DISASTER-RISK REDUCTION MANAGEMENT AND EDUCATION IN INDONESIA: PROSPECT AND CHALLENGE

Tuswadi*

Takehiro Hayashi**

Abstract

As one of the countries which are vulnerable to various kinds of natural disasters, Indonesia requires a well-organized system of disaster management and disaster prevention education to be able to overcome and minimize impacts of disasters for the sake of sustainable country's development. Through comprehensive literature review, this paper explores development of disaster risk reduction management and disaster prevention education systems in Indonesia in order to identify its prospects and challenges. The findings show that the country is still in transition phase in implementing both the newest system of disaster management based on the Law No.24/2007 and the recent school level curriculum on disaster risk reduction education based on the Circular Letter of Ministry of National Education No. 70a/SE/MPN/2010 on Mainstreaming of Disaster Risk Reduction at School.

Keywords: natural disasters, disaster-risk reduction, disaster prevention, basic education, Indonesian schools

* Doctoral student, Graduate School for International Development & Cooperation, Hiroshima University

** Professor, Graduate School of Education, Department of Science Education, Hiroshima University

1 INTRODUCTION

Indonesia, one of the countries in South East Asia, is very vulnerable to have natural disasters due to its location in the confluence of Eurasian, Indian-Australian, and Pacific active tectonic plates. This biggest Muslim country of the world is often stricken by natural disasters such as earthquakes, volcanic eruptions, floods, landslides, and tsunami. Each of these disasters produces physical, social and economic effects. Earthquake and tsunami that occurred in Aceh and Nias islands in 2004 and earthquake in Yogyakarta, Central Java in 2006, are two examples of recent big natural disasters in the country that cause very serious structural and non-structural damage, fatalities and injuries, as well as socio economic disruption. In addition, West Sumatra earthquake, in 30 September 2009, is another example of natural disaster that causes big loss in the country; it was noted that 1195 people were dead; 249,833 units of houses were damaged (114,797 units were heavily damaged); 2512 units of education facilities were destroyed; and many other public facilities such as health facilities, prayer facilities, roads, bridges, hotel, irrigation, markets, power outages, telecommunications networks, etc were also disrupted (National Disaster Management Agency, 2011).

The table below shows the record on damages and loses caused by natural disasters in Indonesia during 2004-2010.

NO	NATURAL DISASTERS	DAMAGES AND LOSES (Billion IDR)
1.	Earthquake and Tsunami in Aceh-Nias, 2004	41,400.00
2.	Earthquake in Yogyakarta, Central Java, 2006	29,100.00
3.	Mudflow in Sidoarjo, East Java, 2006	7,300.00
4.	Flood in Jakarta, 2007	5,160.00
5.	Earthquake in West Sumatra, 2007	1,080.87
6.	Earthquake in Bengkulu, West Sumatra, 2007	1,790.93
7.	Flood and Landslide in West and East Java, 2008	1,691.47
8.	Earthquake in West Java, 2009	6,900.00
9.	Earthquake in West Sumatra, 2009	20,866.60
10.	Flood in Wasior, West Papua, 2010	277.90

Source: Nina Sardjunani and Suprayoga Hadi (2010)

Table 1: Damage and losses caused by natural disasters in Indonesia

Asian Development Bank (1990) defines disaster is an event, natural or man-made, sudden or progressive, which impacts with such severity that the affected community has to respond by taking exceptional measures. Data and facts show that, compared to other countries in the world, Indonesia is one of the most vulnerable countries in terms of natural disasters. In 2011, United Nations International Strategy for Disaster Reduction (UNISDR) ranked number of casualties on 6 types of natural disasters among countries. The result showed that for tsunami, among 265 countries, Indonesia ranked first with 5,402,239 people affected; for landslides, among 162 countries, Indonesia also ranked first with 19,7372 people affected; for earthquakes, from 153 countries, Indonesia ranked third with 11,056,806 people affected, and for floods, among 162 countries, Indonesia ranked sixth with 1,101,507 persons affected.

Looking at the great impacts of disasters toward sustainable country development, it becomes so crucial that disaster / risk management skills are delivered to people in general and to young generation all over the country through education in order to build community surveillances toward disasters.

This paper reviews development of recently established disaster management and disaster risk reduction (DRR) education in Indonesia in order to understand prospects and challenges in building the country's surveillances toward disasters.

2. DISASTER MANAGEMENT IN INDONESIA

At present, Indonesia is better equipped legally and institutionally in responding to natural disasters with the change of its disaster management landscape following the 2004 Indian Ocean tsunami and its 2005 commitment to Hyogo Framework for Action (HFA) 2005-2015. The fact that the nation is powerless in facing disasters of unusual magnitude due to the absence of adequate disaster management systems, has driven Indonesian government to develop proper disaster management systems. Disaster management, as stated by International Federation of Red Cross and Red Crescent Societies Disaster Management, is defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen impacts of disasters.

Since introduction of Hyogo Framework for Action on Disaster Risk Reduction in 2005, Indonesia has elaborated on the spirit of the HFA to establish National Disaster Management

Action Plan which was developed with participation of all parties concerned under the initiative of National Disaster Management Agency (BNPB). The spirit of the government in developing disaster management systems was reflected by adoption of Law No.24/2007 on Disaster Management which set the legal framework for coordination of disaster management efforts, the management of related funds, as well as the involvement of international agencies and non-governmental organizations (NGOs). The law explicitly provides the rights and responsibilities of governments, community and business sectors, whether local, national or international, in the implementation of disaster management in the country. It also brings a consequence to make disasters and efforts to reduce their impacts as a development concern.

3. INSTITUTIONS FOR DISASTER MANAGEMENT IN INDONESIA

With the implementation of Law No.24/2007, the government of Republic Indonesia developed National Disaster Management System that consisted of six components, i.e. legislation, institution, planning, funding, science and technology, and its implementation. For the legal component, in addition to Law No.24/2007, Indonesia has three Government Regulations (GRs) and one Presidential Decree. The three Government Regulations are Implementation of Disaster Management (GR No.21/2008), Funding and Management of Assistance (GR No.22/2008), and Roles of International Agencies and Foreign Non-Governmental Organizations (GR No.23/2008). Presidential Decree No.8/2008 regulates National Disaster Management Agency (BNPB) which was formally established in January 2008, replacing and revamping the former National Coordinating Agency for Disaster Management.

National Disaster Management Agency is a Government Non Departmental Agency which has main functions in formulating and issuing policies on disaster management and handling of refugees efficiently and effectively; and coordinating the implementation of disaster management activities in a planned, integrated and comprehensive manner. This agency is headed by a chairman who is equal to a ministerial level; directive components consisting of 19 members from government and community elements, and executing elements consisting of Main Secretariat, Deputy of Prevention and Preparedness, Deputy of Emergency Response, Deputy of Rehabilitation and Reconstruction, Deputy of Logistics and Equipments, Main Inspectorate, as well as Central and Technical Operations Unit. In addition, to streamline the

process of disaster management in local level, there is an establishment of Local Disaster Management Agency (BPBD) in provincial and district / city levels.

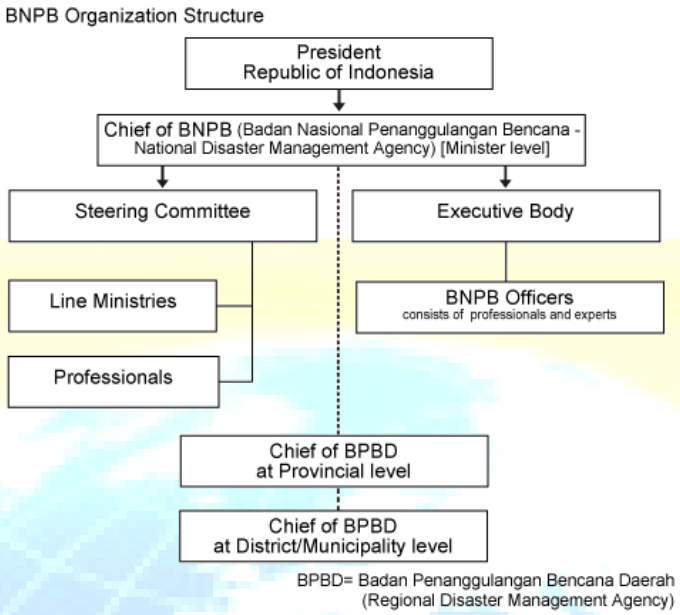

Figure 1: BNPB organization structure in Indonesia

BNPB works together with key government and community sector partners to achieve the mitigation and risk reduction components of Law number 24/2007 through the implementation of National Action Plan for Disaster Risk Reduction (2010-2013) and Disaster Management Plan (2010-2014).

4. DISASTER-RISK REDUCTION EDUCATION IN INDONESIA

Disaster risk reduction or disaster prevention is about putting in place measures to limit negative impacts of natural disasters, especially the frequent medium-scale disasters that continually erode the development gains of communities (AIFDR, 2012). Disaster risk reduction activities can either reduce the likelihood of a disaster that occurs or strengthen a community's ability to respond and cope with a disaster.

Kofi Annan, the former Secretary General of United Nations (UN), has emphasized the importance of disaster prevention by stating: "We must, above all, shift from a culture of reaction to a culture of prevention. Prevention is not only more humane than cure; it is also much cheaper.... Above all, let us not forget that disaster prevention is a moral imperative, no

less than reducing the risks of war" (Strategy for a Safer World in the 21st Century: Disaster and Risk Reduction, Geneva, July 9, 1999). Moreover, it was mentioned in the third priority of Hyogo Framework for Action, that nations of the world should use knowledge, innovation and education to build a culture of safety and resilience at all levels in which disaster risk reduction education and safe school building are two key priority areas for action.

Since schools are universal institution for sharing knowledge and skills, the expectations for schools to be role models in disaster prevention is high. Successful disaster mitigation is one of the ultimate tests of the success of the education over generations (IFC, 20120).

Preparing students and people to gain basic knowledge on how to recognize early features of a natural disaster, how to rescue themselves, their families, and the environment, and how to perform self and environment-based prevention and rehabilitation is basic aim of disaster risk reduction education (Inayati Dewi, 2010). Through disaster risk reduction education, people learn to anticipate disasters, reduce the chance of occurrence and mitigate impacts when they occur. In relation with school perspective, disaster related subjects are most urgent and central among the many topics from school curricula to be taught to students because (i) students need to learn about hazards and risk reduction (ii) schools are the center for community-based disaster risk reduction, and (iii) schools should be physically protected from natural hazards.

Materials content of disaster risk reduction at schools comprise matters related to: i). Knowledge on disaster management and practices before disaster, when there is disaster, and after disaster events, in accordance with thinking skills and physical development of learners, and ii). Development of disaster awareness culture, based on knowledge and attitudes that cover recognition, knowledge, understanding of types, sources and magnitude of natural hazards at school and residence; understanding of disasters history at school; understanding of vulnerability and capacity of school; understanding of efforts in facing disasters; behavior and perception of disaster risk; and vulnerability and capacity (Ministry of National Education, 2010).

4.1. DISASTER CONTENT IN BASIC EDUCATION CURRICULA

Government of Indonesia has realized the importance of building a culture of resilience and safety through education. Therefore, in order to formally deliver knowledge and skills on disaster to students at schools, Ministry of National Education has already issued curricula which cover disaster related content in general.

At present, the newest curriculum adopted by Indonesian primary and secondary schools is called School-Level Curriculum that gives wider autonomy for each school to develop or adopt their own textbooks by taking into account potentials of schools and surrounding region based on guidelines and evaluation standards developed and issued by National Department of Education (DOE). The DOE issues the school-level curriculum that contains competency standard and basic competency.

Competency standards refer to minimum qualifications of learners' ability to describe the mastery of knowledge, attitudes, and skills that are expected to be achieved in each class and / or a semester on the subject learnt, while basic competence is a number of abilities to be mastered by students in certain subjects as a reference for the development of competence-indicators in the lesson.

Formal education curriculum at school levels in Indonesia have a number of subjects that can be grouped into five clusters: Religion and Culture, Language and Arts, Social Studies, Science and Technology, Health and Physical Education.

Based on teaching syllabus under the School Level Curriculum, disaster related content is put in an integrated manner among the subject matters. Bishnu Hari Pandey (2007) stated that disaster related materials were limitedly integrated in school subjects of social studies and science education regardless of the level. Comparatively, higher concentration of disaster content could be found in health and physical education subjects. The disaster related content is more dominant in primary and lower secondary school levels than that in upper secondary. While some chapters are devoted in hazard science in primary and lower secondary school science subjects, no material in hazard or disaster theme is provided in science related subjects at upper secondary level.

In comparison to other school subject areas, health and physical education includes the largest number of subsections and units related to disasters and safety (Bishnu Hari Pandey, 2007). In primary level grade 1-3, basic competency requires students to be able to practice safe and hygienic daily life like sanitation, traffic safety, and safety from physical surroundings. In grades 4-6, students are expected to be able to observe safe outdoor activities. In lower secondary school grade 7-9, more specific subjects are provisioned to enable students use first aid, practice in preservation of healthy environment, learning value of mutual help, cooperation and support in need. In upper secondary grades, skills for mountaineering and rescue and broader level understanding of social system for mutual help and humanitarian ethics are asked for.

Standard and basic competence concerning disaster content for all subjects at Indonesian basic education level (primary and lower secondary schools) is shown in the following tables.

GRADE	SUBJECTS	STANDARD AND BASIC COMPETENCE CONCERNING DISASTER MANAGEMENT
I	Natural Science	Recognizing various astral objects and natural phenomenon (weather and season) as well as its effects on human activities (2nd semester) • Identifying various astral objects through observation • Identifying surrounding weather conditions • Distinguishing effects of dry and rainy seasons on human activities
	Social Science	Describing surroundings of the house (2nd semester) • Describing position of the house
II	Natural Science	Understanding natural phenomenon and effect of the sun in daily life (2nd semester) • Identifying position of the sun in the morning, noon, and afternoon • Describing uses of solar heat in daily life
	Social Science	Understanding position and roles of members in a family and in neighborhood (2nd semester) • Providing examples of cooperation activities in neighborhoods
III	Natural Science	Understanding surface of the earth, weather, and its effect on human, as well as its connection with ways of men preserve nature (2nd semester)

	Social Science	• Describing surface of the earth in surrounding terrain • Explaining relation between cloud conditions and weather • Describing effects of weather on human activities • Identifying ways of humans preserve nature in surrounding of environments Understanding surrounding environment and practice cooperative activities around house and school (1st semester) • Talking about natural and artificial environment in surroundings of house and school • Preserving natural and artificial environment around house • Drawing an area-map of house and school • Conducting cooperative activities around house, school, and village
IV	Natural Science Social Science	Understanding change of physical environment and its effects on land terrain (2nd semester) • Describing various changes of physical environment (wind, rain, sunshine, and sea waves) • Describing effects of physical environment changes have upon land terrain (erosion, abrasion, flood, and landslide) • Describing methods of preventing environmental destruction (erosion, abrasion, flood, and landslide) Understanding history, natural phenomenon, and racial diversity in district/municipal, and provincial level (1st semester) • Reading map of surrounding area (district/municipality and province) on simple scale • Describing natural phenomenon and appearance in district/municipality and province along with relation to social and cultural diversity
V	Natural Science Social Science	Understanding changes happening in nature and its connection with use of natural resources (2nd semester) • Identifying natural phenomenon occurring in Indonesia and its impact on living creatures and environment • Identifying various kinds of human activities that could alter the earth surface (agriculture, urbanization) Respecting various kinds of national historical figure and artifacts in the Hindu-Budha and Islam period, diversity of nature and race, and economic activities in Indonesia (1st semester)

		• Recognizing diversity of natural and artificial appearance as well as time zone distribution in Indonesia by using map/atlas/globe and other media
VI	Social Science	Understanding development of Indonesian region, natural appearance, and social conditions of countries in South East Asia as well as continents (1st semester) • Comparing natural appearances and social conditions of neighboring countries • Identifying continents Understanding natural phenomenon occurring in Indonesia and its surrounding area (2nd semester) • Describing natural phenomenon occurring in Indonesia and its surrounding area • Recognizing measures taken in the event of a natural disaster
	Subjects do not include DRR	Religion, Civics, Indonesian, English, Mathematics, Culture and Art, Physical Education

Table 2: Disaster education content at primary school level

GRADE	SUBJECTS	STANDARD AND BASIC COMPETENCE CONCERNING DISASTER MANAGEMENT
VII	Natural Science	Understanding natural phenomenon through observation (2nd semester) • Conducting systematic and planned objects observation to obtain information on biotic and non-biotic natural phenomenon • Applying safety procedure when conducting observation of natural phenomenon Describing mutual dependency of ecosystem • Applying roles of human in management of environment in order to minimize pollution and environment degradation
	Social Science	Understanding environment of human life (1st semester) • Learning to use map, atlas, and globe to obtain spatial information • Drawing sketches and map of regions portraying geographical objects • Describing phenomenon occurring in the atmosphere and

		hydrosphere, as well as its impact on life
VIII	Social Science Practical Skills	Understanding social issues related to growth of human population (1st semester) • Describing issues and problems of environment and efforts in overcoming them in the frame of sustainable development Appreciating engineering work of water purifying technology (1st semester) • Understanding mechanical technology based on water purifying equipment • Appreciating technical skills in assembling mechanical technology based water purifying equipment • Implementing water purifying technology • Planning working procedure on assembling of mechanical technology based water purifying technology equipment • Assembling mechanical technology based water purifying equipment Appreciating engineering technology (2nd semester) • Understanding chemical technology based water purifying technology equipment • Appreciating the technical skills in assembling chemical technology based water purifying equipment • Assembling water purifying technology • Planning work procedure of the assembling of chemical technology based water purifying technology equipment • Assembling chemical technology equipment based water purifying equipment
IX	Natural Science Social Science Physical Education	Understanding solar system and its processes (2nd semester) • Explaining relation between processes occurring in the lithosphere and atmosphere layer with health and environmental problems Understanding relation between human and earth (2nd semester) • Interpreting map on forms and patterns of the earth surface • Describing interrelation between geographical elements and people in South East Asian region • Describing distribution of the earth surface into continents and oceans Implementing healthy way of life (1st semester)

		• Understanding various kinds of fire hazards • Understanding methods to avoid fire hazards Implementing healthy way of life (2nd semester) • Understanding various kinds of dangers in natural hazards • Understanding methods in dealing with various kinds of natural disasters
	Subjects do not include DRR	Religion, Civics, Indonesian, English, Mathematics, Culture and Art, Communication and IT

Table 3: Disaster education content at lower secondary school level

4.2. RECENT GOVERNMENT POLICY ON DISASTER-RISK REDUCTION EDUCATION

Despite the fact that curriculum for Indonesian basic education level has already included disaster content materials, due to the rise of disasters occurring in the country during 2010-2011 which claimed many victims, Ministry of National Education decided to issue and implement a recent special disaster risk reduction or disaster prevention education curriculum. From young generation perspective, this policy is very crucial because children have the rights to be safe from disasters and also play important roles in disaster risk reduction. Children need to be facilitated with appropriate knowledge and skills to save themselves and other people during disasters.

In line with the reason above, Ministry of National Education, supported by United Nations Development Program (UNDP) has collaborated in the implementation of disaster risk reduction knowledge integration into school curriculum. This decision has been stipulated in a national policy through Circular Letter of the Ministry of National Education No. 70a/SE/MPN/2010 on Mainstreaming of Disaster Risk Reduction at School. The letter is addressed to all Governors, Regents and Mayors throughout the country, calling for the implementation of disaster management at schools level through 3 activities, namely: 1). empowerment of institutional role and capacity of school community; 2). DRR integration into formal school level curriculum, both intra as well as extra-curricular programs; and 3). Development of inter-stakeholder partnership and network to support DRR implementation.

All the three activities should be done based on the strategy document of Mainstreaming Disaster Risk Reduction at Schools issued by Ministry of National Education that functions as a guide for education policy makers and managers at school level (headmaster, teachers, and

school committee) in preparing the disaster risk reduction program in basic education level (Ministry of National Education, 2010).

The policy itself has immediate objective to make children safer during disasters and to prepare them as agents of change who can spread out knowledge to larger communities especially to their own families; while the long term objective is to prepare children, as future generations, with disaster prevention, mitigation and preparedness knowledge (Bambang Indriyanto as cited by UNDP Indonesia, 2010).

Implementation of the newest disaster curriculum began in the school academic year of 2011/2012, especially in areas prone to natural disasters like Bengkulu, West Sumatra, Yogjakarta, Central Java, Bali, Maluku, Papua, and East Nusa Tenggara provinces. Learning materials included in disaster risk reduction curricula cover issues of earthquake, tsunami, floods, droughts, and fires which are integrated into each appropriate school subject in primary and secondary schools such as Natural Science, Social Studies, Geography, Indonesian Language, Mathematics, and Religion (Ministry of National Education, 2010).

4.3. TEACHING MATERIALS FOR DISASTER RISK REDUCTION EDUCATION

After going through a long process of discussion since 2008, Centre Curriculum, Research and Development Board of Ministry of National Education, working together with a non-governmental organization called Safer Communities through Disaster Risk Reduction (SCDRR) Board-UNDP, have successfully prepared books for disaster risk reduction education at schools that have been legalized by a letter of the Ministry of National Education No. 70a/SE/MPN/2010.

Preparation of text-books on disaster risk reduction was done through a participatory consultative process with relevant stakeholders in several areas of Indonesia. Consortium for Disaster Education (CDE), which was formed in October 2006, had been actively involved in the process of drafting and refinement of these books as co-formulators in every process of preparation.

In implementing disaster risk reduction education at schools, teachers should use at least 15 teaching modules and a training module. The teaching modules that cover topics on catastrophic earthquake, tsunami, landslides, fires and floods, provide teachers ways in preparing syllabus and learning indicators as well as teaching model on integration of disaster risk reduction materials into main teaching subjects, local content subjects and extra-curricular activities.

As an initial project in the implementation of disaster risk reduction education program, SCDRR collaborating with National Curriculum Centre and Disaster Education Consortium had successfully conducted training or TOT (Training for Trainers) for teachers and curriculum development teams at national and local level in June 2010, which aimed to enhance community capacity and to empower roles of schools in carrying out disaster management.

5. A BRIEF CRITICAL ANALYSIS OF THE PREVAILING SITUATION

Currently, Indonesian government is more serious than before in dealing with disasters, as evidenced by the enactment of laws and regulations that specifically regulate the disaster management and disaster risk reduction education. With these laws and regulations, the agencies responsible for disaster management have a strong base to move so that the handling and anticipation of disasters can be implemented in a better organized manner under sufficient financial support from government.

As mandated by Law number 24/2007 on Disaster Management; public policy on disaster management in Indonesia has shifted from a focus on relief and rehabilitation efforts to holistic management of disasters. This new policy approach incorporates pre-disaster issues of prevention, mitigation, and preparedness, as well as post-disaster issues of response, recovery, and reconstruction. New initiatives, such as mainstreaming disaster risk reduction in development, building capacity through education and greater awareness at all levels, and utilizing advanced technologies, have enhanced the country's preparedness for each phase of disaster management

Related to disaster prevention education, the primary and secondary school curricula have included disaster education content despite limited portions of themes related to common natural disasters. Fortunately, starting from the academic year of 2011/2012, the government has already launched special curriculum of disaster-related content which cover natural disasters that often occur in the country such as flood, earthquakes, and volcanic eruptions in order that students at school can learn how to deal with disasters surrounding them. The curricula have also been equipped with the availability of specialized learning modules and guidelines for integrating disaster reduction content into the core subjects that make teachers easier in teaching about natural disasters and mitigation skills without having to add new subjects in the curriculum.

There are some challenges in the implementation of newly established disaster management system and disaster-risk reduction education in Indonesia. The first challenge is related to human

resources. Limited human resources both in number and capacity raise big problems, especially associated with the efforts to establish Disaster Management Agencies in local governments level with qualified staff members. Much demand on human resources in the field of disaster management cannot be fulfilled in a short period of time so that the governments' efforts in capacity are still very heavy. The second challenge is about political will of local governments in supporting the implementation of disaster risk reduction education at schools. Whether a region is prone to disasters or not, disaster prevention at schools is still needed to implement. Local government needs to allocate sufficient fund for sustainable disaster-risk reduction education at school level. The third challenge is dealing with knowledge and skills of teachers as well as the availability of sufficient teaching materials and media in delivering disaster curriculum content. If teachers lack of professional development programs and have no enough teaching materials and media in disaster-risk reduction education, it would be difficult for achieving the effectiveness of teaching and learning processes.

7. CONCLUSIONS

Indonesia has already had and implemented new system in disaster management since 5 years ago. National Disaster Management Agency continues to do efforts in collaboration with various stakeholders including community to become more professional in preventing and anticipating disasters in the country. Meanwhile, the implementation of integrated disaster risk reduction education at schools under framework of the latest curriculum has already started in the academic year of 2011/2012. Both disaster management and disaster-risk reduction education need to be equally managed in a professional and sustainable manner with full support and commitment of both central and local governments, schools, and communities, in order to achieve its ultimate goal of realizing community resilience to prevent and cope with disasters.

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