides important suggestions for relationship-building between local communities and schools.

As a core institute of the Regional Centers of Expertise (RCEs) on Education for Sustainable Development, which the United Nations University promotes, the

University has sought how the relationship between local communities and schools should be formed.

In greater Sendai, the RCE was established in 2005 through the liaison of local communities and organizations, which had made efforts to develop human resources and local communities to create a sustainable future.

In Miygai Prefecture, Education for Sustainable Development (ESD) promotion under the UNESCO Associated School Project (ASPnet) has gained in popularity. Currently, it has become the number one ASPnet, with 73 schools being the largest number in Japan. A variety of ESD's activities concerning the environment, disaster prevention, food, traditional culture, and international understanding were put into practice in the ASPnet member schools collaborating with local communities (Ichinose 2011).

Many ASPnet schools in Miyagi chose DRR as their research topic. Currently, Miyagi ASPnet schools have started to relate their experience and DRR search topic to other ASPnet schools.

Continuation of these practices resulted in a deepened, mutual understanding and communication among children and students, parents, community residents, and social education facilities, such as community centers. The previously mentioned example of Kesennuma Hashikami Junior High School, Kesennuma Oya Primary School, and Kitakami Elementary School were all supported by the concept of ESD. During the earthquake, the relationship between communities and schools played an important role in establishing and operating evacuation centers. From the experience, local residents have gained an awareness of the school as an imperative part of a local community.

## 5.5  Conclusion

In conclusion, this paper first categorically summarized the information gathered immediately after the earthquake and the tsunami in 2011. After the disaster, schools were able to communicate with each other and quickly create a plan for supporting the schools and the community.

Next, this paper described the condition of the combination of schools streamlining 3 years after the disaster. In the submerged area, the outflow of the local population caused most of the submerged schools to lose their school district, and they were integrated into schools located in the hinterland. From these experiences, we could create a chart of the local society after the big disaster.

Schools directly affected by the disaster were abolished some time after the disaster. Schools located between the affected and safe areas provided their grounds as temporary housing for a long period of time. Schools located in the safe zone near affected areas played a core role in school streaming. This paper described the results after East Japan earthquake and tsunami 2011 and created a map of school districts after the big disaster.

Third, this paper introduced a new program of the education for DRR. The practice of Kitakami Elementary School, which was mentioned earlier, is a typical example of disaster risk reduction in collaboration with local society and other NPOs. They created this procedure as a result of the tragedy of Okawa Primary School. The school and community maintained the forest behind the school and created an escape route for evacuees, as well. Thus, the hill became a place of disaster prevention.

Currently, with the cooperation of local neighborhood associations, a "District Disaster Preparedness Promotion Committee" has been newly established in some areas, and the schools have performed evacuation drills jointly with neighborhood associations.

The concept of the sustainable development of society proposed by the U.N. provides important suggestions for relationship-building between local communities and schools. It is necessary to strengthen the ability to fight against disasters, and contribute to the restoration of local communities through the activities of Education for Sustainable Development (ESD).

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# Chapter 6
# Governance and Policy on ESD

**Wataru Iwamoto**

**Abstract** This Chapter traces the mechanism of promotion of Education for Sustainable Development (hereafter "ESD") both on the model suggested by the International Implementation Scheme (hereafter "IIS") and on the reality of Japan. It is needless to say that as ESD concerns the learners at all stages of life and also mobilizes the formal and non-formal education, it involves various factors other than school systems and requires the new model of governance which the traditional administration of education does not fit to. The Chapter, following the analysis of the theories of the governance in recent years, will examine the reality of the mechanism of implementation of ESD at both governmental and local levels and clarify the role played by NPOs. This will permit us to identify the characteristics of the governance on ESD in Japan. Finally the possible model of the governance after the United Nations Decade of the Education for Sustainable Development (UNDESD, 2005–2014) will be presented.

**Keywords** Administration of education • ASPnet • Education for Sustainable Development (ESD) • Governance • School systems

The article is based upon the author's individual thought, and it does not imply the expression of any opinion of his organizations.

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## 6.1 The Significance of the Governance in ESD

The nature of the governance depends on what kind of policy is required, who are the targets of this policy and who are the providers of the policy. Here we will clarify the characteristics of ESD from viewpoint of the governance and then will examine what is the theoretical approach on the governance proposed recent years.

### 6.1.1 The Governance Issue in the Context of ESD

The plan of Implementation of the World Summit on Sustainable Development adopted in September 2002 (WSSD 2002), famous for its recommendation "to the United Nations General Assembly that it consider adopting a decade of education for sustainable development, starting in 2005", indicates, from the paragraph 116 to 124, various important points for ESD. Not only the linkages with the targets of the Education for All, but also the necessity of the integration of sustainable development into educational level at all levels as well as the importance of the provision of a wide range of formal and non-formal continuing educational opportunities, including volunteer community service programmes etc. are mentioned in the Plan. This shows well a wide range of action concerning ESD. UNESCO, designated as the lead agency for the UNDESD was tasked to prepare an international implementation scheme by the Resolution adopted by the United Nations General Assembly at its 57th session. The International Implementation Scheme (IIS) (UNESCO 2005) established in October 2005 explicitly mentions, as one of the objectives of the UNDESD, "to facilitate networking, linkages, exchanges and interaction among stakeholders in ESD" It also takes a partnership/alliance approach as responsibility for the Decade and indicates the possible partners at all levels – subnational (local, community), national, regional and international, and from all spheres -governmental, civil society and NGOs and private. Seven strategies are proposed by the Scheme, and among them the two concern the governance such as Consultation and Ownership/Partnership and Networks. (Already at preparatory stage of IIS, the nature of multiple factors was presented by the author (Iwamoto 2003)). The respect of the importance of the governance can be explained one part by the nature of ESD as described above and on the other, by the recent progress of the theory of the governance which we will examine in the next sub section.

### 6.1.2 The Progress of the Theoretical Approaches of the Governance

Bevir (2012), in his compact but exhaustively informative book gave the definition of the governance as follows: "The process and interactions through which highly diverse social interests and actors produce the policies, practices and effects of governing".

According to him, it is also related to the rise of new process of governing that are hybrid and multi-jurisdictional with plural stakeholders working in networks. After indicating various type of governance according to the type of network, he characterizes the collaborative governance as referring to cases in which citizens play a more active role in policy-making or service delivery. Chhotray and Stoker (2009) indicated that the concept of governance becomes challenging with help of the twin forces which are globalization and democratization. They define that the governance theory is about the rules of collective decision-making in settings where there are a plurality of actors or organizations and where no formal control system can dictate the terms of relationship between the actors and organizations. Osborne (2010), after describing the Public Administration which reigned from the eighteenth century through to the late 1970s and the New Public Management until the start of the twenty-first century, presents the New Public Governance, which is predicated upon the existence of a plural state and a pluralist state. The New Public Governance is, according to him, a product of and a response to the increasingly complex, plural and fragmented nature of public policy implementation and service delivery in the twenty-first century. Kennett (2010) indicates the shift from direct forms of governance to a process of governance exercised through a plurality of actors, sites, spatial scales, and processes, with an increasing reliance by governments on informal powers and influence rather than on formal authority. According to Denters and Rose (2005), the transformation of the local governance is explained by the change in a macro sense such as urbanization, globalization and Europeanisation and by the change in a micro sense which is the citizens' orientations dominated by instrumental considerations concerning the performances and efficiency of governments in meeting citizens' demand.

It becomes clear that the theory of the governance nowadays reflects the existence of collective or plural actors and the complex nature of the issues.

In this context, the concept of the transparency has changed as follows: "the need for thinking more broadly as accountability through genuine power-sharing than 'narrowly' as simply displaying information." (Chhotray and Stoker 2009)

Concerning the links with the substance of the context such as environmental issues, Defarges (2011) points out that different from the politics in a classical sense, the governance is linked with the common interest such as sharing of wealth, management of the planet, and he then argued that here the problem replaces the conflict. Chhotray and Stoker (2009) point out that the environment encompasses issues that are simultaneously local and global in characters and that the discussion is underpinned by a fundamental paradigmatic shift from limitless and extractive growth to sustainable development.

We can resume that the governance nowadays is different from a classical sense of the participation of the stakeholders such as provision of the chance of consultations or hearing, and it is requested to satisfy the interest of various stakeholders who will be also the main actors of the implementation of the policy. It also seems that the new style of the governance tends to reinforce the coordination of different actors rather than the respect of the authority or the hierarchy since there is no single actor who monopolyzes the power. This aspect of the governance is crucially important in the field of the ESD which requires the involvement of multiple

stakeholders in all aspects of education. Particularly, the governance plays an important role since Disaster Risk Reduction Education whose linkage with ESD can be explained by its nature of preparedness for the global challenges which requires full mobilization of school education, but also all the sectors of the community like other fields of ESD (Cheal 2010; Coppola 2011).

## 6.2   Governance and Policy on ESD in Japan

As country initiating the proposal on the UN Decade for Education for Sustainable Development, Japan continuously makes effort to promote ESD in the country. This Section will examine the policy on ESD in Japan with highlight on the governance at the governmental and local level and the activities of NGOs.

### 6.2.1   ESD Policy at Governmental Level

ESD policy driven by divers Ministries is coordinated by the Cabinet of the Japanese Government while the organ corresponding to UNESCO activities is located as Japanese National Commission for UNESCO at the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

#### 6.2.1.1   Coordination by the Cabinet

The IIS elaborated by UNESCO points out the importance of the building of national plan and inter-ministerial team. The Interministerial Meeting chaired by the Deputy Chief Cabinet Secretary, established in December 2005, composed of 11 ministries, including four Vice-chair Ministries which are the Cabinet Secretariat, the Ministry of Foreign Affairs, the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and the Ministry of Environment is a kind of Japanese reply to the UNESCO's recommendation, but the reinforcement of the coordination function at the cabinet level also reflects the solution of Japanese government towards the problem of the sectionalism of Japanese bureaucracy.

   The Interministerial Meeting established Japan's Action Plan for the UNDESD in March 2006. (Interministerial Meeting on DESD 2006) The Action Plan states the Guidelines for the implementing ESD, such as programmes leading to community building, diverse places of education and implementing actors, integrated approaches under various agendas, learning from participation, and communication and collaboration between diverse actors. This represents well the nature of multi-stakeholder for promotion of ESD.

   Based on UNESCO's mid-decade review and the Great East japan earthquake that occurred on 11 March 2011, a new paragraph added as follows;

"The Great East Earthquake and the accident at the Nuclear electricity plants and the shortage of electricity caused by the disaster makes many people rethink of the image of "sustainable society" including what should be the supply and use of electricity power. In addition, our country including the affected area will conceive the formation of the new region and society. "Sustainable society" will be a main pillar of the reflection on this issue."(Translated tentatively by the author) Among others, the publishing of the "Japan report" in 2009 and the decision on the venues of the UNESCO World Conference on ESD were coordinated by the Cabinet. The Cabinet Secretariat organises regularly the Round Table composed of around fifteen representatives of different stakeholders such as NGOs, companies, local government etc.

#### 6.2.1.2 Japanese National Commission for UNESCO

The establishment of national commission is recommended by the UNESCO Charter. The Japanese National Commission, an institution under the Law concerning UNESCO activities, provides advice, plan, liaison and survey on UNESCO activities.

Since the proclamation of the UNDESD at UN General Assembly, the National Commission energetically deliberated the issue of ESD. Already in July 2003, National Commission elaborated "Proposal to the UNESCO's International Implementation Scheme on the DESD" which was highly taken into account in the IIS. "Proposals by the Japanese National Commission for UNESCO Regarding the Further Promotion of the UNDESD" issued in August 2007 leads to the resolution adopted at 37th session of the General Conference of UNESCO. Further, "Proposals regarding Effective Utilization of UNESCO Associated Schools for Promotion and Dissemination of ESD" in February 2008 positions UNESCO Associated Schools as base for promotion of ESD. The Commission also elaborated "the Recommendation to the Japanese Government for Further Dissemination of ESD and Promotion of Support to ESD", which was sent to the Minister of Foreign Affairs, Minister of Finance, Minister of Education, Culture, Sports, Science and Technology and Minister of Environment. Inside the National Commission ESD is discussed preliminary in Education Committee. To discuss the principle of the UNESCO World Conference to be held in 2014, the Working group for the UNESCO World Conference on ESD was established in the National Commission in 2011.

#### 6.2.1.3 Ministry of Education, Culture, Sports, Science and Technology (MEXT)

While almost all the Ministries are involved in the promotion of ESD, I will overview here the activities of MEXT. My limited working experience prevents me from describing the activities of the Ministry of Environment or other Ministries, but the collaboration between the Ministry of Environment and MEXT functions smoothly in

general in the field of ESD especially in the school education. Certain ESD programme prepared by the Ministry of Environment is undertaken at local governmental stage with support of MEXT. On the other hand, the Ministry of Environment makes good use of the outcome of research "Framework Necessary to Design and Develop Learning Instruction Processes for Education for Sustainable Development (ESD)" driven by the National Institute for Educational Policy Research.

As the Secretariat of the Japanese National Commission for UNESCO and the Ministry responsible for education, MEXT takes various measures for promotion of ESD.

(1) Courses of Study and Basic Plan of the Promotion of Education
   The Course of Study is the guideline for the curriculum, and almost every 10 years the revision is undergone. The revised Courses of studies for kindergartens, elementary schools, junior and high schools and special schools in 2008 and 2009 include the perspective for the formation of a sustainable society. It is to be noted that the introduction of ESD has been facilitated by the idea of "zest for living" and "Period for integrated studies" hours which permit the transdisciplinary learning, established in the former revision of the Courses of studies in 2000.

   The Basic Act on Education revised in 2006 requests the Government to formulate the Basic Plan for the Promotion of Education. The first Plan established in July 2008 by Cabinet decision mentions ESD as education for fostering the bearer of the sustainable society and encourages the promotion of ESD through various ways such as the increase of the UNESCO Associated Schools. The second Plan established in June 2013 requires promotion of ESD which echoes with the fostering of key competencies, through measures such as quantitative and qualitative reinforcement of the UNESCO Associated Schools.

(2) UNESCO Associated Schools
   UNESCO Associated Schools (ASPnet) founded in 1953, is a global network of 9,566 educational institutions which adhere to the idea of UNESCO. With publication of "Proposals regarding Effective Utilization of UNESCO Associated Schools for Promotion and Dissemination of ESD" by Japanese National Commission, MEXT has eagerly engaged to promote UNESCO Associated Schools. As a result the number of the schools, 24 in 2007 dramatically increased to 647 (as of October 2013). The concrete activities of the school as are various from environmental education to disaster risk education, world heritage education etc (Fig. 6.1).

   To guarantee the quality of the UNESCO Associated Schools, the Japanese National Commission for UNESCO issued "The Guidelines for UNESCO Associated Schools" in September 2012. Taking into account the importance of the linkage between these schools and the surrounding community, the Guidelines emphasize the importance of the network through collaboration with such organizations as local social education institutions and NPOs. The Guidelines also insists upon the necessity of enhancement and utilization various types of in-school and out-of school training.
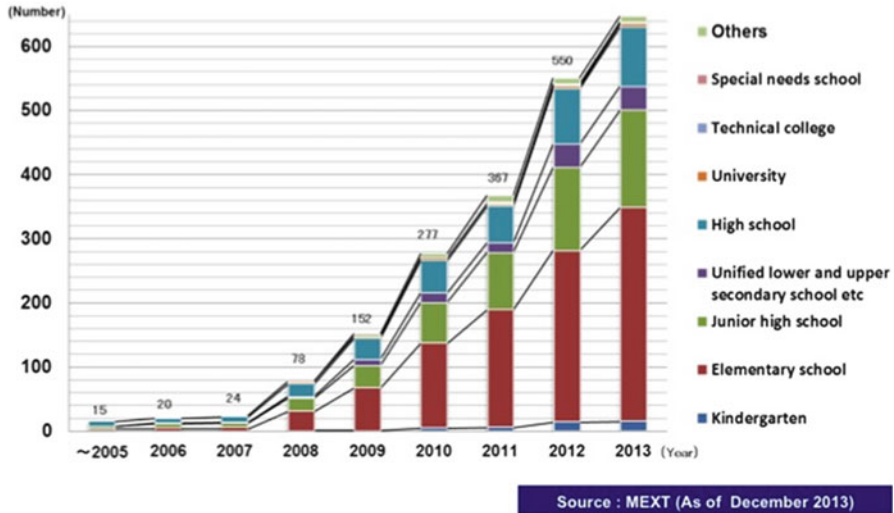
**Fig. 6.1** Transition in the number of the UNESCO Associated Schools (ASPnet)

MEXT annually organizes the Conference of the ASPnet to facilitate the information exchanges such as sharing of good practices. The Asia-Pacific Cultural Centre for UNESCO (ACCU) provides support to schools who apply for ASPNet, through management of website and production of relevant educational materials.

The interuniversity network supporting the UNESCO Associated Schools Project Network (ASPUnivNet) composed of 17 universities supports the ASPnet (as of October, 2013).

Concerning the UNESCO Associated School in Japan, we can indicate the following issues. At first the geographically those schools are not located with balance. For example, at four prefectures out of forty-seven (Aomori, Nagasaki, Miyazaki, Oita) there is no UNESCO Associated Schools which we consider the base of promotion of ESD. On the other hand, we can also observe the case of certain city board of education where all the elementary schools, junior secondary schools, special needs schools, whose management is in the city's competencies, are the UNESCO Associated Schools such as case of the cities of Tama and Omuta. According to Japanese National Commission's document a total number of the UNESCO Associated Schools in four cities (Kanazawa, Kesennuma, Omuta, Tama) represents 23 % of a total number of the schools of the ASPnet in Japan (JNCU (Japanese National Commission for UNESCO) 2013a).

The other serious issue is a possible misunderstanding of the educational world that ESD can be treated only by the UNESCO Associated Schools. This should be solved immediately. We will examine this issue later.

(3) Joint Programme and Assistance to the various stakeholders 'initiative
The initiatives which involve various stakeholders are undertaken.

MEXT, through Japan-UNESCO Partnership programme, organizes the Global Citizen's Conference on DESD with ESD-J which is a big forum of

discussion with various actors of ESD, the management of the ASPUnivNet, and the management of the UNESCO Associated Schools website together with Asia Pacific Center for UNESCO (ACCU), etc.

On the other hand, through Official Development Assistance Grants for UNESCO Activities, MEXT helps the UNESCO related activities targeting ODA countries such as support to the Disaster Risk Prevention education in Myammer. In this framework, "Save Our Future—ESD-DRR International Workshop for Future Leaders in Asia" was organized in Miyagi and Tokyo in February 2013, with participation of the teachers and students from Asia-Pacific countries.

(4) International activities

MEXT established the Japanese Funds in Trust for ESD with contribution of 200 Million Japanese Yen in 2005 at UNESCO and continues to give the funds since then. The Funds are used for the collection of the best practices in the field of the Disaster Risk Reduction, Biodiversity and Climate change.

MEXT organized the International Workshop on ESD on 1 December 2012 and participates or sends the experts to the international meetings on ESD. MEXT officials regularly attend the UNESCO General Conference and Executive Board. On the other hand, MEXT encourages the teacher exchanges with the Republic of Korea in the field of ESD. Similar programmes are undertaken respectively with the United States of America and China.

As a recent initiative, MEXT established in 2012 the SEAMEO-Japan ESD Award in collaboration with the Southeast Asian Ministers of Education Organization (SEAMEO). With partnership of UNESCO Bangkok Office, the Award is given to three schools implementing the best practices on ESD in the region.

### *6.2.2  ESD Policy at Local Level*

ESD Policy is conducted at local level is driven by the Department of the Environment or that of Regional promotion at the prefectural Governor or Mayor office or by the Board of Education which enjoys certain autonomy. Normally the policy inspired by MEXT is conducted by the Board and the UNESCO related issue belongs to the competency of the Board.

One problematic issue can be raised here.

At first, the Board of Education is in general attentive to the voice of the Elementary and Secondary Education Bureau of MEXT while the Secretariat of the Japanese National Commission for UNESCO seldom has relationships with the Board of Education until now. It leads sometimes to the quasi-absence of interest in ESD or UNESCO related issues especially at the level of the Board of Education at Prefecture.

The Information document of the Japanese National Commission for UNESCO indicates that out of 45 prefectural Basic Plans of the Promotion of Education, only 13 refers to the idea such as ESD, sustainable development or sustainability (JNCU (Japanese National Commission for UNESCO) 2013b).

## 6.2.3 ESD by Other Stakeholders

### 6.2.3.1 United Nations University

With support from the Government of Japan, the United Nations University launched the Program on Education for Sustainable Development (ESD Program) at the Institute of Advanced Studies in 2003. Strengthening the contributions to ESD through Regional Centers of Expertise (RCEs) on ESD is one of the program's pillars. The purpose of RCEs is to build platforms where ESD stakeholders can share information and experiences and seek partnerships at the local level. As of October 2013, 117 RCEs have been established worldwide. In Japan, six RCEs in Greater Sendai, Okayama, Yokohama, Kitakyushu, Chubu, and Hyogo-Kobe are functioning to promote ESD activities in their respective regions. As for higher education institutions, the United Nations University decided to build a network of universities committed to ESD in the Asia-Pacific region, and it officially launched the Promotion of Sustainability in Postgraduate Education and Research Network (ProSPER.Net) in June 2008. The activities undertaken in this network include the development of ESD curriculums for administrative officials and business schools through cooperation among Asian universities.

### 6.2.3.2 Japan Council on the UN Decade of Education for Sustainable Development (ESD-J)

Founded in June 2003, the Japan Council on the UN Decade of Education for Sustainable Development (ESD-J) is a networking organization dedicated to promoting ESD in Japan and overseas through partnerships. ESD-J has formed a network of 100 organizations including NGOs/NPOs, educational institutions, enterprises, and other groups active in such fields as environmental education, development education, human rights education, and youth development and is currently engaged in such efforts as policy proposals, training, and information dissemination, and international networking. ESD-J plays an important role both at the central level with their policy proposals, and at local level with implementation of concrete projects.

### 6.2.3.3 Asia-Pacific Cultural Centre for UNESCO (ACCU)

Since its establishment in 1971, ACCU has been implementing various regional cooperative programs in the fields of culture, education, and personnel exchange in close collaboration with the countries of Asia and the Pacific. In response to the start of the UNDESD, ACCU has promoted the DESD by reviewing its past projects from the perspective of ESD and conveying the principles of ESD to governments, NGOs, universities, and other partner organizations in Japan and abroad through

trainings and projects. It also collects and provides the information on ASP net and implements the ESD related projects such as RICE project with Asian countries with support of the UNESCO-Japanese Funds in Trust.

### 6.2.3.4   National Federation of UNESCO Association in JAPAN (NFUAJ)

Established in 1947, NFUAJ carried out various activities aiming at the international peace and the common welfare following the philosophy of the UNESCO Constitution. In the field of ESD, NFUAJ in collaboration with Tokyo Mitsubishi UFJ Bank, provides financial support for ASPNet schools' ESD activities. They organize the ESD International Exchange Programme through which ASP high school students are sent for study tour in Europe. In 2013 NFUAJ launched the programme for promotion activities of UNESCO Associated School ESD volunteers. Around 200 UNESCO Clubs are under NFUAJ and they can be locomotives of promotion of ESD at community level if the staffing structure is reinforced at each club.

## 6.3   UNESCO World Conference on ESD in 2014

The proposal of hosting the End of Decade conference in Japan was already launched at the Bonn Conference in 2009 and the Resolution 64/163 adopted in the 64th session at UN General Assembly in 2010 took note of this.

The UNESCO World Conference on ESD will be held in Aichi-Nagoya and Okayama. Using the motto "Learning Today for a Sustainable Future", the UNESCO World Conference on Education for Sustainable Development will mark the end of the Decade. The World Conference (10–12 November) and the Stakeholder Meetings (4–8 November) are organized by UNESCO and the Government of Japan. The objectives of the Conference are (1) Celebrating a Decade of Action, (2) Reorienting Education to Build a Better Future for All, (3) Accelerating Action for Sustainable Development and (4) Setting the Agenda for ESD beyond 2014. The stakeholders meeting shows also the nature of ESD driven by several actors. THE ASP net Conference, Youth Conference and the Global RCE Conference will provide their outcomes for Aichi-Nagoya Conference the basis of discussions. From viewpoint of the participation of various actors, the Side events, related events will be ideal occasions.

As the outcome document of the World Conference, the Declaration which indicates the participants and UN Agencies' conviction for further promotion of ESD and the high-profile launch of the Global Action Programme on ESD are expected.

Here we need to understand in detail the content of the Global Action Programme which was adopted as follow-up mechanism of DESD at the 192nd

session of Executive Board and at 37th session of the General Conference of UNESCO in 2013. Its goal is, according to the document presented at the General Conference is "to generate and scale-up all levels and areas of education and learning in order to accelerate progress towards sustainable development". It has five priority action areas such as policy support, whole-institution approaches, educators, youth, and local communities. The Global Action Programme is expected to be launched and a roadmap for its implementation will be presented at the UNESCO World Conference on ESD.

## 6.4   Conclusion

The year 2014 marks the end of the UN Decade of ESD, and we expect the further development of ESD in the future. We will examine here what are the challenges from viewpoint of the governance on ESD in Japan and in the world.

### 6.4.1   National Challenges

As we discussed above, ESD is well located in the policy orientation level such as the positioning in the Basic Plan of Education or the Courses of Study. However, at local level, the energy of the Board of Education for ESD varies so much that we meet a certain number of local officials who do not realize the importance of ESD in school programme.

In School educational system, ESD has been promoted especially through UNESCO Associated Schools. However, it is not realistic that all Japanese schools become ASP net. Now the efforts should be made to spread ESD to all schools. Since ESD covers various stakeholders, this will need the assistance of the board of education, UNESCO Clubs, University, NGOs and companies. The effort to link the community with school is made since 2007 in the form of "community school" which recognize the people of the community as members of the administration council of school. The content of education and the management requires the cooperation of the community. In case of ESD, the linkage with the external people to the effective learning seems more substantial. The regional networks based upon the consortium of the ESD-related organs should be conceived. Thus, ESD promoted by point until now is spread as sphere. Once the local network linked nationwide, it can cover all Japan. The national budget 2014 approves this idea and allocates some 40 Million yen to MEXT for the implementation of the programme which consists of the formation of the consortium of ESD and the coordinator hired for this effect. Through this consortium of ESD, it is expected to even increase the regional educational power (Fig. 6.2).
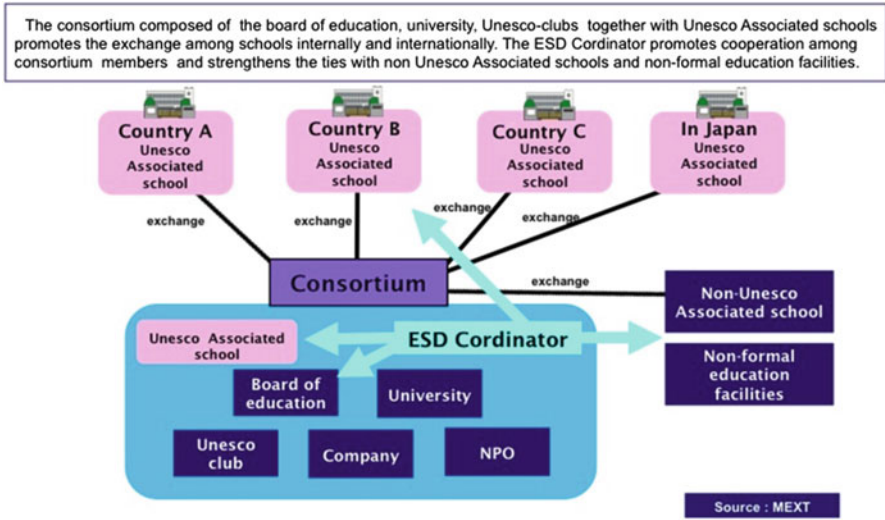
The consortium composed of the board of education, university, Unesco-clubs together with Unesco Associated schools promotes the exchange among schools internally and internationally. The ESD Cordinator promotes cooperation among consortium members and strengthens the ties with non Unesco Associated schools and non-formal education facilities.

**Fig. 6.2** Promotion of ESD

It is to be notes that the networking does not mean who is the responsible or the holder of the authority. The new governance style denying the hierarchy rather makes difficult the identification of the responsibility. The attention should be paid to this point.

### 6.4.2 Global Challenge

As we saw above the Global Action Programme will focus on five priority action areas; Policy support, Whole-institutional approaches, Educators, Youth, Local communities. The problem is to know how to mobilize the stakeholders' efforts for these areas in a visible manner. We should also pay attention to the fact that there is no more International Implementation Scheme. There will be neither Action Plan in Japanese case. The focal point for promotion of ESD will be needed and UNESCO should also encourage the unified efforts for promotion of ESD. Unfortunately the Global Action Programme will not be sufficient.

On the other hand, the discussions on the post Millennium Development Goals has been held world-widely. While it is premature to judge what kind of goals are definitive, it is evident that the education-related goal should be set in the post Millennium Development Goals. It is needless to say how important to discuss in which way ESD should be considered in this context.

Concerning Education for All, the world education movement of which UNESCO is the lead agency, the target year is also fixed 2015. If there is agreement to fix the global educational agenda, how to link ESD with ESD is also an important issue.

### 6.4.3   ESD—Global and/or Local—as Postscript

We consider that ESD prepares the citizens to the global challenges like disaster, climate change and biodiversity. The skills and abilities obtained through ESD are linked with non-cognitive skills or key competencies such as critical thinking, problem solving skills etc. which are important wherever the learners live. On other hand the ideal of ESD will lead to the international understanding. More and more the importance of the global citizenship education is emphasized. (United Nations 2012) In Japan the connotation is a little different from these arguments, but the human resource development in the globalized society is one of the biggest challenges of our country.

We can call this dimension Global aspect of ESD.

On the other hand, as we saw clearly in this Chapter, ESD is connected with the local issue. The educational power of the area is so important and we expect the learners are conscious of the local challenges. Therefore the governance at regional level has been emphasized in this Chapter. This dimension can be called Local aspect of ESD.

It would be dangerous if we stick too much to this kind of dichotomy since in a real world global and local are so connected. We say "think globally act locally", but it is also important to "think locally act globally". The problem is to know how to conceive the system of fostering the people who can act always on these two dimensions and how to construct the system of the governance. This will need another chapter.

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# Chapter 7
# View on Education for Disaster and Recovery: Example of R.C.E. Greater Sendai

**Takaaki Koganezawa**

**Abstract** This chapter aims to reveal the issues surrounding Education for Risk Reduction and Education for Recovery conducted in RCE Greater Sendai region. RCE Greater Sendai is a regional network of organisations that promotes ESD and was recognised as one of the first RCE in 2005 by United Nations University. RCE Greater Sendai currently links four cities (Sendai, Kesennuma, Osaki and Shiroishi/Shichigashuku), their local government, universities, other educational institutions, local industries and citizens and NGOs. The Great East Earthquake that his Eastern Japan in March 2011 affected Sendai city and Kesennuma city in particular among RCE Greater Sendai. The chapter hence focuses on these two regions and analyses on the issues of Education for Risk Reduction and the contents of Education for Recovery from this point forward. For the issues of Education for Risk Reduction in Sendai city three points are raised in this chapter; Tsunami on coastal region, land slide in inland suburbs caused by post-war residential development and "stranded commuters". For the contents of Education for Recovery, recovery of coastal forest and homestead woodland are suggested. Examples of Kesennuma city is limited to the mechanism of industry recovery as part of the contents of Education for Recovery, since numerous case studies conducted in Kesennuma city have already been explored in other chapters of the book.

**Keyword** Ecosystem service • Education for recovery • Education for risk reduction • Education for sustainable development • Industrial relations

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## 7.1 Introduction

Greater Sendai RCE is a network of four different cities linked with universities and related institutions. For this, there are further networks that exist within each region. Due to such unique nature, each organisations and institutions that play part of RCE Greater Sendai are able to mobilise themselves quite flexibly and independently. The way in which each regions and institutions approach Education for Risk Reduction and Education for Recovery post disaster are no exception and the approach can differ significantly. It allows for the organisation to take into its region's geographical condition and implement the best possible practice.

Education for risk reduction that arouse post Great East Earthquake tend to focus on the measurement on evacuation. It stresses on the importance of setting and recognising the evacuation paths on a regular basis, conducting evacuation drill, practising post disaster life at evacuation centre and storing the various items required at the evacuation centre. Needless to say, one of the purposes of the education for risk reduction is to evacuate safely and above mentioned points are all valid and crucial. It is important to keep in mind however, that the evacuation method varies greatly depending on the type of disaster and each regions' geographical conditions. With the Great East Earthquake, the main threat to people's lives was the Tsunami, not the earthquake itself. Because the size and the speed of Tsunami differ depending on the landscape conditions and the shape of ocean bed, it is important to recognise that the evacuation method differ in each region. Comparing Kesennuma city and Sendai-city for example, Kesennuma city has ria shoreline which is deeply indented while Sendai city has shoaling beach and the coast line is a flat terrain. Ria shoreline accentuated the height of Tsunami in Kesennuma and it reached above 7–20 m in some parts, it was critical to evacuate to the nearby mountains and/or hills with higher elevation. In Sendai on the other hand, Tsunami reached only about to 6 m in height due to its famous shoaling beach. This flatness however, meant that it provided no hills or mountains to evacuate; people had to evacuate for a longer distance until they reached to the elevated road and highways which were 4 km away from the coastline. Alternatively, those who evacuated to the roof top of the primary schools nearby survived. Such evacuation paths alone demonstrate the difference of regional conditions. Education for risk reduction is, in other words, to learn both natural and social regional conditions. In order to understand the safe evacuate method, one needs to know and understand the area well in all aspect of regional society, economy, structures of environment and its relationship with one another.

Similarly, Education for recovery requires education program based on regional condition. First point is redevelopment based on the regional environment and landscape. Taking Sendai plain for an example, there are several redevelopment plans for damaged coastal area and the agenda in the area is whether the attempts should be made to regenerate severely damaged coastal forest and homestead woodland (Igune). It was maintained and managed in the area for over 300 years and has been a part of Sendai landscape. There are certain amounts of challenges

involved in including traditional risk reduction tools such as coastal forest and Igune into the new land utilisation plan. It may still be worthwhile considering regenerating them as study material for education for recovery, even if it is difficult to recover destroyed coastal forest in full, so that it can act in its traditional purpose of protecting the surrounding environment but also to embrace historical and traditional Sendai landscape.

For this Tsunami, Umitsu outlines the details of damages caused by Tsunami in Sendai plain (Umitsu 2011; The association of Japanese Geographers 2011). Tsunami in Sendai plain reached up to 6 m and caused enormous damage due to its undertow and spilling waves. Since 1650s Sendai plain coastal line had been afforested with black pine (Kikuchi 2013). Furthermore, residential settlement that were built following the development of new field, were surrounded by homestead woodland (Igune) which functioned as disaster reduction tool (Koganzawa 2001). Even when Tsunami struck the area this time, such coastal forest and homestead woodland minimised the damage (Koganezawa and Umikawa 2013; Tokyo University GCOE Program 2012). Currently, the Sendai city is considering building the coastal levee as part of recovery and redevelopment plan, but it will be important to incorporate eco service system risk minimisation land use such as coastal forest and homestead woodland (Duraiappah 2012; Koganezawa 2012).

Second point on the education for rebuilding is to learn and research the region thoroughly in order to rebuild the regional industry. Taking Kesennuma city for an example, it was a fishery city and employment for the area was maintained by fishery industry. Since the disaster however, volume of landing have drastically reduced in all deep-sea, inshore and coastal fishery. This is not just because of the damage on fishing ships and instruments but due to the collapse of fishery related industry, especially refrigeration systems. Many of the refrigerators in the area have been destroyed by Tsunami and reduced its capacity, affecting the volume of landing and production of fish-related industry. For rebuilding, it is critical for local citizens to have shared recognition of the current situation and needs, and have a clear vision on redevelopment.

In Kesennuma region, fishing port and marine product related facilities were damaged; for example, Tsunami reached 20 m high due to its ria shoreline, fuel tanks for fishing boats were destroyed by Tsunami and caught fire. Cleaning up debris and recovery of residential facilities are obviously important task, but it is also critical to recover and redevelop fishery and marine product industry in order to redevelop the regional economy of Kesennuma region. Kesennuma fishing industry had one of the most volume of landing in Tohoku region where bonito and saury were one of the main fishes caught in the area along with shark from which shark's fin, Kesennuma local speciality, was produced. Kesennuma was also renowned for its refrigeration storage facilities and processed fish products and this whole industry support the regional economy of Kesennuma (Oiwaka 1985; Kumagai 1994; Narisawa 2005). Fish market resumed its operation 6 months after the disaster, but the volume of landing decreased dramatically. Furthermore, re-establishment of processed fish products were delayed due to the damage refrigeration facility received (Fishery Unit of Kesennuma City 2012). Several

researches are currently conducted to study the extent of damage in fishery industry and to determine the direction with which redevelopment work should be conducted (Takano 2012; Seki 2012; Hamada 2013). Fishery industry requires a strong link within the industry itself to work effectively, so it will be necessary to prioritise recovery and re-establishing work with a good understanding of the structure of industry relations (Slow Food Kesennuma 2008).

The aim of this chapter is to provide detailed analysis on the issues addressed above and to raise further challenges that effective learning program development may face. The ultimate purpose of the education for risk reduction and recovery is for children to have hope for their lives and future. In order to achieve this, it is critical to analyse one's residential area and summarise the unsustainable issues in the area before considering the learning program to create the sustainable regional society.

## 7.2 RCE Greater Sendai

Greater Sendai RCE was established in 2005 through the liaison of local communities and organizations. It consists of Miyagi University of Education (MUE) linking the activities conducted at Sendai CBD, Kesennuma, Ôsaki/Tajiri and Shiroishi/Shichigasyuku region. Sendai city has long been aware of environmental issues and, for example, initiated the movement even back in 1980s to reduce the dust pollution by replacing studded winter tire with studless. In Kesennuma city, environmental education for primary school was established where stakeholders such as the local museum, university and overseas school worked closely with local primary schools to develop awareness on environmental issues and sustainable development. In the Osaki/Tajiri area, environmental education was promoted to utilise the local aqua life and farmland which utilised a method focusing on sustainability. These experimental programs in different cities were conducted in collaboration with and supported by the Miyagi University of Education (MUE). Greater Sendai RCE was born using these regional and university networks.

One of the unique characteristics of Greater Sendai RCE is that each region has its own regional network of stakeholders (school, private corporation, NGO, local city council, museum etc.) that aim to build human resources to realise the sustainable development of each area, while each region further collaborates and networks with other regions of Greater Sendai. In other words, Greater Sendai RCE has two layers of network and missions; one within each region's ESD activities and the other in collaboration with Greater Sendai RCE as a whole. To put this into perspective, Sendai region has an agenda of environmental education and education learning activities as an urban area, while Kesennuma looks at practice of education for sustainable development. Osaki region looks at sustainable farming and Shiroishi/Shichigashuku area works on sustainable forest conservation. For Greater Sendai, the agenda is to learn from each region's activities and characteristics and

to promote education for sustainable development and sustainable environmental conservation of forest, farmland and ocean in the region as a whole.

The other unique characteristics of Greater Sendai RCE is that the university acts as linking agency to bring each region together, so that critical activities such as information sharing and capacity building in different areas of Greater Sendai can be achieved uniformly while respecting each region. Greater Sendai RCE sets three rules in running the RCE project; firstly, each region is to set a goal of their own to conduct activities for sustainable future suited to each region and characteristics. Secondly, all regions are to share their experiences and learn from each other, and thirdly Greater Sendai RCE to set a common goal and work together to achieve sustainable living in Greater Sendai as a whole.

## 7.3   Sendai Region: Education for Disaster and Recovery

### 7.3.1   Tsunami and Earthquake Damage in Sendai City

Figure 7.1 is a valuable figure where Tsunami is seen running up Arahama region of Sendai city and was captured by Sendai-city emergency helicopter service. Coastal line can be seen on the top right corner, where Tsunami is overcoming the black pine coastal forest. Igune (homestead woodland that is planted surrounding the residential houses) can also be seen in the centre slightly to the right and the head of



**Fig. 7.1**   Tsunami in Arahama area in Sendai city

**Fig. 7.2** Children and residents evacuated on the roof, Arahama Elementary School, Sendai

Tsunami is running up the agricultural waterway. The shape of Tsunami and the way it approaches land on the photo, it is clear that Tsunami is not entering parallel to the land. This is because coastal forest and Igune along with other buildings act as obstacle which changes the speed and force of Tsunami. The big waves in the centre of the Fig. 7.1 came past the bare land, hence retaining its force. Furthermore, most of the coastal line in Sendai plain is now used as rice paddy with limited residential area and Tsunami run through dried paddy while retaining its speed. Fallen black pines which was once a part of coastal forest can be seen on the bottom left and what's left of Igune in the centre which was surrounding the house. In this region, sand dune developed parallel to the coastal line and there were three big sand dunes between the beach and the East Road. Small settlement formed on top of this sand dune, which is a few meters above the ground, then Igune was formed around this settlement and residential area, leaving the area with black pine coastal forest and three Igune. These manmade forests could not stand the force of Tsunami but it played an important role in protecting houses from collapsing entirely and in keeping debris in the area rather than spreading them everywhere. With this Tsunami, the most damage was in residential areas that were in 3–4 km from the coastal area and people were forced to evacuate towards west, further away from the sea. Roads to the west were congested with vehicles and many were left with no choice but to abandon their car to flee to the East Road. Many of those who failed to reach the East Road lost their lives. Figure 7.2 shows Arahama primary school on the 11th March and the school is engulfed in Tsunami. Students and local residents evacuated to the 2nd floor of the school and water reached as high as the 1st floor,

up to 6 m high. Land in this region was flat and all other safe evacuation place was far from this residential area, making Arahama school the highest building and the only place to evacuate.

### 7.3.2  Agenda for Education for Risk Reduction in Sendai

The first and foremost agenda for coastal region is to construct a building within residential area that can act as an evacuation place for local community. Sendai city is now in the process of planning the construction of evacuation building and signing the agreement with private companies to use their business buildings as evacuation centres in case of emergency. Based on the lesson learnt from the Great East Earthquake, we can summarise the agenda for creating materials for education for risk reduction into three points. First is on the changes on land use of coastal area. Second is to find out the cause of damages residential area in inland experienced from the earthquake and finally the issue of temporary shelter and people unable to go back home after disaster in Sendai city. We will now look at each agenda more in details.

First agenda is in regards to the changes on land use of the coastal area. Sendai city received relatively small damage from Tsunami compared to the others, and this is because Sendai CBD was formed far from the coastal line and no further development was made even in recent years. Ishinomaki-city, along with Kesennuma city on the other hand, was one of the worst-hit because the city and residential area were developed centring on the Port, allowing Tsunami to hit directly. Sendai city centre developed around Hirose River, far from the ocean, but maintained the connection with ocean through the route from Shiogama to Sadayamahori (canal), further towards Nanakita River and Umeda River. This route connected Sendai to the Ishinomaki port. Coastal forest that was destroyed by this Tsunami was planted after 1640 in order to conserve the route from city centre to Sadayamahori (Kikuchi 2013). Many lives were lost at 1611 Sanriku earthquake and Tsunami (occurred on 28 October in 1611) and it destroyed much of the area which was going through new rice paddy development, bringing the area back to wilderness. Construction of Ofune Iribori (Sadayamahori, Channel) began after this to provide goods distribution and water drainage paths in order to develop new rice paddy efficiently and afforesting black pine coastal forest was a part of this development plan. Since then, people began to create residential area on the sand dune mentioned earlier and further built Igune to protect residential buildings from north-westerly winter wind and maintained agricultural land (Koganzawa 2001).

Figure 7.3 left and right shows the google earth aerial shot of the area before and after the quake (Google 2011). Coastal forest of more than 100 m wide can be seen from the beach line except for Arahama residential area and Yuriage port (can be seen in lower part of the figure). Due to the lack of forest, Tsunami entered from Arahama and Yuriage with powerful force while coastal forest and Igune managed to weaken the force of Tsunami in other areas (Koganezawa and Umikawa 2013).

**Fig. 7.3** *Left*: Land use in Sendai Plain before disaster. *Right*: Land use in Sendai Plain after disaster

Residential area expanded after the world war two but it did not expand beyond the East Road and the land between the East Road and coastal line remained agricultural land. This land use of not developing the coastal line minimised the damage by Tsunami in Sendai, though lack of Arahama coastal forest resulted in a regrettable outcome. It is our first agenda as to how to utilise this coastal forest and Igune ecosystem service that is a combined result of natural environment and historical background of human land use (Nishiootachime 2012).

The second issue is Sendai city's residential issue and the damage it had from the quake. As has been mentioned, development of Sendai city did not go towards the coast. This is because self sufficiency rate of rice was below 100 % when Sendai's residential development begun in 1960 and securing the food source was a bigger agenda at the time. Instead of developing the rice paddy that sat along the coastal line, residential development moved towards the hills which were used to plant trees for firewood and charcoal, sourcing sustainable energy in pre world war Sendai. The need of firewood and charcoal declined due to the energy revolution after 1955, so that residential developers saw them as an opportunity to expand residential areas. They developed the areas by flattening the hills, filling the valley and created an artificial flat residential areas. Such unnatural land use was the cause of land slide and total or partial collapse of the houses by the earthquake (Mori 2012). According to the research by Associate Professor Mori at Tohoku University, houses that sat on what used to be a valley filled with soil experienced the

most severe damage, especially the one that sat on the edge of the original land and the filled earth land. The same principle was behind the cause of damaged apartment blocks that were built on previously a paddy field. This suggests that the damage from earthquake often depends on the process of development. It is critical for the affect of earthquake and Tsunami to be researched and documented so that educational material can be created from the experience.

The third issue is about those citizens who were unable to return home from Sendai city centre after the earthquake due to public transport system interruption. The term "stranded commuters" was coined for those people and became social phenomenon after the quake. In Sendai, those 'stranded commuters' evacuated to schools near the stations. Tsutsujigaoka Primary school located 10 min from Sendai station was swamped by 3,000 of such people and they were required to play a different role from other schools where the service was provided predominantly for local residents. Possibility of some sort of incident occurring from mass movement of people needs to be managed well and it is another agenda the quake has raised. This will be an important and interesting topic as part of education for risk reduction.

### 7.3.3 Redevelopment Learning Materials With Attention to Ecosystem Service

Sendai plain's coastal area development is under progress with classification of land use; residential, agricultural, parkland and nature conservation area. Taking the experience of Tsunami from the disaster, building of evacuation space on higher ground and evacuation paths to the East Road is on the way too. With such land use classification, not only is it important to have an idea of residential area to be far from Tsunami danger zone but to incorporate the function of coastal forest and Igune, which assisted in risk reduction of agricultural and residential land in this region, as discussed previously.

The coastal forest and Igune play an important role on risk reduction: not only do they reduce the speed and the height of Tsunami but it also prevented from debris spreading across (Koganezawa and Umikawa 2013). Many houses were destroyed with this earthquake but the quake also produced both undertow and spilling waves which worsened the debris to spread, except for where coastal forest and Igune stood. Evidently, Igune in Sendai plain mainly serve the purpose of windbreak so that many are open to the ocean. When encountered by repetitive Tsunami however, it displayed its full ability by keeping the debris in the area. It is commendable that the black pine coastal forest and Igune, which was created more than 300 years ago based on the Tsunami experience in Edo period, still managed to exercise their function to full potential. This teaches the ability of nature, when combined with human knowledge and foresight can be so powerful. Incorporating the role of coastal forest and Igune into the education for risk reduction learning material would also be important for people in Sendai because of its historical significance.

With this Tsunami, Igune (mostly consisted of Japanese cedar) in Sendai plain have died because it was washed by salty sea water. Those dead cedar trees have been removed and the sight of Igune Sendai plain is now lost. We very much hope that coastal trees as well as Igune to be recovered as part of the redevelopment of Sendai plain. Igune style forestation plan (where redeveloped residential buildings are surrounded by variety of trees) is underway at Iwanuma city, after the report from Tokyo University (Tokyo University GCOE Program 2012). Even if the complete restoration of Igune is difficult, the idea and knowledge should be passed on.

Our lives have so much issue on unsustainability, let alone redevelopment from the quake but much bigger environmental issues such as global warming due to the increase of $CO_2$. The great east earthquake presented itself and its consequences as the most urgent unsustainable issue to the East Japan region. Kesennuma region now has restoring of the industry as their big task while Sendai plain has environmental restoration and restoring and redevelopment of the land use. In order to materialise environmental restoration and redevelopment, it is important to include topics like experience from the past disaster and the role of coastal forest and Igune but it is also essential to include the view of eco service system in the environmental education and food education.

United Nations University issued a report on analysis about environmental conservation function of Japanese Satoyama and Satoumi (mountains and oceans). This report, based on the valuation report of Satoyama and Saoumi, analyses on richness in nature provided by Satoyama and Satoumi and people's way of living in six different regions of Japan (Hokkaido, Tohoku, Hokushinetsu, Kanto, West Japan, West Japan Satoumi). The report takes richness in nature, which people have long been utilising, as eco system service and summarises the environmental issues arising from inefficient use of such service. Eco system service function can be categorised into four; one is the basis of ecosystem which is the product of physical cycle in nature that ensures the diversity. Second is the function as supplier, for example food, timber, firewood and medicinal plants. Third is an adjustment function which controls the small climate adjustment through forestry ecosystem, water source recharge and disaster risk reduction. The fourth is a cultural service such as landscape conservation and human cultural activity conservation. Each of these services complements each other so that the entire service function would degrade if one of the services is to decrease in its use. For example, Igune forest in Sendai plain provided firewood, fertiliser and windbreaker function. However, none of these functions were required when the windbreak building was constructed, chemical fertiliser replaced organic ones and firewood was replaced by electric gas system. When Igune is destroyed because it no longer provide any service human needs, maintenance function of eco service system degrades, and as a result the damage from natural disaster such as Tsunami gets amplified. It is important to keep in mind that there are much unexpected consequences when the eco system service that nature provides is neglected.

## 7.4 Kesennuma Region: Tsunami at Ria Shoreline and Education for Risk Reduction

### 7.4.1 Damage by Tsunami in Kesennuma Region

Ria Coastal line in Kesennuma region was struck by Tsunami of 7–20 m high. Kesennuma city itself received catastrophic damage by Tsunami that entered from Kesennuma Bay in Minami Kesennuma area, Sakana-machi and Shishiori area. In particular, Minami Kesennuma that is located between Kesennuma Bay and Okawa River was damaged severely and fish market and seafood processing facility with refrigerator and freezer system which was the major hub for fishery industry in this region was destroyed.

Figure 7.4 shows the Kesennuma Bay in the centre and Okawa on the left. Figure 7.5 shows the post-Tsunami photograph of Shishiori area; Kesennuma Bay is on the right and Shishiori River runs from left to right. In Shishiori area, seafood processing facility also sat near the coastline and residential area that used to be rice paddy sat behind them. Tsunami entered from Kesennuma Bay towards Shishiori area and damaged the entire area. It went further up in Shishiori River and hit the ground level of Shishiori primary school. Petroleum tank sat on Kesennuma Bay floated with water, drifted towards Shishiori area and caught fire, burning most of the area. A 200 tonne fishing ship used for saury still sit on the land as a reminder of the disaster after being washed ashore by Tsunami.



**Fig. 7.4** Damage by disaster (Tsunami and fire) in ShiShiori district in Kesennuma (*Source*: A. Sugawara)

**Fig. 7.5** Damage by disaster (Tsunami) in Minami Kesennuma district in Kesennuma (*Source*: A. Sugawara)

Figures 7.6 and 7.7 show the land use research conducted in 2012; blue circle suggests areas that people still live in remainder of buildings, whereas red circle suggests areas no one lives even though some building manage to stand still. Inside the red circle is the researched area. In Minami Kesennuma that can be seen in Fig. 7.5 a few reinforced concrete building survived but mostly not inhabited. High-rise building such as this saved many people's lives during Tsunami but it is now largely abandoned and most debris has since been removed, leaving not many buildings in this area by the time research was conducted. The area is designated fishery processing factory collection area however due to the earth-quake the ground dropped and the area faces many issues such as rebuilding the land to level, removal of sewage system, re-building of coastal levee before redevelopment can even begin. Figures 7.4 and 7.6 show Sakana-machi and Shishiori region. Sakana-machi was directly hit by Tsunami and ground level submerged under the water, yet a few buildings were recoverable after some repair. On the other hand, Shishiori was not only affected by Tsunami but outbreak of fire from petroleum leakage turned most buildings into debris. At the time of the field research, there were scarcely any buildings left on the flat land and those that remained were not in a liveable condition.

In Kesennuma region, range of hills was sitting near the coast so many survived by climbing up the hills or evacuating on higher levels of business buildings and schools. Tsunami ran up along the rivers such as Okawa River, Shishiori River and Omose River with such high speed so that the damage was spread to the areas further away from the coastal area which was the unique characteristic of this region.
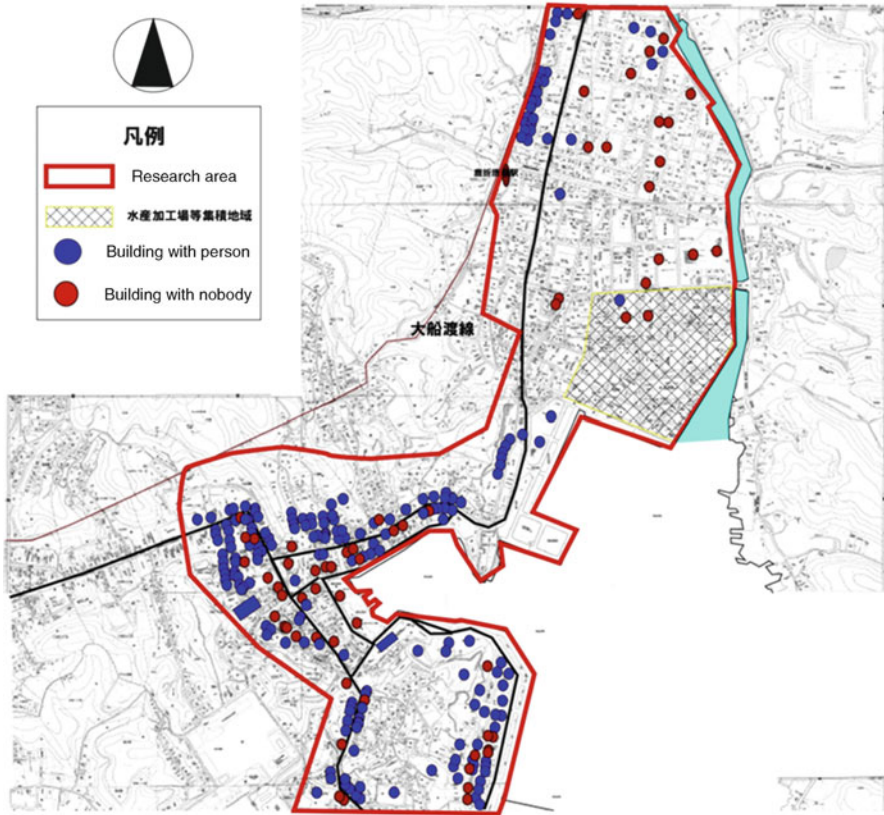
**Fig. 7.6** Land use after disaster in Shishiori, Sakana-machi. *Blue point* Building with person, *Red point* Building with nobody, Red line means research area

After the field research in Kesennuma region on the damage and handling we can summarise the role and the function of schools in Kesennuma region into three points; first, schools need to be located on safe area and the evacuation paths needs to be checked on regular basis. Second, learning activity on regional history, environment and society need to be conducted regularly and thirdly the collaboration and communication between local community and schools needs to be well maintained.

### 7.4.2 Redevelopment of Local Industry and Related Industry

Main industry in Kesennuma city is fishery and fish-related product industry including processed fish products. Redevelopment of Kesennuma city is therefore heavily dependent on the speed with which fishery industry can be rebuilt and overcoming the issues fishery industry has experienced. In order to make it clear, it
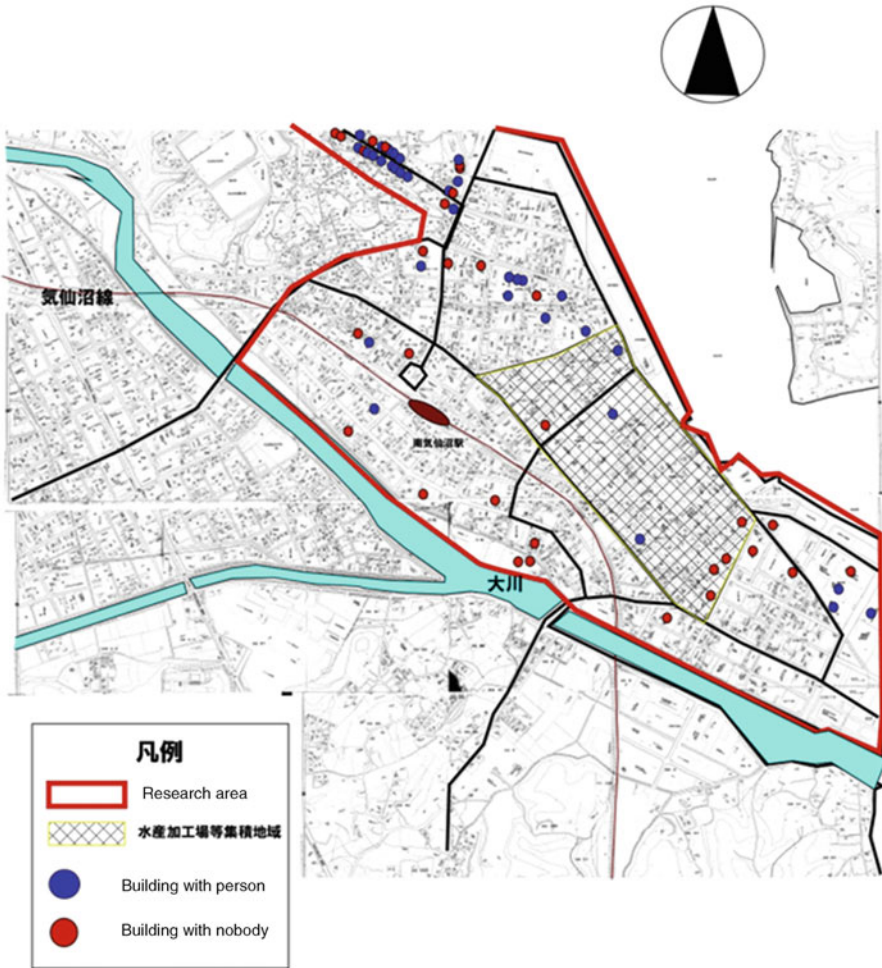
**Fig. 7.7** Land use after disaster in Minami Kesennuma. *Blue point*: Building with person, *Red point*: Building with nobody, Red line means research area

is first important to analyse the mechanism of local industry and the relationship of many different industries.

The Table 7.1 shows the comparison of the quantity of fishes caught in 2010 and 2011. With Deep sea fishery, they were able to catch only 7 % of the previous year for tuna and 35 % for swordfish. Likewise with inshore and coastal fishery, Bonito caught was 36 % of the previous year, blue shark 16 % and sardine was down to only 1 %. With tuna, this is because freezing and refrigeration system is not set up in Kesennuma yet so it is diverted to other market. Bonito, which Kesennuma is renowned for, even with this big drop in numbers still managed to retain top fishing quantity in Japan. The drop in quantity was due to the lack of facilities that support fish market such as refrigeration and ice making. Blue shark's drop was due to the

**Table 7.1** Comparison between pre and post disaster fishing quantity

|  | Fish | Year | (Ton) | Comparison from previous year |
|---|---|---|---|---|
| Deep Sea Fishery | Tuna | 2010 | 231,463 | |
|  |  | 2011 | 16,813 | 7 % |
|  | Swordfish | 2010 | 29,995,341 | |
|  |  | 2011 | 10,649,442 | 35 % |
| Inshore Fishery | Bonito | 2010 | 409,640,654 | |
|  |  | 2011 | 148,633,043 | 36 % |
|  | Blue shark | 2010 | 78,766,775 | |
|  |  | 2011 | 12,816,680 | 16 % |
| Coastal Fishery | Sardine | 2010 | 6,287,924 | |
|  |  | 2011 | 95,187 | 1 % |

Deep Sea fishery: 2 ships were destroyed completely and fishes are landed in Shizuoka and Tokyo
Inshore fishery: 2 ships were destroyed completely, bonito is still landed in Kesennuma as it can be sold raw
Coastal fishery: most fishing boats were destroyed, number reduced vastly as fixed fishing net is not recovered

delay in the set up of the office which processes shark meat, and sardine was due to the delay in fixed fishing net recovery. As we have seen, the recovery rate of Kensen-numa fishery is about 30 % based on the quantity of fish caught and the cause is the delay in other facilities that support fishery industry. It is critical to improve the recovery speed of these offices or fishery industry will not be able to even recover to the point where it was at, which is the minimum starting point for redevelopment of this region.

Figure 7.8 shows the relationship between fishing industry in Kesennuma city. We can divide the fishery industry into a few different category; that are fishing (fishing ground), fishing port, fish market, processing factory and consumer. Within actual fishing itself, there are deep sea fishery which is conducted far from the land, a mid-range inshore fishery, coastal fishery and aqua farming and each fishing deals with different type of species and different harvesting time. In Kesennuma, coastal and aqua farming industries were damaged severely by the 2011 quake and Tsunami. With deep sea and inshore fishery, distribution line was damaged more than equipment or ships itself. Kesennuma is renowned for its coastal fishing and its use of fixed fishing net. Small fixed fishing net for saury's bait has been restored but bigger net that produces richness in variety of species are yet to be restored. With fishing port, not only does it have a function of having the fish collected and set them but it also has a role of fishing boat to stop over for refuel and refill some materials and consumer goods. While the port has recovered with its service function of providing consumable goods but is yet to recover on refuelling part. As the port restore its service the number of fishing boats stopping by are increasing, but more effort is required in restoring refuelling, ice making, boat repairing service and distribution service. For distribution service, facilities for refrigeration are of vital importance; landed fish needs to be frozen immediately
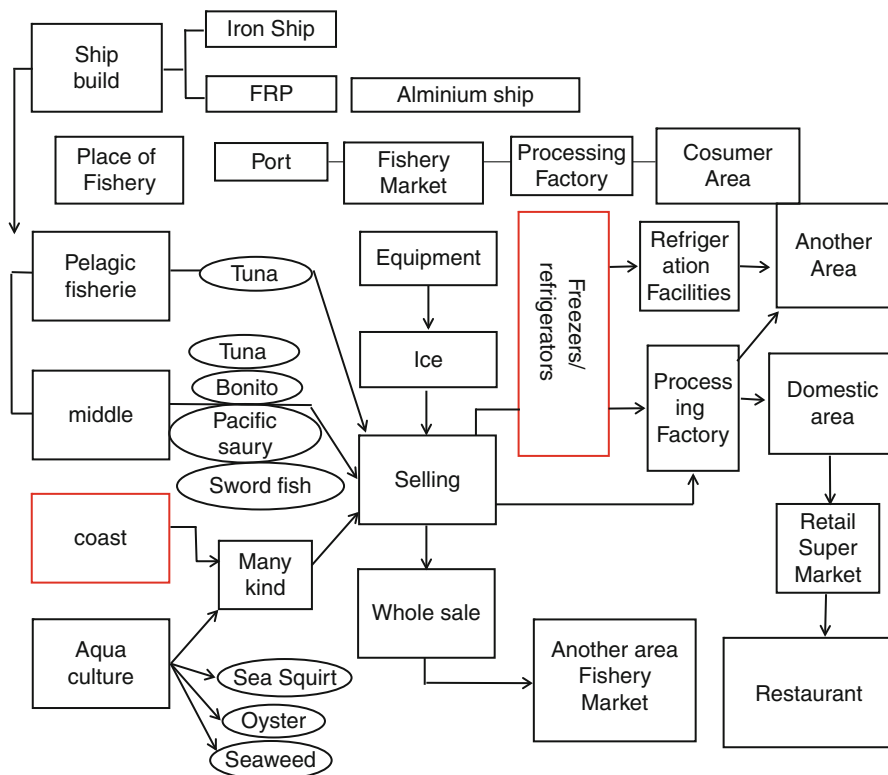
**Fig. 7.8** Inter Linkage of fishery industry in Kesennuma

and kept frozen. All these facilities were destroyed by tsunami, and only 20 % of facilities have recovered since. Kesennuma's fishing industry will not be rebuilt unless this is recovered. Fish product processing factories, similarly, is intertwined with other services and industry and it requires mutual restoring and redevelopment with other stakeholders. For example, for the shark fin processing industry to be established, shark meat, residual and meal processing factory needs to be restored. Kesennuma is a hub for fishery industry and distribution of fish in the region, but it is also a centre of consuming fish products. Fresh seafood caught and landed in Kesennuma and processed products are distributed among local retailers and restaurants and energising the tourism industry.

As we have seen, Kesennuma city's fishing industry requires restoring and redevelopment from all aspects of the industry. An analysis of industry relation is most effective in realising which part of the industry requires the utmost attention and this analysis reveals the delay in restoration of processing industry. This is mainly due to the lack of rapid refrigeration system for pre-processed fish and freezer for storing the raw material (these two combined will be hereafter called 'large refrigeration system'). Larger fish processing companies often own these

large refrigeration system within their company and those that was undamaged by the disaster and who secured a new system have already begun their operation although their facilities are not sufficient. Smaller companies used to share larger refrigeration system but those shared facilities are not yet restored and remains as their challenge. This is further complicated by the fact that the land for processing facilities requires to be raised and sewer system needs reinstalling.

### 7.4.3   Learning Material from Regional Related Industry

In order to redevelop Kesennuma city's fishery industry, it is important to recognise the relationship each sector plays and how it builds one fishery sector. Such recognition needs to be shared among local residents so that the industry redevelopment direction gets arranged. Needless to say, it is important for the promotion of regional economy that each sector that drive regional economy to redevelop individually. In order to increase the speed of redevelopment however, it is essential to consider which sector should be focused with a good understanding of regional economy's industrial relation characteristics. To bring the awareness, the agenda is creating learning material of industrial relationship and materials to understand the mechanism of the regional economic society including the industrial relationship.

Network of industrial relationship is summarised in Fig. 7.8. Understanding the fishery industry as a whole and connecting the each sector; fishing spots, landing place, traded at fish market, whole seller, freezing the landed fish, storage at processing industry, and industry such as retailer and restaurant business that sells fish and fish products. This is further intertwined with ice making industry, shipbuilding business for both building new ships as well as repairing and refuelling oil and supply service, all of which are critical in fishing industry and market transactions. It is important to understand the complexity and structural mechanism of the industry; deterioration of one industry can affect others as there is not mere collection of different kind of industry but are related and have influence on each other. Analysing this relationship and pinpointing on what industry plays a critical part at this particular moment in time is critical. We aim to introduce this industry relationship into social science in year 5 and geography subject in year 7–8.

Second learning material to understand regional economic society is related on the connection between the industry, employment conditions, people's life and population movement. With Kesennuma, the city is connected with Karakuwa, Motoyoshi and even some parts of Rikuzen Takada city with people commuting for work and school and shopping. This will possibly further extend to Tome and Ishinomaki city with Sanriku highway upgrade. As we looked at, primary industry such as farming and fisher, secondary industry (fish processing, shipbuilding business, refrigeration) and service based tertiary industry such as retail and restaurant business are all intertwined and constitute the industry relation. Since the quake however, this relationship is not operating well where it connects between the industry well, produces economic circulation and to further develop.

When operation of one of the sectors halt, then related industry's function automatically gets weaken. For example, with the refrigeration function reduced, other port would take up on the landing role lowering the volume of landing in the region. With the delay in port function's recovery, it further loses its competitiveness with other ports. Obviously such industry produces employment but with the delay of recovery, all those labour would then be lost to other business offices, industry and region, worsening the unemployment rate in Kesennuma region. What makes matters worse for fishing industry, some experienced labour of fishing industry are, at least temporarily, lost to rebuilding of the city post disaster. Labour market of Kesennuma city (an opportunity to work in local region) becomes narrower and people from Kesennuma, commuters from Rikuzen Takada and younger generation move away to other region. As a result, vicious cycle begins from loss of population, loss of consumer and buying power and weakened local economy. It is therefore essential to have an understanding that re-development of the industry and related industry is the key to avoid the situation like this.

## 7.5  Conclusion

In this Chapter, some draft policies are suggested on education for risk reduction and redevelopment based on some research results. The common idea for both type of education is to have regional learning as their foundation. With risk reduction education, check on evacuation paths, creating hazard map, evacuation drill and post-disaster simulation drill are all important factors, and it is also important to do regional learning through textbook and holistic leaning in day to day basis. On site learning on regional learning on environment and industry through collaboration with local community is also an important aspect of risk reduction education.

Education for recovery is about learning on creating the future and about capacity building on one's ability to design the future regional society even when disaster like the Great East earthquake strikes. Future is obviously built on the past and present; it is therefore critical to develop learning capacity with an ability to analyse the past and present accurately. Some program and knowledge built from the practice of education for sustainable development through UNESCO school will be very useful in its practicality.

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# Chapter 8
# Exchange and Sharing of Experiences of ESD-DRR: An International Workshop for Asian Youth

**Tomoko Shibao**

**Abstract** In response to the East Japan Earthquake and Tsunami on 11 March 2011, UNESCO ASPnet youths in Asia were organized in international solidarity, first with message exchange and second in an international workshop. The international workshop was designed and implemented with DRR education in synergy with ESD. This chapter introduces how such workshop provided a learning experience for students and teachers to broaden the scope of DRR education. HOPE framework was used to analyze the students comments to see the ESD elements as they felt by them. The chapter concludes with recommendation to utilize international ESD activities to foster local ESD-DRR in for youth as global citizen.

**Keywords** Disaster Risk Reduction (DRR) • Education for Sustainable Development (ESD) • Global citizen • UNESCO ASPnet • Youth

## 8.1 Introduction

The Hyogo Framework for Action 2005–2015, which urged to "promote the integration of disaster risk reduction as an intrinsic element of the United Nations Decade of Education for Sustainable Development (2005–2014) was adopted in Kobe, Japan in January 2005 (ISDR 2005)." The United Nations Decade of Education for Sustainable Development (DESD) was launched less than two months later in the same year in United Nations Headquarters in New York and "disaster

prevention and mitigation" was listed as one of the fifteen "strategic perspectives" of ESD (UNESCO 2006).

The massive earthquake and tsunami which devastated the communities on the Pacific coastal areas of East Japan on 11 March 2011 was one of the most devastating natural disasters after the adoption of the Hyogo Framework of Action and the start of DESD. In order to send the message of solidarity to the schools and communities of the devastated areas of the East Japan Earthquake and Tsunami, students of UNESCO ASPnet schools in countries of Asia were organized by UNESCO Bangkok and Asia-Pacific Cultural Centre for UNESCO (ACCU) under the Japan Solidarity Project.

ASPnet is a shortened term for UNESCO Associated Schools Project Network. The Programme was started by UNESCO in 1953 with 33 pilot schools of twelve countries. As one the UNESCO's longest running programmes, now the ASPnet is a network of more than 9,500 schools in more than 180 countries. In case of Japan, ASPnet schools have been promoted to implement and enhance ESD through the policy of the Ministry of Education, Culture, Sports, Science and Technology (MEXT 2009, 2010, 2011, 2012, 2013) and by the National Implementation Plan of DESD (Interministerial Meeting on the United Nations Decade of Education for Sustainable Development 2011).

In response to the call of UNESCO, 135 ASPnet schools in twelve Asian countries including Japan participated in the Japan Solidarity Project. The main activity of the Japan Solidarity Project was that students of ASPnet schools to create, individually or collectively, in variety of styles and formats, messages of solidarity to the students and communities in the affected areas of the East Japan Earthquake and Tsunami. It was encouraged that message writing and creation become learning process including reflection on their own DRR education and experience of disaster. Therefore, preparing message of solidarity was meant at the same time to be learning process of remembering the importance of DRR and being prepared.

The Japan Solidarity Project was developed into an international workshop for which students representatives who had participated in the Japan Solidarity Project were invited to participate. This international workshop was designed as ESD-DRR event, where DRR education and ESD is conducted in synergy.

This chapter examines how such international workshop can address issues of ESD-DRR and can serve as opportunity for the youth to empower themselves in international solidarity as global citizens.

## 8.2   Challenge of ESD and DRR Education

DRR is defined as the "concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, reduced vulnerability of people and property, wise management of land and the environment, and improve preparedness for adverse events. (International Federation of Red Cross and Red Crescent Societies 2013)."

In UNESCO (2007) ESD is described as "a most appropriate framework for natural disaster preparedness because (1) ESD is interdisciplinary and holistic. Therefore, important consideration is given to the impacts on, and relationship between, society, the environment, economy and culture; (2) ESD promotes critical thinking and problem solving that is essential to the empowerment of stakeholder groups threatened or affected by natural disasters; and (3) ESD seeks to be locally relevant, acknowledging that languages and cultures say and understand things differently, and addresses both local as well as global issues."

There is a clear account on how ESD practices which had been implemented in the city of Kesennuma, Japan, has been contributing the way schools and communities handle the critical matters in response to and for reconstruction from the huge and multi-faceted challenges after the East Japan Earthquake and Tsunami (Oikawa 2012). According to the experience in Kesennuma, where most of the schools are ASPnet, it was because ESD had been fostered in teachers and students "critical thinking, system thinking, holistic thinking, ability of communication, ability for collecting and analyzing information, and ability of decision making and action," all of which are important and indispensable for the disaster situation.

## 8.2.1  Positioning ESD in Relation to Adjectival Education

UNESCO (2009) argues that ESD has to be synergized with environmental education and other adjectival educations such as "peace education, gender education, inclusive education, multicultural education, human rights education, HIV and AIDS education, global education, consumer education, holistic education, citizenship education, health education and development education."

UNESCO (2012), building on the argument on the need to have synergies with adjectival education in UNESCO (2009) stresses the importance of placing ESD in relation to adjectival education, especially emerging ones such as climate change education, consumer education, entrepreneurial education and DRR education.

Adjectival education is considered to be the issue based education which focuses "only on the issue that is central to its name." According to Wals (2007) important international documents in environmental education such as 1975 Belgrade Charter and 1977 Tbilisi Declaration, though they had many similarities to what ESD advocates for today, worlds' status in terms of sustainability has not to say the least been improved. This illustrates that the importance lies not in the way how a certain type of education is termed or called but how it is interpreted and practiced.

## 8.2.2    "Narrow" and "Broad" and "More Inclusive" Interpretation of DRR Education

UNESCO (2012) introduces examples of the "narrow" interpretation of adjectival educations and "broad" and "more inclusive" interpretation. An adjectival education, when it emphasizes "interconnections with other themes with similar underlying issues and questions" it overwraps with ESD. It highlights six kinds of adjectival education; "as environmental education, development education, human rights education, climate change education, consumer education and DRR education."

For example, environmental education, when viewed in "narrow" interpretation, is about:

– Local environment
– Traditional biological and geographical emphasis
– Implicit acceptance of Western perspective on the environment
– Developing caring interest in environment and practicing study/research skills (Teaching *about* the environment)

In contrast, "broad" and "more inclusive" interpretation of the environmental education is about:

– Local/national/global/environmental interdependencies
– Exploring relationship between human behaviour and global eco-systems,
– Exploration also of non-Western perspectives on the environment
– Developing concerned awareness, action competence, etc. (Teaching *for* the environment)

In terms of DRR education, the following illustration is given to compare the "narrow" and "broad" and "more inclusive" interpretations:

For "narrow" interpretation of DRR:

– Learning to identify and assess risks
– Disaster preparedness and response
– Risk minimization

For "broad" and "more inclusive" interpretation of DRR:

– Building a community of safety and resilience
– Being able to deal with uncertainty
– Developing and comparing future scenarios
– Vulnerability, equity and empowerment

It is argued that the each adjectival or thematic education, such as "as environmental education, development education, human rights education, climate change education, consumer education and DRR education" or other adjectival education such as global citizenship education, health education, biodiversity education, are interconnected with ESD at the center with its core values. The place of ESD in the centre of intersection of these six adjectival education is on the condition that ESD itself is interpreted "broadly" to include all the themes and perspectives that other related educations present.

### 8.2.3 Characteristics and Features of ESD

According to UNESCO (2005) while there is "overall agreement on principles of sustainability and supporting concept", "no universal models of ESD exist" Therefore, the "goals, emphases and processes must (. . .) be locally defined to meet the local environmental, social and economic conditions in culturally appropriate ways."

The essential characteristics of ESD, though implemented in different ways, are presented as follows (UNESCO 2005).

– ESD is based on the principles and values that underline sustainable development;
– ESD deals with the wellbeing of all three realms of sustainability—environment, society and economy;
– ESD promotes life-long learning;
– ESD is locally relevant and culturally appropriate;
– ESD is based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences;
– ESD engages formal, non-formal and informal education;
– ESD accommodates the evolving nature of the concept of sustainability:
– ESD addresses content, taking into account context, global issues and local priorities;
– ESD builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable workforce and quality of life;
– ESD is interdisciplinary. No one discipline can claim ESD for its own, but all disciplines can contribute to ESD;
– ESD uses a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills.

Another set of descriptions on the feature of ESD is as below in UNESCO (2006).

– Interdisciplinary and holistic: learning for sustainable development in the whole curriculum, not as a separate subject;
– Value-driven: it is critical that the assumed norms—the shared value and principles underpinning sustainable development—are made explicit so that that can be examined, debated, tested and applied;
– Critical thinking and problem solving: leading to confidence in addressing the dilemmas and challenges of sustainable development:
– Multi-method: word, art, drama, debate, experience,. . .different pedagogies which model the processes. Teaching that is geared simply to passing on knowledge should be recast into an approach in which teachers and learners

(continued)

> work together to acquire knowledge and play a role in shaping the environment of their educational institutions;
> – Participatory decision-making: learners participate in decisions on how they are to learn;
> – Applicability: the learning experiences offered are integrated in day to day personal and professional life;
> – Locally relevant: addressing local as well as global issues, and using the language(s) which learners most commonly use. Concept of sustainable development must be carefully expressed in other languages—languages and cultures say things differently, and each language has creative ways of expressing new concepts.

## 8.3 Fostering Youth Leadership in Asia

Most parts of Asia are prone to many different kinds of natural disasters, such as flood, earthquake, tsunami, typhoon/cyclones, landslides, volcanic eruption, etc. According to UNESCO (2006), "past experience and projects have revealed the enormously positive effects" of DRR education. Not only the knowledge but skill, attitude and behavior for DRR have to be obtained ideally by every member of the community with disaster risk. Nurturing leadership in the young generation is an important strategy.

"Save Our Future—ESD-DRR International Workshop for Future Leaders in Asia" organized in February 2013 by ACCU together with UNESCO Bangkok was developed as a follow-up activity to the Japan Solidarity Project. Its objective were set as (1) to strengthen bonds for future exchanges among ASPnet schools and build cooperative relations for mutual leaning of ESD and DRR based on the experience through solidarity and (2) to provide opportunities to the participants to enhance their knowledge of ESD, DRR and ASPnet. Implicit objective was to organize an international workshop in synergy between ESD and DRR education.

### 8.3.1 Workshop as a Holistic Learning Space

The international workshop was attended by the students from Grade 7 to Grade 12 from eight schools in five countries of Asia. The international workshop was planned to be what Nakano (2001) describes as a typical workshop, which is "different from the style of one-way transmission of knowledge as in the case of traditional lecture but is a space of learning and creation where learners themselves

**Table 8.1** Learning steps of the international workshop

| Phase | Learning steps |
|---|---|
| Phase I: Preparing for the Workshop | 1. Take photo of "favorite things" in your area |
| | 2. Research your area |
| | 3. Introduce our school and area to other participants (using Facebook and Twitter) |
| | 4. Let us put together all the information |
| | These activities area basically to prepare a short presentation to introduce participants about the school and its surrounding environment and its past activities related to DRR |
| | The presentation will include experience of the school and students in participating the Japan Solidarity Project |
| Phase II: During the Workshop | 5. Learn about ESD, DRR and ASPnet |
| | 6. Learn about the East Japan Earthquake and Tsunami and visit the affected area |
| | 7. Learn about the DRR activities by UNESCO and the Decade of ESD (climate change, behavior change, chain reaction) |
| | 8. Share your experiences of the natural disasters and DRR activities |
| | 9. Learn other participants' experiences of the natural disasters and DRR activities |
| | 10. Think about the history of the earth and natural disasters |
| | 11. Create a teaching/learning materials for DRR education |
| | 12. Learn about the mindset as a DRR leader |
| | 13. Learn how to use ICT effectively (to produce DST) |
| | 14. Discuss and develop the action plan of your school |
| | 15. Participate in the reporting session and exchange gathering at Ministry of Education, Culture, Sports, Science and Technology (MEXT) |
| Phase III: After the workshop | 16. Present the result of the workshop at your school |
| | 17. Share the workshop achievement, using Facebook, Twitter and other SNS, Continue communicating with other participants |
| | 18. Stay active as a DRR leader |

participate, experience, learn and create through mutual interaction and collaboration." It was planned to be of a "holistic learning experience" where four important aspects of "Body, Mind, Spirit, and Emotion" were valued and integrated. The way how a workshop is described in Nakano (2001) is synergetic with ESD.

A series of learning steps was designed leading up to the workshop, during the workshop itself and to follow it up (Table 8.1) as reported in ACCU (2013).

During the workshop, while most of the time, teachers and coordinators were basically observing students' activities while giving advice to them from time to time, there were two evening workshops specifically for teacher and coordinators.

## 8.3.2  Power of Storytelling Using "DST"

One of the most important tangible outputs of the workshop was to create a "story of learning" with photographs, texts and music complied electronically using computer, what the international workshop called "digital story telling (DST)." Each school team comprising four students in a group created a DST work on their learning through the international workshop.

Starting from discussion on the current behavior in using computers and social network system (SNS), they discussed positive factors and negative factors of Information and communication technology (ICT) on the first day of the international workshop. The end of the second day the students began to work on their actual DST of 3 minutes. On the third day the time before moving to Tokyo and after arriving in Tokyo was spent on the group work to continue to finalize the own DST. In the morning of the fourth day, the finishing touch was made to the DST work for the the presentation at MEXT in the afternoon of the same day.

The presentation of DST, attended by outside audience as well Vice Minister of Education and officials at MEXT, was truly one of the highlights of the international workshop. It is because all the works by eight participating school teams were so strong in conveying the message of their experience and learning. Every student seemed to be confident and felt a sense of great achievement in their presentation of DST. Everyone seemed to appreciate others' work and recognized the power of collaborative work not only within the school team but as a whole of the workshop participants.

Interestingly, all the DST work were quite unique in expressing their message without coordination to avoid overwrapping of the content.

As the DST work is a combination of text, photographs and music, it is hard to recreate the effectiveness of each DST work. However, the text can convey at least the key message that each DST work tries to demonstrate. Following are some examples the text of DST work. Minimum corrections have been made to the original texts though there are many unnatural English expressions. English was not a mother tongue for any of the students and some texts were translated from their mother tongue to English with the help of volunteers who supported the students during the workshop.

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SMA Labshool  Cibubur, Indonesia

The Journey
ESD-DRR Intl Workshop for Future Leaders in Asia

Once, it was a peaceful place
Turned into ruins
Because of Earthquake & Tsunami
We feel the same feeling
We support you..
Only time heals..

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(continued)

May you rest in peace

Brand new day
Sharing knowledge
On ESD-DRR
Friendship and networking
Peace Harmony
With Love
Dream Believe
With passion
With sincerity
With togetherness
With spirit
With solidarity
Let's collaborate

Those days are gone
But our memories STAY!
In our heart, we're 1.
We're all Future LEADERS
Together, we can DRIVE CHANGE!!!

Lopez National Comprehensive High School, Philippines
. . .
Five countries,
One goal
Striving for a better future
. . .
Earth has been existing for extremely long period of time. . .
4.6 billion years of history!
Ever since, natural disasters have been occurring in this planet
To address these problems, Education for Sustainable Development (ESD) is
    formed.
Education for Sustainable Development is the development through education
    that meets the needs of the present without compromising the ability of future
    generations to meet their own needs
ESD is for PEACE. . .
ESD is for HUMANITY. . .
ESD is for UNITY. . .
ESD is for CONNECTION. . .
ESD is for HOPE. . .
ESD is for HARMONONY. . .
ESD is a matter of CHOICE. . .

(continued)

INNOVATE, CREATE and SUSTSTAIN real life education for future
    generation.
Through ESD, the future generation will build a network of LEADERS.
To address these problems, Education for Sustainable Development (ESD) is
    formed.
. . .
IGNITE THE CHANGE!

Udomdarunee School, Thailand

What we have learned?
Tsunami effects loss of assets

International exchange
Exchange culture
Exchange experience
Academic knowledge
Seismic Wave demonstration
What is ESD?
Sustainable Development=Meet human need+Preserve the nature
Chain reaction
All for one and one for all, united we stand divided we fall
No matter good or bad behavior, it always affects yourself and everyone. . .
It's CHAIN REACTION
Bad behavior
Good behavior
Our promise
Ride motorcycle too much –>Ride bicycle instead
Spends a lot of time on computer –>Use computer less
Leave the light on all night –>Turn the light off
Leave the door open while the air-con is on –>Close the door

Kesennuma City Matsuiwa Junior High School, Japan

Always living with the sea
Rich and peaceful nature
Port with a lot of energy
The best catch of bonitos in Japan
Our beautiful port, Kesennuma
Festival, filled with excitement
Heart-warming (relations) with the local people
Ties, through welfare studies

(continued)

We thought these days were going on forever

2011/3/11
PM3:46
Why?
Only we have to bear such a tragedy...
Only that time, we took part in the ACCU (international workshop)
We've heard stories from different countries

We've learned that everyone has experienced a lot of natural disasters.
Not only us that had a hard time
Everyone had a hard time
So we can try to (stand up)
People see our effort
Extend their helping hands
then...
That gives us the power to keep our effort
And that the way we keep going
That what we have realized in the workshop

We felt various things from activities
Nice smile
Everybody is active
Communication makes me happy
Music is very wonderful
We should think about disaster risk reduction more

So, let's share our experience with everyone
We want to tell students what we have learned
We want to start our communication with foreign schools
We want to make chance to talk with foreigners
I want to know a lot of foreign (cultures)
We feel make interested in DRR

I want to go to the foreign country and know the present conditions


Fukushima Prefecture Adachi High School

We are together

2011.3.11
Almost 2 years since the day
We participated (in) the workshop
We knew also the world
there is harsh reality
We are not the only (ones) who are in difficulty

(continued)

However...
They are still smiling

Why didn't we escape from Fukushima...

The reason why we stay in Fukushima is that
Because we love our hometown
Because we want to achieve a miracle through reconstruction
Because we believe that the adults protect our life
We will try our best to do anything we can do
Never give up because we are the light of recovery
Let's walk as we look up
Let's take each other's hand, to support each other
Thank you everyone for your love

### 8.3.3   ESD Features of the International Workshop

Through examining the text of DST work, as well as by written comments by students and teachers, certain features of the international workshop conducted in synergy of ESD and DRR education can be highlighted.

#### 8.3.3.1   Multi-Method

The workshop combined various modes and style of learning. The work was done by individual or as a group. The group work either conducted in a school team or in an international team. There are various activities such as visit to affected area of the East Japan Earthquake and Tsunami, presentation of DRR activities and disaster experiences by each school team, lecture at a university, demonstration of chain reaction using each other's body, discussing and feeling the length of the history of the earth and life, producing a simple DRR education tool, taking photographs, writing text, selecting or composing music, editing with computers, and small games and ice break. Experiencing the coldness of snow, observing the winter stars, playing the music and singing, even coping with the day-to-day rules and regulations of the facility imagining the life at the evacuation centre, and travelling together, etc. became part of the learning through the workshop. All through the process, accompanying teachers and coordinators are friendly and occasional advisors and co-learners with the students.

### 8.3.3.2  Holistic

From the preparatory phase to the international workshop, responsibility for sustainability, sense of solidarity and mutual understanding was the thread to weave the various activities of the international workshop together. Feeling, emotion, logical, etc. all thinking, working on craftwork to create a DRR education tool, laughing together, etc. all contributed to the holistic features of the international workshop.

### 8.3.3.3  Applicability

Learning during the international workshop was felt to be applicable to everyday life. It leads to the future direction of the participating students as to be more interested and active in DRR. They feel responsible for DRR but also for many other aspects of sustainability such as peace, humanity, unity, connection, hope, harmony and choice.

### 8.3.3.4  Critical Thinking and Problem Solving

One of the features to be demonstrated by ESD is critical thinking and problem solving. This feature seems to be most evident in the DST work by school teams from the affected areas of the East Japan Earthquake and Tsunami and of the nuclear power plant accidents and subsequent radiation problems. They overcame the compartment of feeling of suffer and self-grief and regret. They realized that the sorrow caused by disasters is shared by so many others in different countries over period of times. They became more confident in their roles to help others including sharing their own experiences.

### 8.3.3.5  Broadening the Scope of DRR Education

Each school had been implementing their DRR education in different ways but the international workshop seemed to have further inspired to take more action by school, by students, and together with community.

Activities of DRR education before participating the workshop by each school included:

– in corporation of disaster experience into certain subject teaching, i.e. social studies, English, science,
– first aid, emergency drill
– donation, charity and fund-raising
– international study tour to the affected area in Sri Lanka of the 2004 Indian Ocean Tsunami

– creating and sending messages to the affected areas including through Japan
Solidarity Project

Simply put, these activities do not seem to go beyond the "narrow" interpretation
of DRR education. However, according to the written commitment by each of
the school team, the perception of DRR seemed to have widened including such
plan as;

– school and community will work together
– stronger link to the external stakeholders
– setting up ESD-DRR club, establishing a youth group of ESD-DRR youth
leaders
– movement with community to reduce waste

DST and other works by students during the international workshop attest that
their learning was not limited to the immediate knowledge on DRR but extends to
other aspects which are important in ESD. What the students thought their learning
outcome at the workshop included such points as own behavioral change and
positive influence on others, working together with community, cleaning up the
international solidarity in making change, youth as change agents, respect for the
earth, environment and oneself, narrowing the gap between the haves and have-
nots, and peace.

Although the international workshop seemed to have broaden the scope of DRR
education, content leading to such issues as "being able to deal with uncertainty,"
"developing and comparing future scenarios," and "vulnerability, equity and
empowerment" which UNESCO (2012) characterises as "broad" and "more inclu-
sive" DRR education could not directly be dealt with.

### 8.3.3.6 Teachers as Co-Learners

All through the process of the workshop, teachers' role as co-learners is quite
obvious. It is reflected in some written comments by teachers such as below:

– I was very impressed by everyone's smile and the very active and self-motivated
attitude of students. I would like to reflect what we have learned in the workshop
to my classes.
– I found that a power to live for the future was generated in communicating with
the students. I really appreciate everyone for giving me such a moving experi-
ence. I will keep the effort to support the students who are working hard to share
their ideas with people all over the world.
– Through this workshop, I feel that my students' mind became more future-
oriented, and I think that we can work on a new project together in rebuilding
our community.
– ESD is very crucial issue we need to share with others. Elaborating DRR in ESD
needs to be applied soon.

– I learned essentials of ESD-DRR. Proactively, I want to plan for a local pilot
  workshop, strengthen ASPnet members in our region and take the lead for
  ESD-DRR activities in m locality.
– Seeing that a lot could be learned from sharing experiences with disaster
  response and management from other countries, this gave me the idea that I
  can also organize a similar workshop.

In terms of learning for the teachers, having separate activities for the teachers
for certain time were found to be effective. Teachers could have their own space as
learners, not caretakers, and learning only among adults in two separate workshops
during the evening, when students were involved in DST related activities. One
workshop was provided by Kesennuma Board of Education on DRR Education
through ESD Framework and the other by a local NGO on the educational
programme using facilitation.

### 8.3.4  HOPE Framework for Analysis on the International Workshop in ESD Point of View

HOPE stands for Holistic, Ownership-based, Participatory/in Partnership, and
Empowering based on the context and with the assumption that education and
learning seeking for sustainable future for all will bring upon a sense of hope for the
participants in such learning.

It was first developed as ESD evaluation method in tune with the principle of
ESD (Nagata 2009) and later developed into a ESD Framework, adding elements
through the discussion, field visits and sharing by ESD practitioners, policymakers
and researchers mainly from the Asia and the Pacific (Shibao 2012). In addition to
the usage for planning, monitoring and valuating ESD practice at the field level,
there is an example of using the framework to analyze current climate change
education in Kiribati (Vaioleti and Morrison 2012).

In an effort to illustrate the strengths and weaknesses of the international
workshop as ESD learning opportunity, students' comments were categorized
according to the elements for each of the HOPE aspects (Guevara 2012)
(Table 8.2).

It seems that Holistic aspect, Ownership-based aspect and Empowering aspect
were felt quite strong by students, which corresponds to the generally felt atmo-
sphere at the international workshop. In terms of participation, though everyone
participated very actively it was not reflected on the students' comments. It is true,
also, that although the programme was designed to invite full participation of the
students, they were not invited to participate in designing the programme nor
consulted on what they wanted to learn. The programme was designed and
implemented in partnership with various stakeholders such as UNESCO, ASPnet,
Miyagi University of Education, Kesennuma Board of Education and other boards
of education, supporting cooperation etc. to name a few, but it was not something

**Table 8.2** HOPE framework analysis

| Aspects of HOPE | Elements and related students' comments |
| --- | --- |
| H Holistic | Elements of Holistic<br>– more integrated approach to addressing current issues and problems<br>– complexity and inter-relatedness of issues<br>– drawing from different disciplinary knowledge and perspectives<br>– 3H (head, hands, heart)<br>– intergenerational learning<br><br>Related Students' Comments (From Workshop Reports)<br>• I wish to see the world without pollution and less disaster risk<br>• I learned the importance of not only thinking but also taking actions<br>• This workshop really inspires me and totally moved not only my feet but also my mind and heart to do something which can encourage other people to be a part of the change<br>• I learned about solidarity, friendship, and also learned that though we are from different countries, we are but one. It is very heart touching<br>• I learned to respect the earth, environment and myself<br>• Natural disasters in a way mean that the earth is still active, but these days I've come to think that some of them may be caused by us humans<br>• I hope that 10 years from now our society be the one of mutual cooperation with others so that we can concur together any disaster in the future<br>• Music is the world's common language, isn't it! Be a person of eco-friendly action<br>• I realized that our positive approach is more effective than any perfect presentation in order to share what we are thinking<br>• I hope that, in 10 years' time, the world will establish the society where there is no war or conflict and no gap between rich and poor any longer, as well as the society where people can value each other's dignity<br>• When I go to college, I will participate in volunteer activities more positively and would like to take a part in making comfortable society in which people are stronger and more cooperative<br>• I learned the importance to find the truth, as well as the importance to take action after learning the truth during this workshop |
| O Ownership-based | Elements of Ownership-based<br>– the need for individual, communities and institutions to be able to decide and therefore have ownership and responsibility for what they want to learn<br>– the need to acknowledge ownership of indigenous and traditional knowledge<br><br>Related Students' Comments (From Workshop Reports)<br>• I decided to change my bad habits, and invite all of my friends to do so<br>• When I arrived at Tokyo Youth Hostel, I felt sad because the workshop is almost over, but I felt happy to gain more knowledge and have new friends during the workshop. I believe that we all can drive a change together for a better place!<br>• I came to know the importance of sharing and appreciating other people's opinion and idea at the presentation<br>• I think that more opportunities such as this workshop would promote the public to have more interest in disaster prevention |

<div align="right">(continued)</div>

**Table 8.2** (continued)

| Aspects of HOPE | Elements and related students' comments |
| --- | --- |
| P<br>Participatory | Elements of Participatory<br>– acknowledgement of the role that individuals, communities and institutions play in deciding and shaping what needs to be learned, what is valuable knowledge and how it will be learned<br>– use of participatory approaches<br>– decision-making about how resources are to be allocated<br>Related Students' Comments (From Workshop Reports)<br>– |
| In Partnership | Elements of in Partnership<br>– recognition that it is not possible for single individuals and institutions to conduct teaching and learning that would contribute to achieving the vision of a sustainable future for all<br>– resource-sharing, in terms of time, human resources and knowledge,<br>– shared goals and values and mutual respect<br>– Partnership not static but are evolving in response to context<br>Related Students' Comments (From Workshop Reports)<br>– |
| E<br>Empowering | Elements of Empowering<br>– skills to plan, respond and mitigate disasters;<br>– skills to develop alternative sustainable livelihoods;<br>– skills to work with others, learn with others and live in peace with others<br>Related Students' Comments (From Workshop Reports)<br>• We love and want to protect the world<br>• I decided to change for the better and share all the knowledge I've gained here<br>• I learned how to present my own opinions clearly<br>• I learned that language difference could not be a barrier<br>• I'd like to know more about the world and exchange a lot of information in the communication with people all over the world |

which left strong impression on students. If HOPE analysis is made using other information than the students' written comments it, would have illustrated the strength in Partnership aspect.

In terms of the holistic feature of the international workshop, the choice of the place, as well as the programme itself, was felt crucial. Visit and on-site lecture at the affected area left the strong impression. Vast natural surroundings of snow and forest of Zao-Shizen-no-ie (Zao Nature House) was felt effective for opening up the mind, feeling and spirit of the participants to contributed to the holistic aspects. Occasional interaction with elementary school students who were at the Zao Nature House for their skiing lessons, especially for the students from overseas, must have

some contribution to the raising the self-esteem because of the high interest from these younger children to the participating students and resulting active interaction beyond language barrier.

## 8.4 Discussion

ESD has been seeking the way how education and learning is to take place in accordance with different contexts in pursuit of sustainable development for all of present and in the future, requiring "a more systemic and reflexive way of thinking and acting with the realisation that our world is one of continuous change and ever-present uncertainty (Wals 2007)." In realization of "continuous change and ever-present uncertainty" there is one thing which can be said to be certain; natural hazards will continue to occur.

This aspect of DRR education is the strength in that the danger can be obvious and tangible to those in the locality of high disaster risk so that the motivation to participate in DRR learning is expected strong.

However, according to a journalist who has been observing DRR education in Japan over two decades, in his conversation to the author of this chapter, notes that DRR education which just to tell learners to prepare for the possible danger would not sustain itself. DRR education, if based on "narrow" interpretation become routine both teachers and students even though there is seemingly a significant reason to learn.

ESD with its core values, characteristics and features can make a difference and make learning opportunity more meaningful, relevant ant joyful. As ESD deals with complexity, uncertainly, and issues without simple cut answers, traditional education model of teachers as transmitter of stored knowledge would not work in ESD. Instead, teacher's role as learning facilitators and co-learners are gaining much attention – which was exactly the case during the international workshop. It does not undermine the importance of knowledge, however. Having and updating knowledge is all the more important. DRR education in ESD makes the knowledge acquisition and generation more holistic, ownership based and participatory. The international workshop was an example of DRR education in synergy with ESD.

Any international workshop is conducted outside of regular classroom as a special event. How to link the school and classroom activities is a challenge. Another challenge is to reflect the learning during the international workshop in the classroom or school activities. With only a small number of students and teachers participating, the impact could be very limiting. However, with peer learning from students to students and with teacher to teachers, the learning outcome of the international workshop will be shared and utilized in formal and informal ways.

The most significant aspects of the international workshop were on one part difference because of the international participation and on the other hand commonness because of the shared concern on DRR.

In order to illustrate this point, a written comment of one volunteer, who helped the last part of preparation of the international workshop and attended the reporting session including the presentation of DST at MEXT, is useful. He had just retired from almost 40 years of teaching job as headmaster of a public high school.

"Looking at the students who did not want to leave the conference room at the Ministry after the reporting session is over, I was convinced the whole international workshop was concluded successfully. I credit the success to those meticulously prepared for it. I feel that this was a very meaningful workshop for all the students from four countries abroad but all the more so for the 16 students from Japan (. . ...). I think more high school students need experience such as this workshop where all the students have a common issue that they all work together to find solutions for. I hope this kind of international workshop will continue to develop like-minded students in (four) countries, and other countries, to create space for them through such common experience."

"Given the very nature of the current world, we have all become global citizens," not assuming a "deficit model that makes a judgment about who is or isn't a global citizen (Guevara 2013)." The international workshop provided planned lectures and activities, but equally or more importantly the learning seems to have taken place among students by learning from each other and through working together. In what Guevara calls "learning through global citizenship," "learning as relational is essentially about local-to-local relationships, but such a leaning relationship is embedded within learning and understanding of the global contexts (not just about each other)." The students learning from each others' experience regarding experience of disaster at the beginning, through working together ESD-DRR their learning was transformed into global concerns as environmental protection and peace together with sense of empowerment.

This aspect was not clearly articulated in designing and implementing the international workshop. Interaction among participants were expected for them to "have fun" but not clearly recognized as an important and integral part of the learning process.

Though limited in several days international workshop duration, significance of students' learning from each other going beyond the immediate DRR concern or going deeper understanding of DRR should not be overlooked.

Such international workshop opportunities can be more systematically positioned in ESD-DRR efforts in different countries in linking schools and community across the national boarders. Interaction and exchange using the internet and other means without physically bringing the students together could be another approach to realize the kind of relational learning.

These are the perspectives that ESD has provided in the context of DRR education in an international workshop.

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# Chapter 9
# ESD and Education for Disaster Risk Reduction (DRR) at Schools: Changes in DRR Education After Great East Japan Earthquake

**Katsunori Suzuki**

**Abstract** Analysis of DRR Education guidelines and manuals revealed that Japanese DRR education has several unique characteristics. Firstly, prefectural boards of education have been taking initiatives in promoting DRR education in line with the guidance by MEXT. There are significant differences of DRR education in different regions in the country. Since Kanto, Tokai regions as well as Kansai region have significant risks of future earthquakes, schools in these regions are quite active in DRR education. On the other hand, schools facing Japan Sea side are generally less active since many of them recognize fewer risks of natural disasters. DRR education covers different topics in different regions and in different schools. Some covers broader topics, while others only conduct earthquake drills. After Hanshin-Awaji Earthquake in 1995, DRR education has been gradually expanding to cover broader topics and becoming more systematic. Great East Japan Earthquake has accelerated such trend. Since the ability required for DRR education can be developed through ESD, linkages between DRR education and ESD should be further strengthened. Further development of DRR education can be achieved through promotion of ESD.

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## 9.1 Overview of Japanese ESD and Education for Disaster Risk Reduction at Schools

### 9.1.1 Education for Sustainable Development and Education for Disaster Risk Reduction

Education for Disaster Risk Reduction (DRR Education) is one of the important topics of education for sustainable development (ESD). As mentioned in Chap. 2, the Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT) (as well as the Secretariat of the Japanese National Commission for UNESCO), in 2008, decided to promote ESD at formal education especially through the best use of UNESCO Associated School Project (ASP). Since then, the number of ASP schools has significantly increased from 24 in April 2008 to 705 in April 2013. However, DRR education has not been quite actively promoted in ASP schools compared with other topics. MEXT (Japanese National Commission for UNESCO 2012) and Kanazawa University (Kanazawa University 2012) conducted questionnaire surveys on ESD activities at ASP schools in 2012 separately. The number of schools that provided the answer are 309 in the MEXT survey and 101 in the Kanazawa university survey. Although the objectives and many survey items were different, major topics of ESD activities were questioned in both surveys. The results are shown in Table 9.1. Although the results are not identical, similar trends can be observed. In both surveys, environment, international understanding, traditional culture are adopted in many schools. In both surveys, DRR obtained less than 20 %. The Kanazawa University survey revealed that DRR is adopted in all types of schools (elementary, junior high and senior high schools) similarly.

**Table 9.1** Topics adopted at UNESCO ASP schools (% of total schools)

|  | MEXT survey | Kanazawa University survey |
|---|---|---|
| Understanding on UN system | 6 | 1 |
| International understanding | 51 | 43 |
| Environment | 68 | 79 |
| Pease/human rights | 35 | 24 |
| Disaster risk reduction | 19 | 16 |
| World heritage | 22 | 15 |
| Climate change | 7 | 3 |
| Biodiversity | 16 | 22 |
| Energy | 27 | 16 |
| Food | 32 | 47 |
| Traditional culture | 41 | 60 |
| Others including social welfare | 21 | 17 |

The survey results do not necessarily mean that DRR education is not popular in Japan. Rather, DRR education seems to be quite popular in Japan, since Japan has many earthquakes and MEXT and many prefectural board of education have been taking initiatives and guidance to promote DRR education. It may be interpreted that because so many schools have been carrying out DRR education even before schools knew ESD, they may not consider that DRR education is a part of ESD. For instance, the 2010 survey by Hyogo Prefectural Board of Education (Hyogo Prefectural Board of Education 2010) revealed that 89 % of schools surveyed (answers from 1,376 schools) included DRR education in their schools' educational goals and 92 % of schools carried out DRR education in this prefecture.

## 9.1.2   Characteristics of Japanese DRR Education

Japanese DRR education has several unique characteristics. They include:

(1) Since Japan suffers from many natural disasters, many schools have been traditionally carrying out DRR education. It is interesting to know that in addition to MEXT, prefectural boards of education have been taking initiatives, in many cases, rather than municipal board of education. It can be assumed that DRR education is so important in Japan, schools not only in big cities but all schools in their jurisdictions are encouraged to carry out DRR education to protect human life and safety.

(2) There are significant differences of DRR education in different regions in the country. Since Kanto, Tokai and Kansai regions have significant risks of future earthquakes, schools in these regions are quite active in DRR education. As mentioned before, schools in Hyogo Prefecture are enthusiastic in DRR education since they experienced extremely severe earthquake in 1995. On the other hand, schools facing Japan Sea side are generally less enthusiastic since many of them recognize less risks of natural disasters.

(3) DRR education, traditionally called as Disaster Prevention Education (DPE) in Japan, covers different topics in different regions and in different schools. Some covers broader topics such as daily disaster preparedness, strengthening of schools building to prepare for earthquakes, earthquakes and other disaster drills, consideration on resilient society etc. In Tohoku region, recovery and reconstruction of society is also the important topic of DRR education. Some others only conduct earthquake drills.

(4) Types of disasters vary in different regions but many types of disasters, such as earthquakes, tsunami, volcano eruptions, floods, typhoons etc. have been covered in DRR education, depending on specific needs in respective regions.

## 9.2  Historical Development of DRR Education

### 9.2.1  DRR Education After Hansin-Awaji Earthquake

Since Japan faces much bigger disaster risks than other countries, disaster prevention education (DPE) has been carried out for many years at schools. MEXT issued a first reference material for DPE/DRR education in 1988. At that time main focus of DRR education was earthquake and other disaster drills.

After Hanshin-Awaji Earthquake in 1995, the concept of DRR education was significantly expanded. More comprehensive learning on activities, such as self-help to protect their own lives, mutual cooperation to support with each other at disasters, were integrated into DRR education. Challenge Plan for Disaster Prevention Education (http://www.bosai-study.net/top.html, available only in Japanese) was developed to support implementation of good DRR education and disseminate good practices at schools and other organizations.

After Hanshin-Awaji Earthquake, Kobe-Gakuin University (Kobe-Gakuin University 2010) developed classification of various DRR education activities into the following categories:

– Drills and field exercises

  • Disaster drills
  • Training of fire extinction
  • Training to use AED
  • Exercise at emergency shelters etc.

– Use of existing programs and DRR education materials such as DVDs

  • Lectures on disasters by experts
  • Lectures on actual disaster experiences by victims
  • Visit to disaster prevention centers
  • Classroom experiments etc.

– Learning through development processes of disaster prevention materials

  • Hazard maps
  • Disaster prevention newsletters
  • Disaster prevention posters, disaster prevention calendars etc.

– Learning through teaching

  • Opportunities to send messages to local communities
  • Teaching from elder students to junior students

– Collaboration with other topics etc.

  • Collaboration with social welfare activities
  • Collaboration with local community events
  • Collaboration with areas affected by disasters
  • International collaboration etc.

Taking such classification into account, MEXT promoted comprehensive DRR education. Such concept was integrated in the revision of the "Guidance for School Education" in 2008/2009.

### 9.2.2  Revision of DRR Education Based on Experiences of Great East Japan Earthquake

MEXT established an "Expert Committee on DRR Education and Disaster Management based on Great East Japan Earthquake" in July 2011. The Committee issued the Interim Report (Expert Committee on DRR Education and Disaster Management based on Great East Japan Earthquake 2011) in September 2011 and the Final Report (Expert Committee on DRR Education and Disaster Management based on Great East Japan Earthquake 2012) in July 2012 and recommended to take further steps for better DRR education and disaster management. The reports emphasized the importance of self-defense to make adequate judgment and save their own life by themselves (Jijo). They also stressed the need for mutual cooperation with others (Kyojo). Major views expressed in the reports include:

For DRR education,

– To ensure sufficient time for DRR education;
– To promote systematic approach for disasters;
– To identify necessary knowledge at each stage—kindergarten, elementary schools, junior high schools, senior high schools respectively;
– To more seriously learn from experiences of previous disasters;
– To strengthen quake-resistant structure of school buildings;
– To have better knowledge on earthquake early warning systems; and
– To train response actions for Tsunami

For disaster management

– To promote training of teachers and other staff at schools
– To encourage good daily communication with parents and local residents
– To develop disaster prevention manual in consultation with relevant stakeholders.

Considering views and comments of these reports, MEXT issued the "Guidelines to Develop Disaster Prevention Manual at Schools (MEXT 2012)" in March 2012. Table of contents are shown as follows:

Chapter 1: About the Manual
Chapter 2: Important points in preparing disaster prevention manual at school
Chapter 3: Stages of disaster prevention and key to develop a manual
Chapter 4: Important points for kindergartens and special support education schools
Chapter 5: Reference materials

The Guidelines give suggestions on how to improve disaster prevention manuals at respective schools. By law, each school is requested to develop its own disaster prevention manual.

Objectives of the manual are (i) to establish organizational framework to prepare for disasters with clear identification of responsibilities of individual teachers and other staff at the school; and (ii) to establish framework to respond to disasters at community level, raise awareness on disasters and increase disaster preparedness.

The Guidelines indicated three stage activities to be considered at schools:

(1) Risk management at daily life

- Set up of institutional framework
- Safety check activities
- Disaster drill and
- Training of teachers and other staff at schools

(2) Risk management when disasters occur

- Initial responses
- Response for secondary disasters such as tsunami, fire etc.

(3) Risk management after disasters

- Conformation of students' safety
- Cooperation for shelter management activities
- Mental care etc.

Based on the Guidelines, disaster prevention manuals at schools have been reviewed and revised/improved. In many prefectures, prefectural board of education took the lead. It is worthwhile to note that all the latest revisions of DRR manuals mainly focused on earthquake and tsunami because of Great East Japan Earthquake.

## 9.3   Case Studies of DRR Education

Initiatives of boards of education vary from prefecture to prefecture. Some unique case studies are introduced in this Section.

### 9.3.1   Reference Material for Disaster Prevention Education at Schools: Case of Kanagawa

Considering serious disaster risks at Kanagawa Prefecture, the Kanagawa Prefectural Board of Education developed "Reference Materials for Disaster Prevention Education at Schools (Kanagawa Prefectural Board of Education 2012)" in 2005, and revised them in 2010. After the Great East Japan Earthquake, the Reference

Materials were further revised and strengthened, based on the experiences and lessons learned from Great East Japan Earthquake.

Chapter 1: How to use this document
Chapter 2: Objectives of, thrusts and opportunities of DRR education
Chapter 3: DRR education to be learned in respective subjects
Chapter 4: Case examples
Chapter 5: Teaching materials
Chapter 6: Sample worksheets
Chapter 7: Guiding materials on Tsunami
Chapter 8: Reference materials

One of the unique characteristics of the Reference Materials is that they specifically identify knowledge and attitudes to be learned in different subjects at different grades and show easy-to-understand case materials and practical worksheets.

Objectives of DRR education:

1. To be able to take actions with quick and adequate judgment to secure their safety, recognizing risks and dangers at disasters and preparing for such disasters;
2. To be able to take actions to contribute to the safety of others, other groups and communities at the time of disasters and theirafter;
3. To be able to understand information and knowledge on local environment, disasters and disaster prevention activities, including knowledge on mechanisms on how disasters happen.

Abilities to obtain at different levels on DRR education

– Lower Grades (1–2 Grades) of elementary schools
   To be able to follow instructions by teachers, parents etc.
– Middle Grades (3–4 Grades) of elementary schools
   To understand various risks at disasters, take actions to secure their safety with their own judgment.
– High Grades (5–6 Grades) of elementary schools
   To understand various risks at disasters, take actions to secure their safety with their own judgment and help others for their safety.
– Junior high schools
   To deepen understanding on disasters on the top of DRR education at elementary schools, obtain practical skills useful at disasters, and understand the importance of volunteer activities
– Senior high schools
   To obtain attitudes to secure not only their own safety but safety of friends, family and other local people, skills such as emergency treatment, actively participate in various disaster prevention activities and volunteer activities

Subjects/activities to learn DRR education

– Lower Grades (1–2 Grades) of elementary schools
  Life environment studies, ethics, classroom activities, school events etc... .
– Middle Grades (3–4 Grades) of elementary schools
  Social studies, classroom activities, school events etc.
– High Grades (5–6 Grades) of elementary schools
  Social studies, science, physical education, ethics, classroom activities, school events etc.
– Junior high schools
  Social studies, science, health and physical education, ethics, classroom activities, student committee activities, school events etc.
– Senior high schools
  Civics, science, health and physical education, home economics, classroom activities, school events etc.

In addition, the document contains specific examples for each subject in each grade, sample teaching materials and worksheets. This is one of the most detailed and specific materials for DRR education.

### 9.3.2  School Manual on Protection Against Earthquake: Case of Chiba

Chiba Prefectural Board of Education is another quite active case for DRR education. It prepared a "Report on the Lessons learned from Great East Japan Earthquake (Chiba Prefectural Board of Education 2011)" in November 2011. Since Chiba Prefecture suffered from serious damages from Great East Japan Earthquake, it developed a very detailed report describing how schools and students suffer from serious damages by the earthquake, tsunami, fire and other secondary disasters. The report also describes how shelters were opened at individual schools, what were major problems in shelter and other activities, how support was provided to suffered students etc. This report will provide good, concrete basis to review lessons learned from Great East Japan Earthquake.

In addition, Chiba Prefectural Board of Education issued the "School Manual on Protection against Earthquake (Chiba Prefectural Board of Education 2012)" in March 2012.

Chapter 1: Preparation at schools
Chapter 2: Response actions at Disasters
Chapter 3: Actions for reopening school activities
Chapter 4: Possible response for extremely large disasters
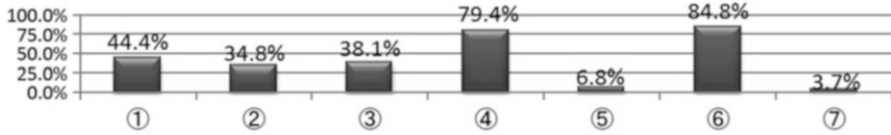Chapter 5: Reference for DRR education

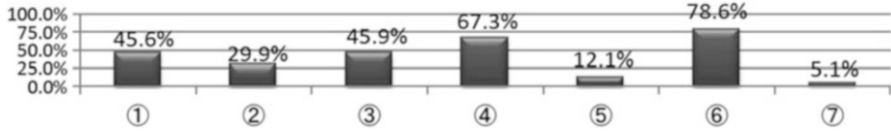**Fig. 9.1** DRR education at schools: Elementary Schools



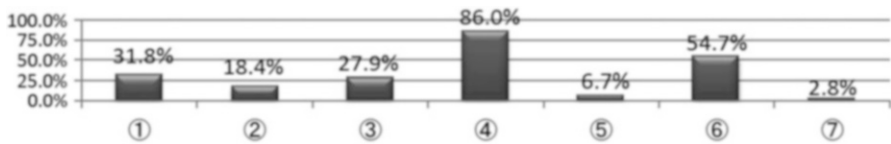**Fig. 9.2** DRR education at schools: Junior High Schools



**Fig. 9.3** DRR education at schools: Senior High Schools

Compared with the Reference Material by Kanagawa, this Manual focused on the actions to be taken at and after disasters happen. It contains much less information on school curricula to prepare for disasters. It can be considered that Chiba suffered from serious, direct damages by the Earthquake, the Manual focused on the practical information on how to respond to disasters.

Starting from October 2011, Chiba Prefectural Board of Education has been carrying out the survey on DRR education at schools in every fiscal year (Chiba Prefectural Board of Education 2011, 2013, 2014).

The survey revealed that Chiba's DRR education has been mainly focusing on practical response actions at and after disaster occurrence and pay less attention for basic knowledge, for instance, on the mechanism on earthquake occurrence. It is interesting to know that in Fiscal Year (FY) 2011 and 2012 surveys, there were no survey items on DRR education in school educational curricula but in FY 2013 survey items on DEE education were included. The results show that all the schools that responded have DRR education in their School Safety Programs

From Fig. 9.1 it can be noticed that that at elementary schools, DRR education was included mostly in classroom activities (84.8 %) and school events (79.4 %) and less in subjects (44.4 %), ethics (34.8 %) and period of integrated studies (38.1 %). These features are similar in junior high schools and senior high schools in Chizba (Figs. 9.2 and 9.3).

For Figs. 9.1, 9.2, and 9.3: 1: Subjects, 2: Ethics, 3: Period of integrated studies, 4: School events, 5: Student committee activities etc., 6: Classroom activities, and 7: Others

### 9.3.3  Basic DRR Education Policy and School Manual on Disaster Prevention for Earthquake: Case of Shizuoka

Shizuoka Prefectural Board of Education issued two basic documents on DRR education: Basic DRR Education Policy (Shizuoka Prefectural Board of Education 2013) in February 2013 and School Manual on Disaster Prevention for Earthquake (Shizuoka Prefectural Board of Education 2012) in March 2012. School Manual on Disaster Prevention for Earthquake mainly deals with response actions for disasters and activities thereafter, similar to Chiba's School Manual on Protection against Earthquake.

Chapter 1: Daily activities to prepare for disasters
Chapter 2: Response to Tokai Earthquake
Chapter 3: Response for Extremely Large Earthquake
Chapter 4: Response of schools at risk of Tsunami
Chapter 5: Reopening of school activities
Chapter 6: Response to nuclear accidents

It should be noted that this Manual covers accidents of nuclear power plants. While MEXT's "Guidelines to Develop Disaster Prevention Manual at Schools" covers nuclear accidents, many DRR education manuals do not cover nuclear accidents, mainly because the nuclear issues are politically sensitive in Japan. Since Hamaoka Nuclear Power Plant is located in Shizuoka Prefecture and may have relatively high risk, Shizuoka's Manual may have to cover nuclear accidents, different from many other manuals.

Basic DRR Education Policy is also unique in Shizuoka.

DRR education as lifelong learning

Chapter 1: Present status and challenges of disasters in Shizuoka
Chapter 2: Goals of DRR education
Chapter 3: Promotion of volunteer activities

School education

Chapter 1: Basic concept of DRR education at schools
Chapter 2: Institutional arrangements for DRR education
Chapter 3: DRR education at different educational stages
References

It covers not only school education but also lifelong education. It identified five stages—kindergarten, elementary school, junior high school, senior high school and university students/adults. Another important characteristic of this Manual is that it covers not only earthquakes and tsunami but also various other types of disasters such as volcano eruptions, flood, landslides, large scale fires etc. Similar to Kanagawa's Reference Material, the Manual specifies abilities to be obtained at different stages of education. While the document is not as detailed as Kanagawa's Reference Material on DRR education in respective subjects/activities, it may be considered to be even more comprehensive because it covers longer stages including lifelong learning, and not limited to earthquakes and tsunami.

Shizuoka also carried out a survey on DRR education at schools. According to the survey, 40 % of schools included DRR education in subjects, 33 % in period of integrated studies and 96 % in school events. Overall trends seem to be similar to Chiba's results.

### 9.3.4  Guidelines for Disaster Prevention and Disaster Prevention Education at Schools in Mie Prefecture: Case of Mie

Mie Prefectural Board of Education issued the "Guidelines for Disaster Prevention and Disaster Prevention Education at Schools in Mie Prefecture" in December 2011, slightly earlier than many other prefectures (Mie Prefectural Board of Education 2011).

Chapter 1: About the guidelines
Chapter 2: Previous activities for DRR education at schools
Chapter 3: Problems of present DRR education and guidelines for future improvement
Chapter 4: Thrusts of future DRR at schools
Chapter 5: Record of discussions

The Guidelines mainly address disaster prevention at schools rather than DRR education, but have some components of DRR education. Mie Prefecture places importance on disaster prevention and has been actively promoting model school projects with practical exercises such as disaster drills.

### 9.3.5  Guidelines for School Safety: Ishikawa's Approach

Ishikawa Prefectural Board of Education issued revised Guidelines for School Safety in August 2011 (Ishikawa Prefectural Board of Education 2011). The Guidelines contains three major components of school safety, one of which is safety from disasters (DRR education). Chapter 4 of the Guidelines addresses DRR education as follows:

Section 1: Education for safety from disasters
Section 2: Safety management for disasters
Section 3: Evaluation of safety from disasters

Ishikawa Prefecture, facing Japan sea, does not have specific guidelines/manuals for disaster prevention/DRR education. The Guidelines cover various types of disasters including large scale fire, earthquake and tsunami, typhoons and flood, thunder, landslides and nuclear safety. Although it is mentioned that the Guidelines took into account the lessons learned from Great East Japan Earthquake, descriptions on DRR education for earthquake are very short and simple, compared with other guidelines and manuals mentioned above. It seems that Ishikawa has less awareness on risks of disasters, especially earthquakes and tsunamis, although Ishikawa suffered from Noto Peninsula Earthquake in 2007. Some municipalities and schools are, therefore, aware of risks of earthquakes and took actions to help municipalities and schools in Tohoku regions, but Ishikawa people in general feel less risks and pay much less attention to DRR education. Similar trends are also observed in other prefectures in Hokuriku - Toyama and Fukui.

## 9.4 Way Forward

Japanese DRR education has several unique characteristics. They include:

– Prefectural boards of education have been taking initiatives in promoting DRR education, in line with the guidance by MEXT.
– There are significant differences of DRR education in different regions in the country. Since Kanto, Tokai regions as well as Kansai region have significant risks of future earthquakes; schools in these regions are quite active in DRR education. On the other hand, schools facing Japan Sea side are generally less active since many of them recognize fewer risks of natural disasters.
– DRR education covers different topics in different regions and in different schools. Some covers broader topics, while others only conduct earthquake drills.
– Types of disasters vary in different regions but many types of disasters, such as earthquakes, tsunami, volcano eruptions, floods, typhoons etc. have been covered in DRR education, depending on specific needs in respective regions.

After Hanshin-Awaji Earthquake, DRR education has been gradually expanding to cover broader topics and becoming more systematic. Great East Japan Earthquake has accelerated such trend and demonstrated the need to develop ability to make quick and adequate judgment to save our own lives from disasters. Development of such ability can be achieved through ESD.

Some prefectures such as Kanagawa and Shizuoka have comprehensive DRR education schemes, while some others still remain traditional disaster drill activities. Effort to establish more comprehensive and systematic DRR education should be accelerated, in close collaboration with ESD activites.

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# Chapter 10
# City Level Response: Linking ESD and DRR in Kesennuma

**Yukihiko Oikawa**

**Abstract**  This chapter traces the responses of educational sectors such as schools and Board of Education (BOE) in Kesennuma City on the recovery process after the East Japan Earthquake and Tsunami (EJET), linking Education for Sustainable Development (ESD) and Disaster Risk Reduction (DRR). Firstly, the chapter analyzes the ESD background of Kesennuma City and the damaged situations of the city and schools in Kesennuma City after EJET immediately. It also analyzes the responses of schools and Kesennuma City Board of Education (BOE) in order to reopen schools and to recover the school education in Kesennuma City. And then, it also analyzes the framework and the method for improvement of DRR education based on experiences and lessons from EJET and ESD by introducing the research of BOE and some case studies of schools in Kesennuma City. Lastly, the chapter analyzes the perspectives for Recovery Education in Kesennuma City, which should be made best use of ESD concept. ESD establishes the linkages and collaborations between schools and communities as well as among diverse actors inside and outside of the community. These networks function to emergency situations after disasters such as Disaster Risk Management (DRM) and Disaster Risk Reduction (DRR). And ESD and DRR education have the synergy with each other focused on abilities and attitudes to be fostered as well as curriculum development. ESD emphasize integrated study and interdisciplinary approach to make the curriculum, on the other hand, the concept of ESD and one of Recovery Education have the same way of doing. Therefore, ESD is a crucial concept and method in order to promote and to improve DRR education effectively at schools and in communities.

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## 10.1 ESD Based in the Local Communities of Kesennuma City

In order to concur with the international trend of sustainable development, Kesennuma City has been implementing activities aimed at building a sustainable regional society through community and school education. Kesennuma City is located in the northeast part of Miyagi Prefecture at the southern gateway to the Rikuchu-Kaigan National Park, a town with a beautiful rias coastline whose main industries are fishery and tourism. Based on the principle of sustainable social development, the city has been the home of "Mori wa Umi no Koibito (the Forest is the Ocean's Sweetheart)" movement for more than 20 years, was the first city in Japan to declare itself a "Slow Food City", and as a fishing industry base has declared itself an "International Cultural Fisheries Industry City", and has promoted activities with the characteristics of environmental education, making use of the city's rich natural environment that includes "forests", "rivers", and the "ocean", as well as food education and international education.

With regard to school education, in 2002 Kesennuma established an ongoing systematic program, centered on Omose Elementary School, which is based in the local community and makes use of the materials provided by the city's rich natural environment and collaborating with schools abroad such as US Schools. These activities have expanded into international joint environmental studies with a school in the United States on a "Waterfront Environment" theme, which combines local and global perspectives and is conducted as a Japan Fulbright Memorial Fund program (Fig. 10.1).

Not only has this program become the base for Kesennuma City's current ESD activities, but it has also played a leading role in promoting subsequent ESD in Japan as a pioneer of ESD activities in Japanese school education. Furthermore, junior high schools in Kesennuma and prefectural high schools also began joining the program in 2004, and in addition to expanding activities involving collaboration between elementary, junior high, and high schools while strengthening collaboration with the local community, specialist organizations, and overseas institutions, the program has also spread to other schools in the region.

**Fig. 10.1**   ESD Leanings of Omose Elementary School Joint with US Schools [*Source*: Mobius 2009]

In recognition of these widespread ESD activities, in June 2002 Kesennuma City was designated by the United Nations University as a model for the Greater Sendai area, which has been designated as a Regional Center of Expertise (RCE) for implementation of the United Nations Decade of Education for Sustainable Development (DESD), involving the city in the promotion of ESD on a global scale (Table 10.1) (United Nation University-Institute of Advanced Studies (UNU-IAS) 2005).

Furthermore, in order to enhance the quality of ESD in school education, in 2008 membership in UNESCO Associated Schools Project Network (ASPnet) was promoted under the leadership of the Kesennuma City Board of Education, and a total of 35 Kesennuma schools - kindergartens, elementary schools, junior high schools, and high schools - joined ASPnet (currently 34 Kesennuma schools in ASPnet as one school was absorbed due to the impact of the Great East Japan Earthquake) (Oikawa 2011).

Through Kesennuma's measures to promote ESD, various schools within the city utilize RCE and the UNESCO Associated Schools Project Network (UNESCO ASPnet) and are aiming to nurture in students a love for the region and a rich international sensibility by reevaluating the merits and problems of the region in which they live from an international perspective while remaining based in the local community (Oikawa 2009).

**Table 10.1** Constituent of Kesennuma ESD/RCE Promotion Committee (28 organizations). Members of Kesennuma ESD/RCE Promotion Committee (28 organizations)

| Specialized knowledge Institutes | Local government (Public Sector) | Local industry and press organizations | NPO and volunteer | Educational organizations |
|---|---|---|---|---|
| Miyagi University of Education | Miyagi Prefectural Kesennuma Civil Engineering Office | Kesennuma Office of Tohoku Electric Power Co., Inc. | Kesennuma UNESCO Association | Omose Elementary School |
| Kesennuma City Library | Environmental and Health Division, Kesennuma City | Kesennuma Chamber of Commerce | "Slow Food" Kesennuma Association | Hashikami Elementary School |
| Rias Ark Museum of Art | Planning and Policy Division, Kesennuma City | Sanriku-Shinpo Newspaper | Kesennuma Nature School | Shishiori Elementary School |
| Miyagi Architect Association | Kesennuma City Board of Education | Kahoku-Shinpo News paper | "I Love Oshima" | Nakai Elementary School |
|  |  |  | Oshima Experience Station | Omose Junior High School |
|  |  |  | Kesennuma Butterfly Association | Shishiori Junior High School |
|  |  |  | "Forest as Sweetheart of Ocean" Research Group for Teaching Materials in Region | Kesennuma High School |
|  |  |  |  | Kesennuma West High School |

## 10.2   City Level Response in East Japan Earthquake and Tsunami

### 10.2.1   Damages in Kesennuma City Caused by East Japan Earthquake and Tsunami

At 14:46 on Friday March 11, 2011, a massive earthquake of magnitude 9.0, which epicenter was offing of the coast of Miyagi Prefecture, struck East Japan, mainly Tohoku area. The intense quake of the maximum seismic intensity 7 in Miyagi Prefecture continued for 5 min or more. And approximately 30 min later, an unforeseen huge tsunami struck along Japan's Pacific coastline from Hokkaido area to Shikoku Area, mainly Tohoku and Kanto area. The tsunami was up to about 40 m of height maximally in Iwate Prefecture. The awful earthquake and tsunami caused the terrible disaster which gave very serious damages to many cities in Tohoku and Kanto area, especially in Pacific coastline. It is called "East Japan Earthquake and Tsunami" and it was also said "The disaster which occurs once per millennium". (Fig. 10.2 left).

This unprecedented earthquake and tsunami caused immense damage to Kesennuma City. Coastal areas in particular were devastated when the tsunami struck. Moreover, Kesennuma City also sustained damages after the tsunami from widespread fires centered on coastal areas due to oil tanks and propane gas swept away by the tsunami catching fire. The Shishiori area in particular experienced huge fires that virtually razed the central town area to the ground. Despite the efforts of the rescuers who rushed to Kesennuma with tens of fire trucks from Tokyo Fire Department to help put out these fires, it took over a month to completely bring the fires under control (Fig. 10.2 right). The human damage caused by the Great East Japan Earthquake was 1,040 deaths due to the earthquake (as of February 28, 2013) and 105 deaths related to the earthquake disaster (as of January 31, 2013). Although 2 years have passed since the disaster, some 240 people remain missing, and there are still dark shadows over the hearts of survivors and the path to recovery. In terms



**Fig. 10.2** *Left*: Boat flowing up to the city by Tsunami, *Right*: Fire burning out City after Tsunami

**Table 10.2** State of damage in Kesennuma caused by East Japan earthquake and tsunami (as of February 28, 2013)

| Local government | Type of damage | Number of victims (Damaged properties) | Overall percentage (%) |
|---|---|---|---|
| Kesennuma City | Deaths due to the disaster *1 (of which victim is unidentified) | 1,040 (8) | 1.4 |
| | Deaths related to the disaster *2 | 105 | 0.1 |
| | Missing persons*3 | 240 | 0.3 |
| | Deaths + missing persons *4 | 1,385 | 1.9 |
| | Damaged offices*5 | 3,314 | 80.7 |
| | Affected business Owners *6 | 25,236 | 83.5 |

*1–4: Police reports *5 Ministry of Internal Affairs and Communications estimates *6 Calculated from the 2009 Economic Census for Business Frame (Tabulation by Enumeration District)

of material losses, a total of 15,751 homes were destroyed, affecting some 9,500 households, with Kesennuma residents suffering immeasurable proprietary losses (Table 10.2).

With regard to the city's economic and industrial damage, of the total of 4,102 business offices in Kesennuma, 3,314 (80.7 %) were damaged in the disaster, causing 25,236 workers to lose their jobs—83.5 % of the total of 30,232 workers employed by businesses in Kesennuma (Table 10.2). This economic crisis has persisted for a long period of time, affecting the subsequent employment situation. Following the earthquake disaster, the ratio of available jobs to job seekers in 2011 was 0.19 in April and 0.17 in May—less than 0.2 for two consecutive months. More than 1 year after the disaster, this ratio had not recovered as far a 1.0 as the employment situation stagnated long-term.

As a result, the Kesennuma's population of 74,247 at the end of February 2011 (before the earthquake) fell by nearly 5,000 to less than 70,000 (69,494) in July 2012.

## 10.2.2 Schools' Crisis Response to East Japan Earthquake and Tsunami

The massive earthquake of 9.0 magnitudes on the Richter scale hit Kesennuma City at 2:46 p.m. on March 11, 2011 and continued for about 5 min. The quake was so intense that students and teachers at schools couldn't keep standing. About 30 min later, a huge tsunami, which happens once per millennium, attacked the coastline of Kesennuma City. Consequently, schools and residents in Kesennuma City were seriously damaged. Furthermore, lifelines, communication networks and means of transportation all over the city were decimated in just a few minutes. Almost all the schools in the coastal city of Kesennuma were left alone and unaided like "a solitary island located on land". Immediately, under these circumstances, schools in

**Fig. 10.3** Schools hit by Tsunami, *Left*: Kesennuma Koyo High School, *Right*: Shishiori Elementary School

Kesennuma were charged with the urgent and immensely important responsibility of "how best to protect children's lives".

The huge tsunami reached three elementary schools, one junior high school, one high school, and one kindergarten in Kesennuma. Kesennuma Municipal Minami-Kesennuma Elementary School, Shishiori Elementary School, and Oya Kindergarten, as well as Miyagi Prefectural Kesennuma-Koyo High School, all sustained devastating damages in the tsunami, especially Minami-Kesennuma Elementary School and Kesennuma Koyo High School, which could not be restored (Fig. 10.3). In addition, Kesennuma Municipal Hashikami Elementary School and Karakuwa Kindergarten sustained serious earthquake damage, making use of all or part of the school buildings impossible. Furthermore, 18 elementary, junior high, and high schools located in coastal areas were used as evacuation centers for many evacuees after the tsunami and were run by teachers, city employees, and local residents. Another five elementary and junior high schools were used as bases for Self-Defense Force, police, and fire crews, and four elementary schools provided their gymnasiums as temporary morgues (Oikawa 2013a).

In the past, Kesennuma City had compiled school disaster-preparedness manuals and carried out evacuation drills for various disaster scenarios in preparation for earthquakes or tsunamis predicted for the near future. However, the immense scale of this earthquake disaster was truly "unprecedented", far exceeding predictions and manual guidelines. Moreover, because the scale and nature of damage differed greatly depending on schools' geographical conditions and regional situations, responding to the disaster was extremely difficult. In addition, due to the break in telecommunications, schools were unable to receive instructions from the Board of Education or contact other schools, and so were forced to make choices and decisions independently without any information. At each school, teachers came together to pool and using all their knowledge and courage to carry-out evacuations and escapes in the nick of time. Thanks to their quick-thinking efforts, no children in Kesennuma who were at school that day lost their lives (Kesennuma City Board of Education (BOE) et al. 2013).

Sadly, however, more than ten children who were absent from school that day, or who had left school early or gone home before the tsunami hit did lose their lives. Learning from this painfully tragic experience, the board of education and schools have been charged with the responsibility of improving and formulating disaster-preparedness education and evacuation manuals so that such children can be protected in the future.

### 10.2.3 City Level Response for Schools' Reopening After the Disaster

Immediately following the earthquake disaster, virtually all schools were packed with many evacuees, and many teachers and school staff ran the evacuation centers with the help of local residents.

There were also teachers who, despite having been affected by the disaster themselves and without means of telecommunications or transportation, went around evacuation centers and school districts gathering and conveying information, checking on the safety and damage status of students and notifying them of temporary school closings and graduation ceremonies and other events. With many schools provided not only their gymnasiums but also classrooms to evacuees, and many other schools providing bases for Self-Defense Force teams and fire crews as well as morgues, problems also piled up.

However, under the catchphrase "Reopening schools amidst disaster", the Kesennuma City Board of Education and schools strove to resolve these problems one-by-one with the aim of reopening the schools, despite numerous restrictions and insufficient infrastructure. In consultation with evacuees, the minimum classrooms necessary for resuming classes were secured, school busses were provided for students in evacuation centers outside their school district, a full school lunch system was reestablished as quickly as possible, and other measures were implemented one after the other. Finally, sustained by the support and encourage of people around the country and the world, all elementary and junior high schools in Kesennuma were able to begin the new school year together on Thursday April 21, 2011, making Kesennuma the first city in the disaster zone where all elementary and junior high schools reopened together. In this way, even amidst this unprecedented disaster, Kesennuma City's teachers and school staff worked together to fulfill their mission, pouring all their energy into "protecting children's lives" as well as "for the evacuation of local residents" and "the resurrection of schools and education" (Oikawa 2013a).

In the same way, students also put into practice their disaster-preparedness education and ESD learning experiences in the evacuation centers and at school. Students helped prepare meals outdoors, cleared away rubble, cleaned toilets at a time when there was no running water supply, cared for elderly evacuees, performed musical concerts at evacuation centers, and otherwise poured their energy into doing everything they could to contribute to the recovery of the local community (Fig. 10.4)

**Fig. 10.4** Shelter in the gym of Hasikami Junior High School after East Japan Earthquake and Tsunami

## 10.3   Linking of ESD and DRR

As stated in Japan's Basic Plan for the Promotion of Education, ESD is an important educational principal that converges with the principles of the New Basic Act on Education and aims to nurture "Zest for Living" in children as well as cultivate leaders of the future. In the Great East Japan Earthquake, it can be said that ESD most certainly played a role also in educational reconstruction after the earthquake disaster, such as emergency management and the reopening of schools. The relationship between ESD and Disaster Risk Management (DRM) and Disaster Risk Reduction (DRR) or Disaster-Preparedness can be considered from the following three perspectives;

1. The first is the question of how ESD actually functions in DRM and DRR at the time a disaster occurs.
2. The second is the synergy between ESD (an educational orientation) and DRR education.
3. The third is the strength for students to overcome and recover from disasters that is enabled by the flexibility and resilience fostered by ESD.

### 10.3.1   Convergence of Climate Change Education and DRR Education

UNESCO is now stating key action themes for the second half of the DESD (2010–2015) as "UNESCO Strategy for The Second Half of The United Nations Decade Of Education for Sustainable Development".

**Fig. 10.5** Category of climate change and disaster relation
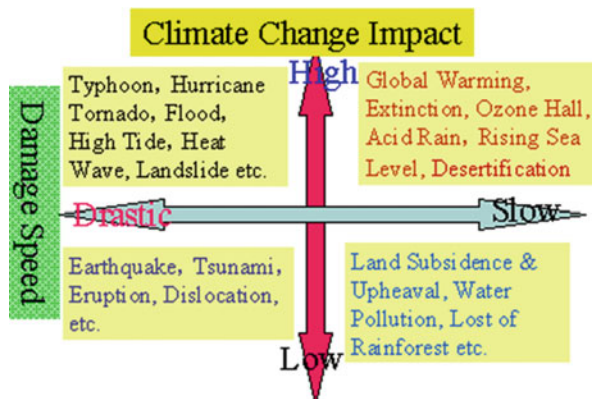


In the 2nd half of the DESD, UNESCO will support Member States and other stakeholders in addressing global sustainable development challenges through ESD, by focusing on the following three priorities (UNESCO 2010):

- Climate Change
- Biodiversity
- Disaster Risk Reduction and Preparedness

In this context, those three themes are getting key issues to promote ESD in the world including Japan at present.

With regarding to DRR education, especially, "Climate Change" and "Disaster Risk Reduction (DRR) and Preparedness" are very crucial issues. So far uncountable people around the world have suffered massive disaster caused or affected by climate changes such as Global Warming. For example, just during last 10 years, Hurricane Katrina attacked southern part of USA in August, 2005, and Cyclone Nargis gave huge damages to South East Asia in April, 2008 and Typhoon Yolanda (Haiyan) hit Philippines in November, 2013 recently. Disasters should be categorized 4 types, according to "Climate Change Impact" and "Damage Speed" of disasters (Fig. 10.5).

Therefore, thinking about DRR education, it will be needed to integrate climate change education and disaster risk reduction (DRR) education, as well as both perspectives of them in order to build its framework and to develop its programs, and also to implement them. Climate Change Education and DRR Education can be jointed by key word of "Disaster", so that, with linking Climate Change Education and DRR Education, it should be fostered abilities and altitudes of knowledge, skills of response and preparedness to students and people in "DRR education" (Shaw et al. 2011).

By the convergence of Climate Change Education and DRR Education thorough integrated and infusion approaches, the object and contents of DRR education can be categorized as follows.

**Table 10.3**  Learning steps for DRR education

| Step | 1st step | 2nd step | 3rd step | 4th step |
|---|---|---|---|---|
| | Mechanism of climate change and disaster | Impact to society and life | Response and preparedness | Recovery and reconstruction from disaster |
| Ability | Knowledge and awareness for mechanism | Recognition of influence and relation | Response and preparedness for mitigation | Creativity and collaboration for recovery |
| Content | Understanding mechanism of climate change and disaster, scientifically and critically | Recognizing how climate change and disaster influence society and live hood | Learning response and preparedness for disaster risk reduction, and implementing | Learning process, perspective and contribution to creative recovery and reconstruction |

1. Learning of Climate Change, such as Global Warming, Acid Rain, Ozone Hall, Desertification etc. thorough Climate Change Education
2. Learning of Disaster Impact such as Typhoon, Tornado, Flood, Heavy Rain, Landslide, etc. through Disaster Risk Management
3. Learning of Risk Reduction such as Evacuation, Setting up Shelter, Disaster Map, DRR Manual, Making DRR Organization, etc. through DRR Education
4. Learning of Recovery and Reconstruction of Infrastructure, live hood, Education, Economy, Community etc. through Recovery Education

In addition, this integrated and infusion approach between Climate Change Education and DRR Education also makes the learning steps and process of DRR education very clear and systematic (Table 10.3).

Step 1: Understanding Mechanism of climate change and disaster, scientifically and critically to foster Knowledge & Awareness

Step 2: Recognizing how climate change and disaster influence society and live hood to foster Recognition of Influence & Relation with disaster

Step 3: Learning response and preparedness for disaster risk reduction, and implementing to foster skill of Response & Preparedness for Mitigation

Step 4: Learning the process, perspective and contribution to creative recovery and reconstruction to foster the imagination and creativity for recovery

## 10.3.2  *The Role of ESD in Disaster Risk Management (DRM) and Disaster Risk Reduction (DRR)*

When considering disaster-preparedness frameworks, there are said to be three levels of disaster-preparedness: Self-Help, Mutual-Help, and Public- Help. However, in the case of the East Japan Earthquake and Tsunami, although Self-Help and

Mutual-Help functioned to a certain degree, these alone could not be sustained over a long period of time. However, due to the immense scale of the disaster, it took time for Public-Help assistance to be provided, and in fact never reaching some areas. NPOs and NGOs played a new role of filling the time gap in such areas, providing a new form of support through networks comprising a diversity of actors. The Kesennuma City Board of Education refers to such assistance as "N-Help".

ESD nurtures critical thinking and systematic thinking, as well as communication skills, information collecting and analyzing skills, and the ability to make decisions and take action. These skills are all essential in crisis situations at the time of disasters, and in the Great East Japan Earthquake, schools faced and overcame difficulties by fully utilizing these skills. In fact, students also made use of their past learning experiences and poured effort into doing everything they could to contribute to the region's recovery.

Furthermore, ESD is being promoted through collaboration and cooperation with the local community, other regions, and related organizations. Following the earthquake disaster, these ESD ties also functioned effectively in each local community in terms of evacuation actions and evacuation center operation. Under these circumstances, rooted in and having promoted ESD in cooperation with their local communities, Kesennuma schools were able to play a leadership role as DRR and evacuation base in this crisis situation while working in cooperation with local residents (Mikami and Oikawa 2012).

### 10.3.3   Synergy Between ESD and DRR Education in Kesennuma City

Kesennuma City Board of Education (BOE) has teacher's researching group over 40 years. The members are selected from elementary and junior high schools in Kesennuma City. They have been researching DRR education on the job training after the East Japan Earthquake and Tsunami, conducted by supervisors of Kesennuma BOE.

In FY 2012, they developed "DRR education Sheets (Bousai-Gakushu-Sheets)" for promoting DRR education at each school in Kesennuma effectively. In order to create "Disaster Education Sheets", firstly they considered the synergy between DRR and ESD, and they categorized and indicated "Abilities and Attitudes" which should be fostered to children in DRR education from ESD perspectives. There are seven kinds of perspectives for abilities and attitudes such as "Critical Thinking", "Imaginations and Planning for future", "Systematic thinking", "Communication", "Collaboration", "Linkage and Connection", and "Participation" (Table 10.4) (National Institute for Educational Policy Research (NIER) 2012).

"Disaster Education Sheets" describe Grade, Subject or Field, Time period in which DRR education should be done, and Estimated Process or Activities of DRR Education as Lesson Plans. The sheets also include the Points or Suggestions of

**Table 10.4** Synergy of Abilities and Attitudes between ESD and DRR Education

| Perspectives | Ability/attitude of DRR from ESD perspectives |
|---|---|
| Ability to think critically | Ability to think about the way of dealing with natural disasters and compare and review other's opinions and information |
| | Ability to determine a better solution regarding disaster prevention actively and expansively |
| Ability to predict and to plan the future | Ability to think what they can do for the future and for the community and to plan with a sense of purpose by considering the past disaster as a precept |
| Ability to think versatility and systemically | Ability to have an idea regarding disaster prevention from various points of view of oneself, community and society |
| Ability to communicate | Ability to share opinions with each other regarding disaster prevention and to find better solution |
| | Ability to listen to other's opinions in case of emergency |
| Ability to collaborate with others | Try to act with consideration to elderly and handicapped people in case of disaster |
| | Try to help and encourage others in a difficult situation in a post-disaster |
| Attitude of respect for a connection | Try to appreciate connections between people, oneself and community through DRR education |
| | Try to understand that disaster prevention requires cooperation and collaboration by the whole community |
| Attitudes of positive participation | Try to participate in the practices of DRR in the community such evacuation drills positively with the awareness of DRR |
| | Try to take actions for enhancing DRR awareness of others |

Improvement and Step up the activities of DRR. The sheets also mention steps and cycle of DRR education curriculum and empathies the linkage and collaboration with families and community (Fig. 10.6) (Kesennuma Teacher Researching Team 2013a).

Teacher's researching group developed over 60 sheets and made "DRR Education Matrix". They set these various sheets in school curriculum depend on developing stage of students and subjects or fields. According to "Disaster Education Sheets" and "DRR Education Matrix", teachers at each school and grade are able to promote systematic and effective DRR education collaborating with community (Fig. 10.7) (Kesennuma Teacher Researching Team 2013b).

### 10.3.4   Case Study of DRR Education at Schools in Kesennuma City

Based on the experience and lesson of East Japan Earthquake and Tsunami, each school and board of education in Kesennuma City tried to improve their Education for Disaster Risk Reduction (DRR) and recovery by making the best use of concepts and practices of Education for Sustainable Development (ESD).

| No.1 —① Evacuation drill (for fire) | Targeted Grade | Suitable Class Activity | Time length |
|---|---|---|---|
| | All | School event | 15 minutes |

**Learning Summary** · **Learn how to protect oneself in case of fire.**

**<<Viewpoints of Learning for Disaster Risk Reduction>>**

| Steps of DRR | |
|---|---|
| (Self-help) Mutual-help Public-help N-help | · Learn how to protect oneself in case of fire. |
| **DRR Learning Cycle** | |
| (K/P) J/A R/C R/R | · Conduct a drill in preparation for building fire. |
| **Ability/Attitude obtained from ESD perspectives** | · Develop the attitude to participate in a drill spontaneously to prepare for emergency with the awareness of disaster prevention. |
| · Ability to participate spontaneously | |

**<<Lesson Plan>>**

| | Contents | Support by teachers | Notes |
|---|---|---|---|
| **Time flow** | 1. Outbreak of fire | · Announce a fire drill by a school public address. | |
| | 2. Prepare for evacuation. | · Close windows and ensure exits available. <br> · Put disaster hoods on, have handkerchiefs and wait calmly until next instruction. | |
| | 3. Evacuate. | · Go to refuge (playground) following evacuation routes. <br> · Instruct pupils/students not to inhale smoke and cover their mouths. <br> · Take a roll call and check all pupils/students have evacuated. | · Check different evacuation routes depending on the start of fire. |
| | 4. Return to classrooms and review the drill. | · Instruct pupils/students to write the evaluation of their action on the evaluation sheets to augment their awareness of disaster prevention. | · Remind pupils/students not to push, run, talk and return during evacuation. |

**Suggestions**
· Ask fire fighters for cooperation for even better drills.
· Refer and utilize "No.14 Experience of initial firefighting" and "No.13 What is in the Disaster Prevention Center? " (earthquake and smoke simulation)" for more understanding.

**Things to prepare**
☐ Broadcast equipment
☐ Evaluation sheets
☐ Buckets to wash indoor shoes and floor-cloths

**Fig. 10.6** Disaster education sheets by teacher researching team of Kesennuma BOE (2013)

**Fig. 10.7** Disaster education matrix by teacher researching team of Kesennuma BOE (2013)

Here, two such cases are discussed from different junior high schools in the area that were devastated by the tsunami: Hashikami Junior High and Koharagi Junior High School. And also, it should be analyzed that teacher researching group (Kyoiku-Kennkyu-in) at Kesennuma City Board of Education proposed new method of DRR education from ESD perspectives based on experiences and lessons of East Japan Earthquake and Tsunami.

**Case 1: DRR Education of Hashikami Junior High School with Community**. Hashikami Junior High School has been promoting three DRR education cycles known as "Self-help, Mutual-help and Public-help" for 8 years. With the experience gained from the East Japan Earthquake and Tsunami, they surveyed information and reexamined their previous DRR education guidelines.

Firstly, it is important to learn the correct information concerning natural disasters and to gain the proper skills to protect lives while at the same time, acquiring the firm decision making skills needed even in such unexpected situations. Secondly, it is also important to prepare for disasters at the community level and in each home. Thirdly, it is important to establish systems and lessons in order to pass on those experiences to future generations. As a result, with the "Self-help" lessons taught every year, students will work through effective DRR education lessons with the perspective of knowing, preparing and acting (Oikawa 2013b).

Hashikami Junior High School in FY 2012 focuses on Self-help and Mutual-help by working on DRR education with their local community in order to know, prepare and act against future calamities. They have been conducting DRR activities such as evacuation drills and hands-on activities for disaster preparation at each grade level.

In FY 2012, the school also started conducting small and primary evacuation drills with each community association, organized exercises to set up emergency centers (Fig. 10.8 Left). And they created a detailed disaster prevention map in the school district of Hashikami Junior High School.

In June, they conducted evacuation drills on the school yard with residents that live in temporary housing. The route for this exercise made participants follow a step-by-step procedure that saw them escape to higher ground behind the school—Hashikami Junior High School is at an elevation of 31.5 m. However, in case students and residents of the area believe that they are still in great danger, another evacuation drill was organized in order to bring everyone to even higher ground. They also conducted small scale evacuation drills to help foster the ability for immediate decision making in case another earthquake hits the area.

In September, hands-on activities included visits by first graders to the Tsunami Museum in Karakuwa District where they learned about earthquakes and tsunamis. They also learnt about natural threats and the history of previous tsunami disasters. The second graders went further in their education and took first aid and lifesaving courses while third graders conducted educational activities of DRR for elementary school students. The third graders also worked to enhance children's awareness of the DRR system by using coloring picture-stories and playing cards for the elementary school's early and middle grade students (Fig. 10.8 Right).

**Fig. 10.8** *Left*: Students taking lifesaving course (Hashikami Junior High School 2012) *Right*: Presentation on DRR education with picture cards to elementary school students (2012)

**Case 2: Altitude Display Project of Koharagi JHS**.  After the East Japan Earthquake and Tsunami, the major DRR project that students and staff at Koharagi Junior High School worked on was their "Altitude Display Project." Students and staff at the school worked with their local community to install color coded altitude signs on telephone poles throughout the school district. Each sign indicates the approximate elevation above sea level from that point.

There are three major aims of this project. Firstly, through installing the signs above sea level on telephone poles, students as well as the local population will develop an awareness of altitude for disaster response management and guide young children's evacuation route in case of another tsunami. The second is to strengthen the links with the local community, and the third is to remember the lessons learnt from the East Japan Earthquake and Tsunami (Oikawa 2013b).

1. Activities of Altitude Display Project
   Through the project, students found and marked on a map the 228 telephone poles in their school district. What to display and how to mount them were also investigated. The entire school worked together to develop their signs. After developing their ideas, the school principal and the local leader met with Tohoku Electric Power Company and Kesennuma City's Division of Emergency Management to submit their request for a construction permit which was officially accepted.

   From there, the students then constructed the signs with some assistance by the university who donated equipment and financial support. The signs were cleverly color coded in order not to confuse small children and the elderly. Students used five colors: red, orange, light green, dark green and blue. Based on what happened during the tsunami, they considered the height of 30 m or more as a safe evacuation point from a tsunami. As a result, all the city's residents would know to evacuate to the green sign at least if and when another tsunami approaches (Fig. 10.9 right)

   Along with local people, they divided into five groups, and each group tackled 35 telephone poles to display altitudes in November, 2012. Actually, it didn't quite proceed as expected since students felt unfamiliar at first. However, residents gave demonstrations to students, and students were able to set the signs up safely and they completed the entire installation (Fig. 10.9 left).

**Fig. 10.9** *Left*: Making color coded altitude signs (Koharagi Junior High School 2012). *Right*: Installing the altitude signs (Koharagi Junior High School 2012)

2. Effects, Dissemination of Altitude Display Project

   Students' articles about the project appeared in some local newspapers in November, 2012. They also went to nursery schools and elementary schools in the Koharagi area to teach children about their project and how to use the signs to recognize the appropriate altitude. They also taught evacuation methods to small children. First of all, during massive earthquakes with long periods of shaking, it is important for children to protect themselves from moving or falling objects.

   When the shaking has subsided, it is important to evacuate to places at least 30 m above sea level which are indicated by green or blue signs.

## 10.4 ESD Towards Post-Disaster Recovery and Reconstruction

ESD will undoubtedly be an important concept in the process of post-disaster recovery and reconstruction in the future with respect to the following five perspectives (Oikawa 2012a, b).

### 10.4.1 Education Fostering Crisis-Response Skills in Cooperation with the Local Community

As described above, it is often said that a cycle of "Self-Help", "Mutual-Help", and "Public-Help" is important in disaster-preparedness education, but due to the immense scale of the East Japan Earthquake and Tsunami—referred to as a "once per millennium" event—"Public-Help" did not function sufficiently immediately after the disaster, making "Self-Help" the primary means of assistance—that is to say, people's lives were dependent on their own decision-making ability and

crisis-management skills. Furthermore, there were many communities and evacuation centers where "Mutual-Help" was provided by neighborhood associations and volunteers during evacuations and at evacuation centers.

However, it is also true that some precious lives were lost due to assumptions such as "Normalcy Bias", "Majority Synching Bias", and "Altruistic Behavior" within these processes. It can be said that improving and expanding DRR education in cooperation with the local community by utilizing the lessons learned from these experiences is an urgent issue.

### 10.4.2   Education Aiming for Coexistence with Nature

In the East Japan Earthquake and Tsunami, Kesennuma City was subjected to the astounding powers of nature in the form of an earthquake and tsunami, sustaining enormous damage. However, as a city surrounded by bountiful nature that developed through the blessings of the sea, Kesennuma is naturally orientated towards urban planning emphasizing coexistence with nature, as expressed by the city's reconstruction plan catchphrase "Living with the Ocean".

Having served as the cornerstone of Kesennuma's pioneering environmental education and food education, ESD is expected to play an important role in realizing this goal in the future as well.

### 10.4.3   Education that Passes Hometown Spirit Down to the Next Generation

The earthquake disaster had an enormous impact not only environmentally and economically, but also culturally. Due to the human and material damage as well as the destruction of communities, the continued existence of traditional performing arts and other culture is under threat. In working towards reconstruction, it is essential that efforts are made to revive local traditions and culture, ESD is promoted as an introduction to regional heritage education, and pride in and affection for the local area be cultivated.

### 10.4.4   Sharing Learning Across Regional and National Borders

Immediately after the earthquake disaster, Kesennuma received assistance from a great number of sources, making people more aware than ever before of the ties between themselves and their community and other regions and countries around the world.

In the future, too, we must take a broad perspective, valuing and respecting our ties with the world. To enable this, we intend to nurture in students communication skills and international perspectives by creating opportunities for sharing learning experiences across regional and national borders.

### 10.4.5  Education for Building the Future

When pursing reconstruction education, it is important to nurture in children—especially future leaders in reconstruction—the ability to design a future for themselves and the region. To this end, Kesennuma City has held essay and drawing contests as well as workshops in which children are asked to imagine and design the future. In addition, to enable children to have hopes and dreams for the future even under the difficult circumstances of the disaster zone, effort is being poured into educational activities aimed at strengthening children's "unbreakable spirit" and "supple mind"—in other words, their "resilience". For example, schools holds workshops and lectures to which artists and sportspeople at the forefront of their fields, astronauts, and outstanding people are invited as guest speakers; children are sent to summer camps and on study abroad programs; and other activities aimed at nurturing children's aspirations are implemented proactively.

## 10.5  Conclusions

Kesennuma City has been promoting ESD since 2002 by collaborating with various sectors and institutes in the community and abroad. Almost all the schools in Kesennuma City have been acknowledged by UNESCO as an Associated School (ASPnet) for moving ahead with ESD programs in formal education. Although the City had been hugely damaged by this terrible disaster, the schools did not lose any students at school, and also outside of school, they had the lowest number of victims in total during this calamity. The ESD abilities concerning disaster risk management worked to save lives (Kesennuma City Board of Education (BOE) 2013).

The concept of ESD is a critical, systematic and holistic way of thinking that incorporates the ability of communication, collecting and analyzing information, and decision making and action; in other words, fostering abilities for problem solving, imagination and creativity to overcome the difficulties for the future.

Moreover, after the disaster, most Kesennuma schools are aiming to foster these abilities and capabilities through ESD beyond the many difficulties caused by the disaster of the East Japan Earthquake and Tsunami.

On the other hand, ESD is able to establish links with communities which were very effective in managing evacuation and shelters. It also helped to progress partnerships with domestic and international institutions so that Kesennuma City and schools could make the best use of the support from other regions and countries.

These concepts and links were very useful and effective in the recovery process. In this context, ESD surely functions as a key concept of DRR and also as the concept towards recovery from the disaster (Oikawa 2012a, b).

Following the East Japan Earthquake and Tsunami, those areas where there are good ties between schools and their communities had high potential for successful evacuation, evacuation center operation, and reconstruction. Accordingly, cultivating good relationships between schools and communities by promoting ESD is extremely important for post-disaster recovery.

Furthermore, global networks with overseas institutions and organizations also provide tremendous power and strength for reconstruction. Following the earthquake disaster, Kesennuma City received tremendous support and encouragement from numerous schools, local governments, and organizations throughout the world with which it had forged deep ties through such organizations as UNESCO, the United Nations University, and the Japan Fulbright Fund, and also gained opportunities for recovery education. Furthermore, in future it will be hoped to pursue recovery education with a view to also nurturing the next generation leaders of reconstruction utilizing programs concerned with ESD such as OECD Tohoku School, UNESCO International Workshop and other programs. In this way, from the perspectives of both educational approaches and network-building, ESD is regarded as providing an undoubtedly important function as a major principle and means for promoting DRR education and carrying out reconstruction. In future, Kesennuma intend to continue to stride towards recovery and reconstruction by creating and establishing rich learning with the participation and collaboration among diverse actors through ESD.

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# Chapter 11
# Towards the Establishment
# of Sustainable Campus

**Takayuki Nakamura, Masayuki Fujisawa, and Rajib Shaw**

**Abstract** Campus sustainability concept research is not that old. As per operation is concerned, it is for last 10–15 years, where the US and European universities have taken lead in the campus sustainability initiatives. In Japan, the initiative started after G8 summit of Hokkaido, which led infra/facility based approach. This gradually changed to softer aspects with involvement of students, faculty members and incorporation in curriculum. A network called CAS NET Japan was established recently to facilitate the process in the country, and to establish connection with abroad. A case study from Kyoto University is presented to highly campus sustainability initiative. Finally, the GET (Governance-Education-Technology) framework is presented to highlight the holistic approach of campus sustainability.

**Keywords** Campus sustainability • CAS NET Japan • Eco-campus • Hard and soft measures • Sustainability literacy

## 11.1 Background

A worldwide acknowledged notion of "Sustainable Development" was introduced as a main idea in the final report named "Our Common Future" which was published in 1987 by the United Nations Conference on Environment and Development (UNCED). The notion was explained as an idea describing the development, which satisfies the needs of both present generation and future generation.

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In short, "Environment" and "Development" don't compete each other but can coexist, therefore it is needed to develop the notion adequately under the concept of environmental preservation. After this report, the notion of "Sustainable" is understood to fulfill the necessity of not only present generation but also future generation. Furthermore, the notion was succeeded to the Earth Summit, which was held in 1992 and the World Summit on Sustainable development (WSSD), which was held in 2002.

Followed by this movement, the resolution of "Education for Sustainable Development (ESD)" was submitted to the 57th General Assembly of the United Nations by Japanese government. The resolution stood on the viewpoint that human resource, especially education was critical in order to promote and realize sustainable development at all levels. The resolution was successfully and unanimously adopted. All countries are implementing their detailed action plans for ESD during the decade from 2005 to 2014 based on the resolution. In Japan, a committee consisting of related ministries and agencies of Japanese government was established in March 2006 for the sake of implementing the action plans on ESD. It is expected to realize sustainable society that each government should implement steadily concrete policies based on each country's action plan on ESD and each nation ought to receive the benefit of high quality education and learn the values, actions and lifestyles which are needed for the sustainable future and the reform of society.

Environmental education at post-secondary levels throughout the world has come to be predicated on, at least in part, the greening of campuses where the courses are taught (Fisher 2003). Green practices provide legitimacy to environmental education programs. A number of resources are available to assist staff and students in getting sustainability initiatives off the ground. One in particular holds special promise, from the International Organization for Standardization (ISO). Although directed largely towards the business community, the ISO 14000 series of environmental standards may be very useful to campuses when initiating an environmental review, or contemplating the adoption of an Environmental Management Systems (EMS). The standards provide methodological assistance to organizations, including academic institutions, which seek to establish a workable EMS. Use of the ISO standards has the added benefit of bringing the business world into the campus classroom, which may provide a useful counterpoint for environmental education. A case study is included which describes the experience of a New Zealand tertiary college using ISO 14001 in its first environmental review.

Campus sustainability concept research is not that old. As per operation is concerned, it is for last 10–15 years, where the US and European universities have taken lead in the campus sustainability initiatives. A study conducted by Shriberg (2002) establishes the importance of non-environmental internal conditions for campus sustainability—particularly image/reputation, decision making structures and political orientation—in providing a context for success or failure of sustainability initiatives. This dissertation establishes that multiple, diverse stakeholders (especially faculty and students)—with the support of top leadership—are most likely to be successful in creating conducive conditions when

they promote sustainability in terms of institutional strategic positioning (to institutional leaders) and an ethical/moral obligation and opportunity (to other stakeholders). More generally, this research supports the assertion that the type of stakeholders involved in sustainability advocacy as well as the approach that change agents use in promoting sustainability can significantly impact results. This study establishes many legitimate barriers to campus sustainability, but emphasizes the importance of institutional priorities, interpersonal relationships and cross-boundary communication as particularly problematic.

In contrast, in another study, Savelyeva and McKenna (2011) described a Global Seminar (GS) curricula model by exploring its on-the-ground participatory practices in America, Europe, Africa, Asia, and Australia. The GS model provides a broader notion of teaching and learning for sustainability that incorporates greening and education for sustainability into curricula. This participatory model proves the emerging shift towards a new paradigm of teaching and learning for sustainability in academia. Koester et al. (2006) described greening of campus approach, which bridges academic content, administrative policies, and facilities management practices. It enables a campus-wide unfolding of education for sustainability. Tracking the history, evaluating the progress, modifying the approach and continually refocusing the effort are presented as essential to a whole-systems approach.

In a survey, Beringer et al. (2008) described that the majority of higher education institutions in Atlantic Canada are engaged in sustainable development work, most notably in the area of curriculum. Sustainability research and scholarship is spread amongst faculty and students; many institutions have inter- or multi-disciplinary research structures to address sustainability questions across campus and in collaboration with community partners. Much unrealized potential remains within physical operations, faculty/staff development and rewards, and student opportunities.

Curtin Environment Awareness Team (CEAT) is a group of volunteers at Curtin University of Technology in Perth, Western Australia, who work together to promote awareness, activities and information dissemination related to sustainable use of the university campus (Carol 2006). In 2003 an attempt was made to integrate a CEAT concern relating to a declining habitat for bird and animal life around a campus lake, with an undergraduate problem-based design project in the School of Architecture. After the students' work was completed, CEAT reviewed the projects and selected three schemes for possible inclusion in the program of capital works for the campus. CEAT members and students were surveyed after the design project was completed. The survey results indicated that CEAT members considered that student involvement enhanced the quality, scope and likely implementation of the project. The student survey results indicated that this project raised their awareness of the complexity of addressing sustainable use of the campus and identified the potential influence of architect designed projects on the natural environment. However, in spite of formal acknowledgement of the value of the project by the Vice Chancellor of the university, there was no indication that the university plans to move from the current ad hoc approach towards sustainability either in the management of the campus or in the core teaching programs.

## 11.2   Sapporo Sustainability Declaration

Regarding the activities on campus sustainability, the declaration named "Sapporo Sustainability Declaration" which was adopted at G8 University Summit held in Sapporo in July 2008 contributed to the initiation of the movement. G8 University Summit took place in line with the G8 Hokkaido Toyako Summit in 2008. The responsibility of university and the concrete measures to realize campus sustainability were discussed at this university summit. The following statements in the declaration are remarkable.

– University should take on the role to propel sustainability in the society.
– University should conduct social model-experiments by utilizing its campus to realize sustainability and have close relationship with various stakeholders in the society.

University owns its campus as a place where university is able to experiment its sustainability by utilizing its state-of-the-art knowledge and technology. Therefore, the action plan of university for sustainable campus, green campus or global warming can contribute to the creation of social model for seeking sustainability. It is indispensable in terms of educating students who will be responsible for sustainability of the society in the future that university is acknowledged a social experimental place for sustainability. In other words, university campus is able to be utilized as an ideal teaching material in line with as an experimental place. In that sense, university has capacity to contribute to the creation of the society for future generation.

Around the time of this declaration, American and European major universities began to establish organization, which implements their campus sustainability. In addition, the worldwide networking on campus sustainability is being accelerated. For example, The American College and University Presidents' Climate Commitment (ACUPCC) was published in 2006 in the United States. Taking the opportunity, the attitude of university for sustainability completely changed and many universities are making lots of efforts in order to accelerate campus sustainability at their campuses.

On the other hand, in Japan, few universities started the activities on campus sustainability. In addition, there was no establishment of Japanese network on campus sustainability. Under such a circumstance, the Great East Japan Earthquake occurred in March 2011 and it raised a question whether Japan is truly sustainable or not. Furthermore, taking the opportunity of the large increase of electricity fee, not only the energy issue but also the evolution of our lifestyle is being discussed. In that sense, now is the time to have to consider seriously if the university is surely sustainable or not.

Based on the above-mentioned background, Kyoto University decided to give the priority to campus sustainability, accelerate related activities on campus sustainability and establish its domestic and foreign network from fiscal 2012. Our definition of sustainable campus is as follows.

> In order to accelerate campus sustainability in Japanese universities and contribute to create more environmentally sustainable society in Japan, we more promote environmental activities of the "hard aspects" such as energy saving, $CO_2$ reduction, traffic plan, waste management, etc., and at the same time, we more carry out the "soft aspects" such as environmental education, regional cooperation, food issue, effective administration, etc.

This definition might be somehow vague and some people may insist that the definition should be clearer and more concrete. However, the reason why we don't define like that is that we think the activities on campus sustainability ought to be based on the diversity of the society, culture and economic situation of the community and the region which the university belongs to.

## 11.3  Establishment of CAS-Net JAPAN

In March 2014, the Campus Sustainability Network in Japan whose abbreviation is CAS-Net JAPAN was established. This is the first domestic network on campus sustainability for higher educational institutions in Japan. Kyoto University takes the role of the secretariat of CAS-Net JAPAN. This network was established based on the one-year discussion of several meetings consisting of a hundred of faculty members, experts, staffs and students in Japan. This network doesn't intend to lead the participants to one direction, but intends to exchange the views, opinions and good practices on campus sustainability into the participants. As the result, this network leads to accelerate the activities on campus sustainability of Japanese universities.

The goal of CAS-Net JAPAN is the same as the above-mentioned definition of sustainable campus of Kyoto University. In addition, the establishment of cooperative relationship with the advanced network of foreign universities is emphasized in that goal. It is also underlined to create activities on campus sustainability at each university by utilizing its own characteristics and exchange those activities amongst the members of CAS-Net JAPAN.

In order to accomplish the goal, CAS-Net JAPAN implements the following activities.

(1) Information sharing and distribution to promote campus sustainability at Japanese universities
(2) Survey and study about the activities on campus sustainability at foreign universities
(3) Promoting the cooperation on campus sustainability with inside and outside institutions
(4) Creating and disseminating the evaluation system on campus sustainability in Japan
(5) Research on university administrative systems to promote campus sustainability
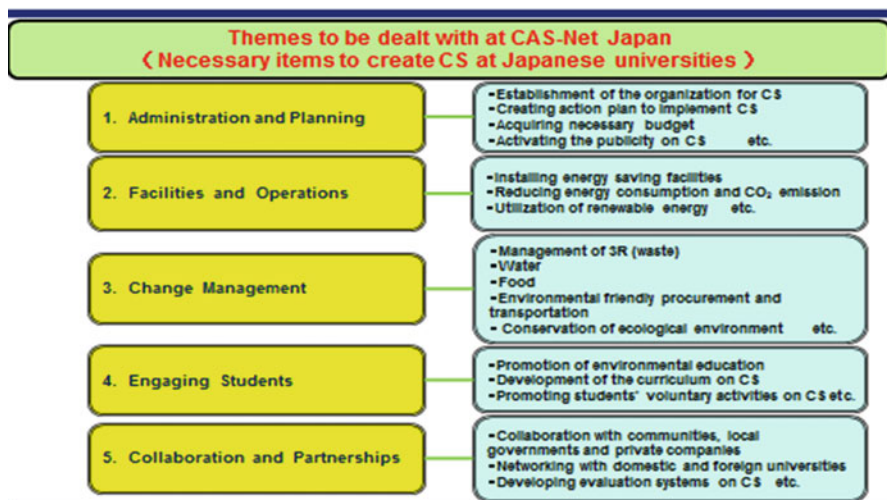(6) Engaging students to create sustainable campuses

**Fig. 11.1** Framework and activities of CAS-Net Japan

(7) Awarding superior activities on campus sustainability
(8) Creation of website and distribution of newsletter
(9) Other necessary matters to achieve the purpose of CAS-Net JAPAN

In addition, the themes to be dealt with at CAS-Net JAPAN are tentatively identified, as shown in Fig. 11.1.

The first annual conference was held at Kyoto University on March 26, 2014. The number of the universities and related institutions which join CAS-Net JAPAN was 24 as of May 1, 2104. The members of the CAS-Net JAPAN Steering Committee consists of academicians, professional and practitioners from a diverse background. CAS-Net JAPAN has established four working groups in 2014 and the topics of these working groups are as shown in Fig. 11.2.

## 11.4 Activities on Campus Sustainability at Kyoto University

The energy consumption and $CO_2$ emission of Kyoto University increased by 93 % in 2006 in comparison with the level in 1990 because of the increase of graduate students and the upgrade of facilities and experimental devices. As the result, the carbon dioxide emission of Kyoto University has become the fourth largest place in Kyoto-city and the cost of energy consumption of Kyoto University has increased by about 35 million US dollars per year. In addition, the energy saving measures have been performed in just faculty departments only.
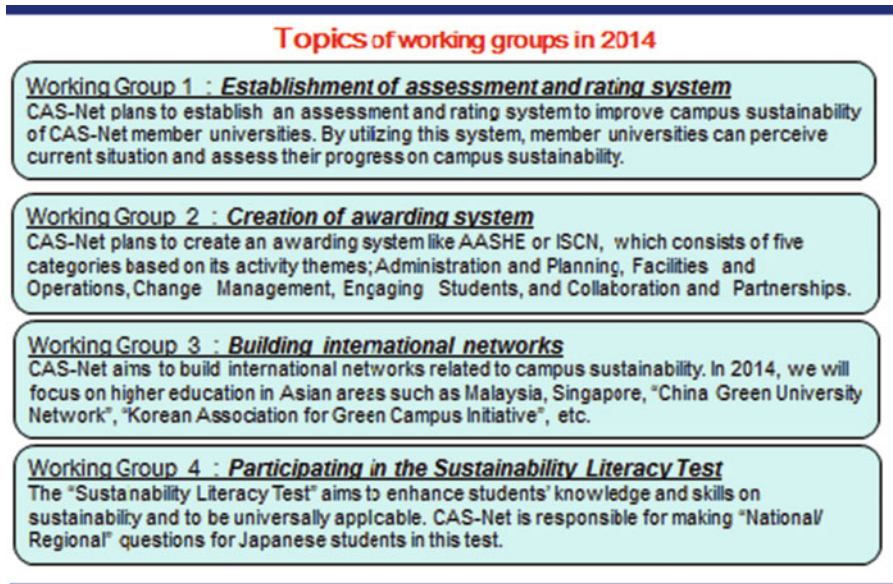
**Fig. 11.2** Working groups of CAS-Net for 2014

Upon reflection of these circumstances, the "Energy Saving Policy of Kyoto University" was created in April 2007. The policy demands that each faculty department should reduce energy and greenhouse gas per unit area by 1 % a year, and submit a report regarding the result of the reduction. The department has to explain the reasons officially if it is not able to achieve 1 % reduction. Moreover, the "Tax System for Campus Sustainability of Kyoto University" was created in January 2008 (Fig. 11.3). Under the scheme of this system, the tax is imposed on each faculty department based on the usage of electricity, gas and water of the former year as the following flowchart shows.

The tax is utilized to implement campus sustainability at Kyoto University. Figure 11.4 shows some examples of the facilities, which were installed into the university buildings by using this tax system. The result of this tax system is as follows. Kyoto University was able to reduce 144,241 GJ and 7,346 t-$CO_2$ for 5 years. The reduction energy cost is equivalent to 1.86 million US dollars. In addition, this tax system has been prolonged for another 3 years.

As above-mentioned, Kyoto University was mainly implementing "hard aspects" of campus sustainability. However, the implementation was not conducted under the recognition of holistic approach of campus sustainability including "soft aspects". Education and Research at Kyoto University have being conducted under the recognition of the importance of environmental issues. Yet, it was the reality that there was no recognition as the themes of campus sustainability and little contribution to the society and the community. Moreover, food issues which are familiar with students, faculty members and staffs have not been recognized as one
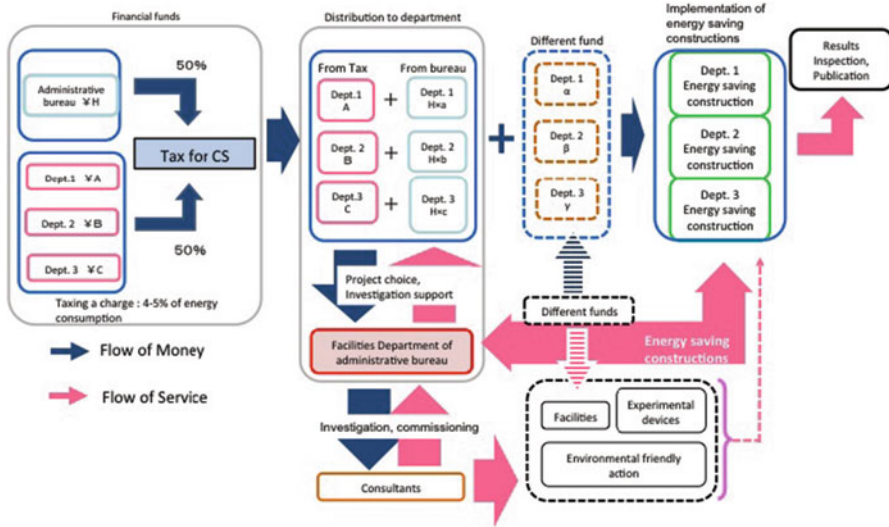
**Fig. 11.3** Tax system for campus sustainability in Kyoto University



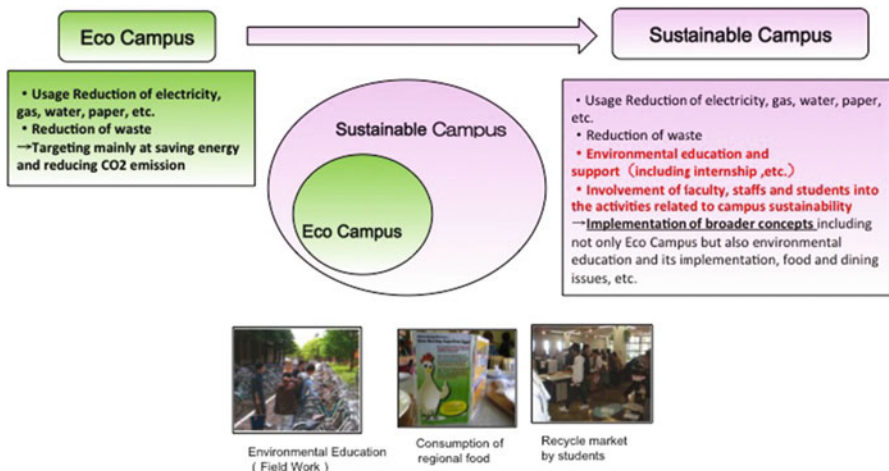**Fig. 11.4** Certain measures implemented in Yoshida Campus of Kyoto University

**Fig. 11.5**  Framework of eco-campus to sustainable campus in Kyoto University

of the important items of campus sustainability until now. Based on this situation, Kyoto University changed the direction by using a slogan named "from Eco Campus to Sustainable Campus" and the Facilities Department has been making lots of efforts to explain the difference between Eco Campus and Sustainable Campus as shown in Fig. 11.5.

In order to investigate the worldwide stream on campus sustainability and to adapt it to the activities on campus sustainability of Kyoto University, several officials from the facility department participated in the annual conference of the Association for the Advancement of Sustainability in Higher Education (AASHE), which was held in Los Angeles in October 2012 and made presentation explaining the activities on campus sustainability of Kyoto University. A series of these types of visit broaden the knowledge of facility department and also helped to disseminate Kyoto University's experiences worldwide.

At the same time, AASHE called for the submission of the international pilot project on the evaluation of campus sustainability. This international project aimed to provide an opportunity for worldwide universities to join the Sustainability Tracking Assessment and Rating System (STARS) and evaluate their activities on campus sustainability. AASHE aimed to improve the STARS evaluation system and make it more globally applicable. Kyoto University decided to participate in this project in December 2012 because Kyoto University expected to evaluate its present situation on campus sustainability and research its future direction. The report of Kyoto University was drafted by its faculty members and staffs of Facilities Department. The final report was submitted to the secretariat of AASHE in December 2013 after the authorization of the President of Kyoto University. Kyoto University had the second place of the submission in Japanese universities after Hokkaido University. The evaluation was categorized as "Reporter" due to the international pilot project; however the real score was
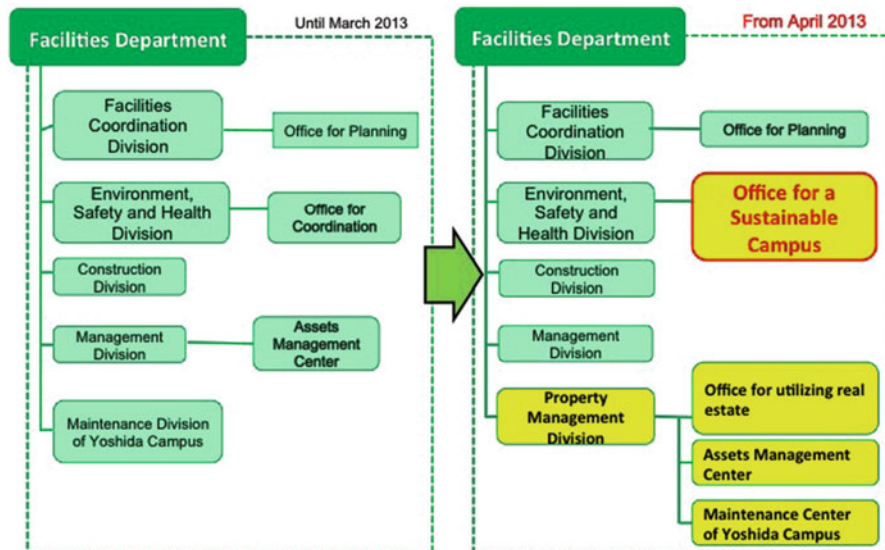
**Fig. 11.6** Campus sustainability office in Kyoto University

recognized as "Silver". To continue the initiatives in a systematic manner, an Office for a Sustainable Campus was established as one of the organizations of Facilities Department in April 2013 in order to promote campus sustainability at Kyoto University as shown in Fig. 11.6. The office is recently implementing lots of activities on campus sustainability at Kyoto University under the cooperation of faculty members, staffs and students.

In line with this establishment of the office, the survey to the advanced foreign universities and the networks of campus sustainability has been conducted and the team participated several overseas conferences to disseminate and gain experiences. Lastly, in line with the first annual meeting of CAS-Net JAPAN, Kyoto University organized an international symposium in March 2014 for the establishment of sustainable campuses under the theme of the combining "hard" and "soft" networks to establish sustainable, environmentally-conscious campuses. This international symposium has become an epoch-making event to initiate and promote campus sustainability in Japan.

## 11.5 Way Forward

Campus sustainability concept has evolved recently, mostly started from green campus or eco-campus or environmental friendly campus. It has two concepts: the soft aspect, which is more on awareness raising or inclusion of university wide curriculum of sustainability; and the hard aspects, which is more on the facility

related issues. In Japan, it is rather recent concept, which took a boost after the G8 Hokkaido summit in 2008. The initiative started mainly with the hard aspects, to make the university campus energy efficient, water efficient and producing less amount of garbage and recycling system of garbage etc. Gradually, the concept evolved to softer aspects of involving students and faculty members. The establishment of CAS-Net Japan is a classic example of look at the balanced mixture of soft and hard aspects.

To continue this effort, a GET framework is proposed, which has Governance, Education and Technology dimensions. Governance part includes: (1) specific policy on sustainable campus at the university, (2) administrative set-up with proper staffs, (3) specific budget support and (4) implementable action plans and actions at different level. Education part needs following measures: (1) general course for all university students, (2) specific and specialized courses in relevant graduate school, (3) eco-literacy test made mandatory for all new students, (4) campus sustainability day/week is observed campus wide, and (5) linking campus to the community. Technology part includes: (1) development of new technology through innovative research, (2) encourage innovations in technology, and (3) focus on process technology on participation and involvement. In summary, developing campus sustainability model needs a process based approach, it needs institutionalization of efforts, it needs to have learning through network, needs measurable progress, and need to emphasize campus community linkage.

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