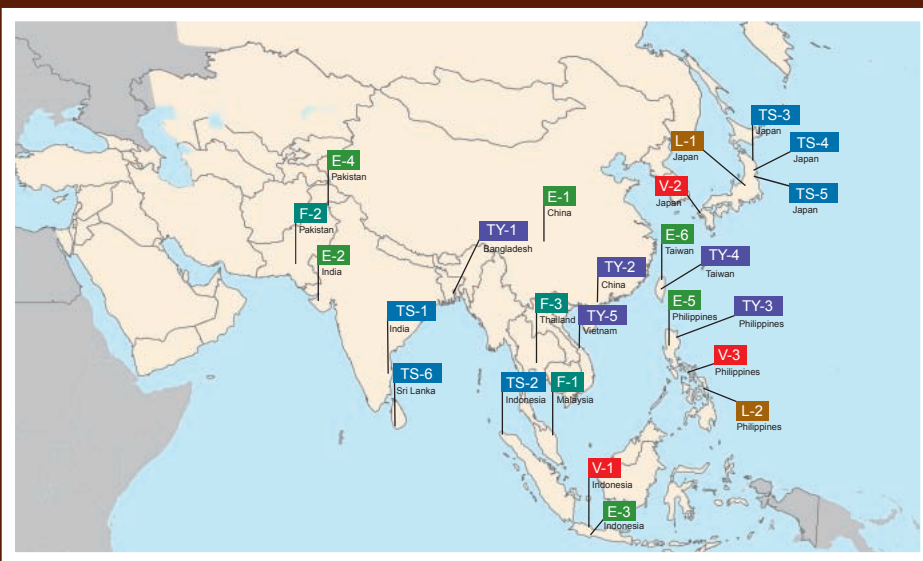


School Recovery

Lessons from Asia



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Preface

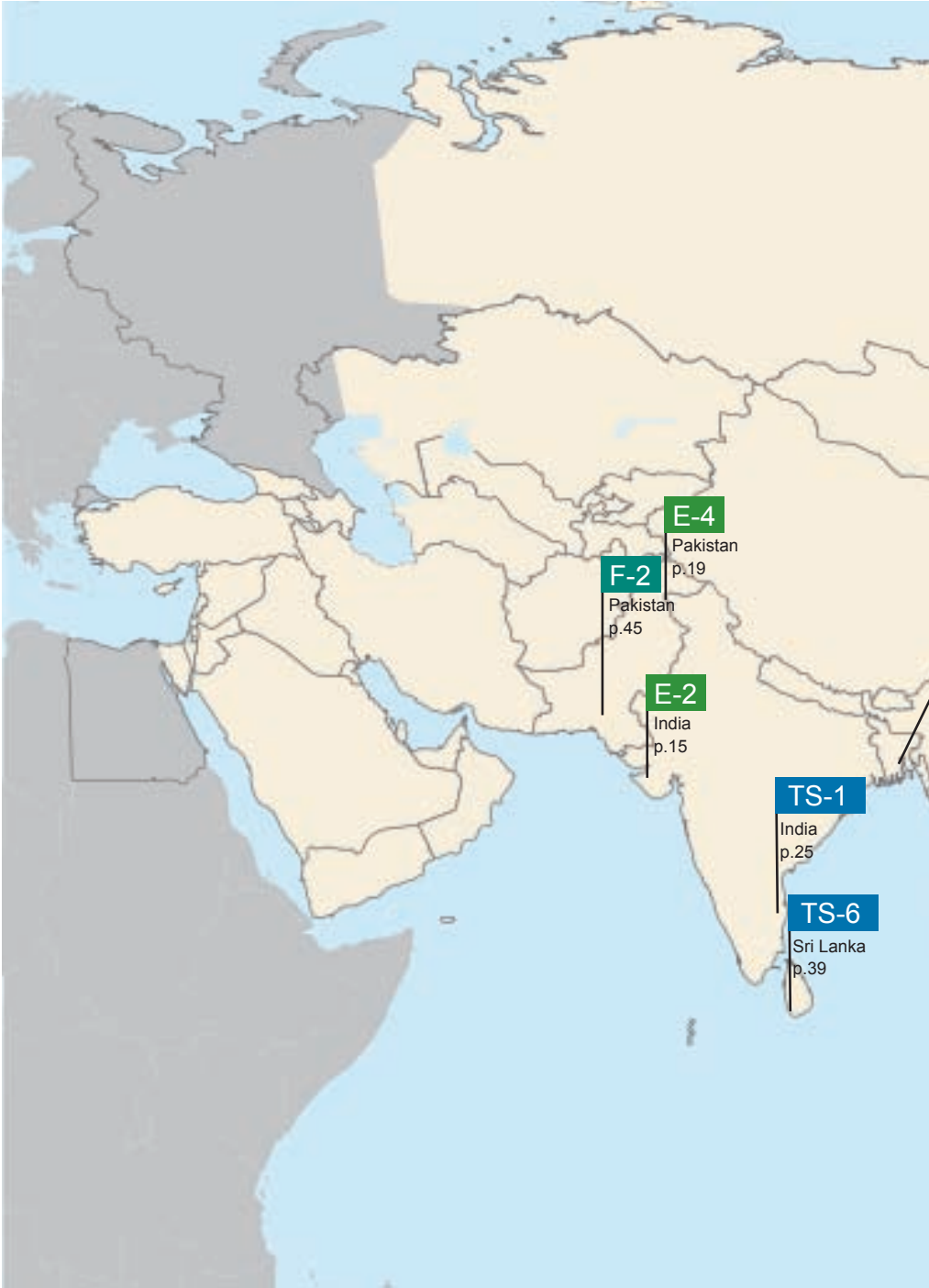
Schools are at the core of society and community. A healthy school is related to a healthy society. Different countries have a different system of education, however, in most countries, elementary schools are central to the community. The higher the education system is, the lesser the bonding with the community, since in many cases, the students go farther from the community for education. In many countries, education is granted, and compulsory, however, still in many developing countries, education does not reach all, and people need to take special efforts to send their children to schools, even during normal time. This becomes difficult during the disaster period, especially when the schools are damaged and education is interrupted.

Every year, millions of students worldwide are affected by interruptions in their education due to disasters. Although children spend up to half of their waking hours in schools, all too often educational facilities are not constructed or maintained to be disaster resilient. The preventable death of children and adults who study and work in schools causes irreplaceable loss to families and communities. Disasters can also leave life-long physical and psychological injury to countless of children globally. Every new school must therefore be constructed as a safe school and existing unsafe schools must be retrofitted to be disaster resilient, if not disaster resistant. In addition to providing a space for children's education, schools often act as centers for community activities and constitute social infrastructure that is crucial in the crusade against poverty and illiteracy. The Education for All (EFA) and Millennium Development Goals (MDG) targets will not be attained without the construction of more secure educational facilities.

The East Japan Earthquake and Tsunami (EJET) of March 11, 2011 also damaged several schools in different parts of Tohoku region. In Okawa Elementary School of Ishinomaki City of Miyagi Prefecture, several students and teachers lost their lives. In other cities also, students lost their lives, since they were handed over to their parents. The whole affected regions of Tohoku are currently undergoing recovery process, where schools will play vital roles. Although the affected area has high aged population, however the community has a strong feeling toward the schools and their recovery process. In an effort to understand the recovery processes from past damages of school buildings due to disasters, the current attempt compiles 25 case studies from 12 countries on 6 different hazards. Although the case examples come from different countries and different socio-economic background, a few common elements are identified, which can be applied to the current context of school recovery in the Tohoku region. The Hyogo Framework for Action (HFA) in the education sector (E-HFA) is considered as a framework for the integrated approach of disaster risk reduction. It goes beyond the school building or education, and looks at the comprehensive way of disaster risk reduction in the education sector. Different professionals and academics especially form the Asian University Network of Environment and Disaster Management (AUEDM) contributed to this compilation, and I acknowledge their help and cooperation. I hope that this compilation will be a useful reference document for the education sector and its post-disaster recovery.

Rajib Shaw

Contents





Impacts of Disasters on Education

Significant impacts on the education sector are caused by disasters: students and teachers are killed or injured; school buildings are damaged; classes are disrupted for long periods; students drop out; etc. In terms of economic costs, disasters can have direct and indirect costs as well as secondary effects to the education sector. Direct costs to education relate to the physical damage to capital assets and include the cost of damage to school buildings, sporting facilities, books, computers, etc. and the cost of demolition and clearing of unsalvageable facilities. Indirect costs to education

refer to damage to the flow of services and consist of the cost of education and sport facilities used as evacuation and relief centers; additional transportation costs due to damaged roads; loss of income to teachers; and other educational services disrupted. Secondary effects refer to both the short- and long-term impacts on overall economic performance, such as lost contribution to the national economy or production generated by the education sector; variations in employment rates; impact on the public sector; etc.

1. Impacts of Disasters on Students, Teachers, and School Staff

Every time a disaster takes place, plenty of children become excluded from school, many never able to come back (Petal, 2008). But the ultimate exclusion happens when students, teachers, and non-teaching school staffs are killed in schools that were either built in harm's way or not built to withstand anticipated and recurring natural hazards. Non-structural risks like falling objects and blocked fire exits can make children, teachers, and other workers victims of altogether avoidable fatal or serious injuries and disabilities (Petal, 2008; Risk RED, 2008).

2. Impacts of Disasters on School Facilities and Related Infrastructure

Schools can get damaged beyond repair in a disaster and, as a result, students are left with nowhere to go. Devastated schools require a level of reinvestment many times higher than the initial small incremental cost of building safely, which can be a substantial burden on the economy (GFDRR, 2009). The destruction of other infrastructure such as roads can lead to a worsening of learning conditions and, if vital education-related infrastructure inside and outside the school is permanently damaged and not restored causing children not to return to their studies, this results to a direct loss of human capital (Baez et al, 2010).

3. Impacts of Disasters on Educational Continuity and Quality

Lack of resilience can leave schools unprepared to recover swiftly. Long-drawn-out closure triggers loss of trust in the school and students become unable to find a sense of continuity in their commitment to continue formal education. When they are deprived of continuous schooling numerous students may never be able to catch up and often forced to drop out permanently. Without acceptable alternative locations and facilities, children can be excluded from school in large numbers (Risk RED, 2008). Posttraumatic stresses and lack of psychosocial support can also affect the situation by making it impossible for some children to refocus on their studies. Student enrollment, attendance, performance, and progression can be expected to deteriorate.

After the 2004 Indian Ocean Earthquake and Tsunami, some Indonesian schools were not able to reopen due to the lack of teachers (Russell, 2005). In cases like this when valuable instruction time is lost, the quality of education may drop (Baez et al, 2010). Also, when educational records become missing, students may fail to enroll and go on to further education (Petal, 2008). Additional disruption to school activities during disasters is also brought about by the fact that schools in the country are often used as temporary emergency or evacuation centers. Following a disaster, teachers and students often spend longer hours at school such as at weekends or extending class hours to complete the lessons that have been missed.

Overview of School Damage in Recent Major Disasters

Disasters impair education systems (Rognerud, 2009). To quantify and describe the disaster impacts explained above, Table 1 shows how the major disasters affect schools in different parts of Asia in the last ten years.

Table 1. Impact of Disasters on Asian Schools in the Last Decade

Sources: Petal, 2008; Rognerud, 2009; GFDRR, 2009; China Post, 2009; Vibal Foundation, 2009; EERI, 2009; NDRRMC, 2010, 2011; AFP, 2011; Kobayashi, 2011

2011	Thailand	2,600 public and private educational institutions and around 700,000 people involved in education have been affected by the Bangkok floods. Damage to educational facilities is estimated at USD 224 million.
	Japan	More than 6,000 public schools (kindergarten and primary, secondary and special needs schools) were damaged by the Great East Japan Earthquake and Tsunami. There were a total of 607 deaths, including 575 students and 32 teachers. 124 students and staff were reported missing, as of June 24, 2011.
2010	Philippines	Super Typhoon Megi damaged 28 schools. 63 schools were utilized as evacuation centers. Pupils reported that they lost most of their school supplies. Teaching and other learning materials were lost or damaged.
2009	Indonesia	The 7.6-magnitude Western Sumatra Earthquake damaged 1,100 schools, affecting 3,200 classrooms
	Philippines	Tropical Storm Ketsana damaged 78 elementary and high schools. Damage to classrooms, textbooks, desks, computers, and other equipment reached USD 13 million. 122 schools used as evacuation centers for 8,400 families.
	Taiwan	682 schools nationwide destroyed by Typhoon Morakot, with total damages estimated at around USD 6 million.
2008	Myanmar	2,460 schools completely collapsed in Cyclone Nargis (almost 50% of the schools in the affected area).
	China	An estimated 10,000 children died in their schools due to the Wenchuan Earthquake. An estimated 7,000 classrooms were destroyed.
2007	Bangladesh	Cyclone Sidr destroyed 496 school buildings and damaged 2,110 more.
2006	Philippines	Super Typhoon Durian caused USD 20 million damage to schools including 90-100% of school buildings in three cities and 50-60% of school buildings in two other cities.
	Philippines	245 children and their teachers died in the Southern Leyte Mudslide that buried the village elementary school after 5 days of rain had ceased.
2005	Pakistan	17,000 students died at school, 50,000 were seriously injured, and many became disabled due to the Kashmir Earthquake. 10,000 school buildings destroyed. 300,000 children affected. In some districts 80% of schools were destroyed.
2004	Indian Ocean	Tsunami destroyed 750 schools in Indonesia and damaged 2,135 more. 150,000 students without schools. 51 schools were destroyed in Sri Lanka and 30 in Thailand.
	Cambodia	Severe floods directly affected between 500,000 and 1 million students in 1,000 to 2,000 schools in 8 provinces.
	Bangladesh	1,259 school buildings were lost to floods and 24,236 were damaged.
2003	India	93 children died in a fire due to explosion of a cooking gas cylinder
	Iran	Due to the Bam Earthquake, 67 of 131 schools collapsed while the remaining schools were heavily damaged. 10,000 school children and 1,200 teachers died and more than 32,000 students were adversely affected.
	China	900 classrooms in dozens of schools collapsed in an earthquake 27 minutes before thousands of children returned to their classrooms. A middle school collapsed killing at least 20 students.
2001	Taiwan	A three-story school collapsed in the middle of the night.
	India	971 students and 31 teachers were killed by the Gujarat Earthquake, though most children were outside for Republic Day celebrations. 1,884 schools collapsed, destroying 5,950 classrooms including 78% of public secondary schools. 11,761 school buildings suffered major damaged with 36,584 classrooms rendered unusable.

As the statistics above demonstrate, non-disaster resilient schools not only kill or injure students and teachers, the destruction of the physical educational infrastructure can be a great economic loss for a country. However, the flip side of the coin is that the destruction of old and unsafe physical assets offers the opportunity to replace them with safer infrastructure (Baez et al, 2010).

Key Issues and Lessons

After reviewing each of the 25 case studies, two key lessons are drawn from each, which is shown in Table 2. In the table, the following abbreviations are used: E: Earthquake, TS: Tsunami, V: Volcano, F: Flood, TY: Typhoon, and L: Landslide.

Table 2. Recovery Lessons from the 25 Case Studies

Code	Country	Key Message 1	Key Message 2
E-1	China	Teacher's training is a key factor in making decisions during an emergency	Importance of drills and quick evacuation is proven
E-2	India	Community participation in the recovery process is essential	Children's awareness of disasters and environmental sanitation should be fostered
E-3	Indonesia	Corporate sector role is important in school reconstruction	Community participation in recovery process is essential
E-4	Pakistan	CSR role is important not only in school construction, but for the education of children also	Recovery program can be a trigger for EFA (Education for All)
E-5	Philippines	Remembrance of past disasters is important	Evacuation drill is important and effective
E-6	Taiwan	Understanding the importance of disaster by the school and community is necessary	Disaster education can be enhanced through recovery experiences
TS-1	India	A mega-disaster prompted disaster education in school	Participatory education (school-community linkage) is important
TS-2	Indonesia	Private sector participation is important not only for infrastructure but also for education continuity	School-community linkage is important
TS-3	Japan	Disaster education and drills are important for evacuation behavior	Participation of the community in the decision-making in the recovery process is crucial
TS-4	Japan	Due to topography, school becomes a vital community infrastructure	School recovery is dependent on city's recovery process
TS-5	Japan	School becomes a shelter for the local community and needs to be properly equipped	Education in emergency is important for continuity of school education
TS-6	Sri Lanka	Multi-stakeholder involvement is important in the recovery process	Low-frequency, high-consequence disaster influences decision to build school in safe location

The immediate reconstruction of damaged schools constitutes a key element after a disaster because it allows children to return to a state of normality and to replace their emotional crisis with the joy of being around other children and have a space in

which to learn and play at the same time (HHF, n.d.). Communities also benefit from the reconstruction of schools as while children are attending classes, parents and guardians are able to focus on returning to their daily work, which is important in order to feed their

Code	Country	Key Message 1	Key Message 2
V-1	Indonesia	Teachers are considered as the key change agent in the recovery process	School-community linkage is the key to sustainable relationship
V-2	Japan	Disaster memory is important to be passed on to next generations	Old damaged school building can act as a museum and learning center
V-3	Philippines	Pre-emptive evacuation is proven to be life-saving for predictable hazards	Education in emergency is important in a long-running disaster
F-1	Malaysia	For countries not prone to disasters, school drills can be effective in raising awareness	School-community linkage is important
F-2	Pakistan	Post-disaster damage and needs assessment is useful	Public-private partnership through community-based organizations (CBOs) is important
F-3	Thailand	Resilience, adaptation, and cooperation are essential for school-community linkages	Environment-disaster linkage is crucial to disaster education
TY-1	Bangladesh	School-community linkage is important for sustainable recovery	Emergency education is essential for educational continuity
TY-2	China	School location is important for educational continuity	School becomes a core for coordinating relief and recovery
TY-3	Philippines	Stand-by calamity fund is useful for the speedy recovery of the education sector	Emergency education is essential for educational continuity
TY-4	Taiwan	Location of school as a crucial infrastructure is important	Education leading to awareness and action is important
TY-5	Vietnam	Pre-disaster recovery planning is useful for quick recovery of the education sector	Location of school building is crucial and important
L-1	Japan	Quick recovery is important for educational facilities	Local information should be disseminated to students and teachers
L-2	Philippines	Aware students can take appropriate preventive actions	Hazard assessment is a crucial part of school disaster education

families. The return to employment activities also helps communities to rise again and contributes to rebuilding the economy. Similar to observations made in the Kobe Earthquake and Gujarat Earthquake (Nakagawa and Shaw, 2004), most of the 25 case studies show that

the community with strong social capital and a tradition of community activities can pro-actively participate in the reconstruction process, and thereby contribute to a successful and speedy recovery.

Linkage to E-HFA

For an integrated approach that incorporates disaster risk reduction (DRR) into the education sector, Gwee et al (2011) identified and modified 16 out of the original 22 tasks suggested for the implementation of the five priorities for action of the Hyogo Framework for Action (HFA) to adapt them for use in the education sector. The 16 tasks are referred to as E-HFA or Education in the HFA as shown in Table 3.

Table 3. Sixteen Tasks Relevant to the Education Sector

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

Source: Gwee et al, 2011

The 16 E-HFA tasks are to be performed at all levels, i.e., national, local, community, and school, to achieve sustainable implementation. When considering DRR education, it should not be limited to the education curriculum only, but should also include related issues such as structural and non-structural safety measures; legislative measures supporting the integration, implementation, as well as funding of DRR

in the education sector; risk assessments and early warning systems; DRR training for school staff, etc. An integrated approach is necessary and the E-HFA tasks can help cover the various important issues that need to be addressed. Table 4 below illustrates how the recovery lessons from the 25 case studies are connected the E-HFA tasks.

Table 4. Linkage Between the Recovery Lessons and the E-HFA Tasks

E-HFA		E1	E2	E3	E4	E5	E6	TS1	TS2	TS3	TS4	TS5	TS6	V1	V2	V3	F1	F2	F3	TY1	TY2	TY3	TY4	TY5	L1	L2	Total
Priority1	Task1																										0
	Task2																										0
	Task3																										0
	Task4																										0
Priority2	Task5																	1								1	2
	Task6																										0
Priority3	Task7					1	1	2	2					2	1		2		1	1			2			1	11
	Task8							1								1							2				2
	Task9	1																									1
	Task10						2								2										2		3
Priority4	Task11		2															2									2
	Task12										2		2								1		1	2			5
	Task13				1	1					1	1									2				1		6
	Task14		1	2	2				1	2		2	1	1				2		2		2		1			12
Priority5	Task15	2				2				1						1	1					1					6
	Task16																										0

Note: 1 = Key Message 1 and 2 = Key Message 2 in Table 2

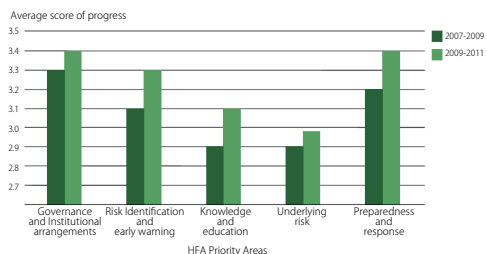


Figure 1. Global progress against the HFA
Source: UNISDR, 2011

Most commonly implemented recovery actions relate to Task 14 (disaster recovery), Task 7 (public awareness of DRR), Task 13 (physical structures, i.e., building codes, retrofitting, protection of critical facilities, etc.), Task 15 (disaster preparedness, i.e., drills, standby funds, etc.), and Task 12 (land-use planning, i.e., safe location for schools). Tasks under Priority 4 (reducing underlying risks) are performed 50% of the time. Tasks not done in any of the 25 case studies are all four tasks in Priority 1 (institutional basis for DRR in education), Task 6 (early warning), and Task 16 (assessment of disaster preparedness). The case study lessons, categorized according to the E-HFA priority area they belong to, are then graphed and compared to the result reported in the 2011 Global Assessment Report on Disaster Risk Reduction (GAR 2011).

According to GAR 2011, whereas substantial progress is being made globally against the HFA priority targets in early warning, disaster preparedness, and

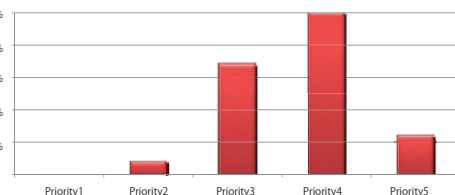


Figure 2. Classification of the Case Studies
According to E-HFA

emergency response, countries are still struggling to address the underlying risk drivers (Figure 1). Interestingly, reflecting the lessons from the 25 case studies, Figure 2 shows almost the opposite tendency. In Figure 2, Priorities 4 and 3 are performed on more occasions than the other priorities. Figure 2 seems to suggest that perspectives change after one has experienced a disaster, hence the difference on the focused priorities. This is interesting in that although the cases are more on post-disaster response and recovery, HFA 4, which focuses on underlying risk factors are incorporated into the recovery process. This is significant in the sense that it encompasses the future risk reduction perspectives. For obvious reasons, the schools are focused, and HFA 3 has gotten more emphasis. It should also be noted that the examples presented here are rather randomly selected from different Asian countries on different types of disasters. A more systematic analysis may provide more insight in the progress of E-HFA.

防災教育の効果

災害による学校機関への被害は、児童・生徒・教職員への人的被害、教育施設の損壊被害、教育活動の長期休止、児童・生徒の教育からの離脱を招く。災害は、学校機関へ直接的・間接的経済被害だけでなく、二次的被害ももたらす。教育への直接的被害は、人的被害をはじめとして校舎や体育館、書籍やコンピューター、損壊した校舎の解体費用などが挙げられる。間接被害

としては、学校教職員の損失だけでなく、学校施設が避難所として使用されることによる長期間の教育内容の低下や道路などのインフラ被害や居住地の変更に伴う通学路の変更、教職員の収入低下等が挙げられる。二次的被害としては、就職率や進学率など将来的な影響と、それに伴う短期・長期的な経済的影響が挙げられる。

1. 児童・生徒、教職員への影響

災害が発生し、学校施設が被害を受けるたびに、児童・生徒は学校に通うことが困難になり、時として同じ場所に戻ることが難しい。災害に耐える校舎でなかったり、災害を受ける可能性の高い場所へ建築された学校では、児童・生徒、教職員が災害の犠牲になることがある。建物が強くても、棚からの落下や火災などにより児童・生徒、教職員が犠牲となることもある。

2. 学校施設と関連基盤への影響

災害で被害を受けた学校施設が修復している間、学校施設にて教育活動を実施することが困難になる。また、多くの場合、学校施設の修復工事は長期に渡るため、児童・生徒が整備された施設において教育を受けることが難しくなる。GFDRR (2009) によると、学校施設の修復は、建設当時の経費よりも多くかかることが報告されており、学校施設の被災は行政資金に大きな負担をかけることにつながっている。また、道路などの生活基盤が災害で被害を受けることが、学習環境の悪化につながることがいわれている。Baez ほか (2010) は、学校内外の教育に不可欠な生活基盤が破壊されると、子供達は学校に通うことが困難になり、将来的には人的資本の損失へととなると述べている。

3. 災害が教育の質と継続性に与える影響

学校施設が被災したとしても、質を維持した教育を継続していくことが求められる。学校施設の災害への対策が十分でないことは、被災したときの復興にも時間を要することにつながる。長期間にわたって学校施設が機能しないことは、学校への信頼性の低下や通学の習慣の損失につながり、義務教育の継続性に課題を抱えることとなる。そして、学ぶ機会の損失は、児童・生徒のその後の人生において取り返しがつかない大きな課題をもたらす。Risk RED (2008) は、被災した学校が十分に施設が整っていない代替地で学校教育を再開した事例において、PTSD (心的外傷後ストレス障害) に対する社会心理的なケアが十分でなかったことが、一部の児童・生徒の学習への集中力に影響を与えたこと、また、入学・進学数や出席などに悪い影響をもたらしたことを報告している。

2004年に発生したインド洋津波の後、インドネシアの一部の学校では、教職員の不足により、学校を再開することが困難であったことが報告されている (Russell, 2005)。Baez ほか (2010) は、教職員の不足は、教育の質の低下につながると述べており、Petal (2008) は、災害によって児童・生徒の在籍記録等が紛失された場合、将来的に高校や大学へ進学する際の証明を得ることが難しくなることを指摘している。また公立学校の施設が避難場所として使用されることにより、学校教育活動の充実度に影響を与えることが懸念され、災害によって遅れたカリキュラムを取り戻すために、週末や時間外に授業が行われることになる事態となる。このように、学校施設が被災することで、子供達の生活と教育の質に大きな影響を与えることが考えられる。そのため、学校施設には、災害に対して脆弱性を取り除き、被災した場合も早期に質の高い教育を再開できるように準備をすることが求められる。

学校施設が被害を受けた近年の主な災害

表 1は、アジアの地域において学校施設が災害によって被災した最近の10年間の事例である。

表 1.

アジアにおいて近年学校施設が被害を受けた事例

Sources: Petal, 2008; Rognerud, 2009; GFDRR, 2009; China Post, 2009; Vibal Foundation, 2009; EERI, 2009; NDRMC, 2010, 2011; AFP, 2011; Kobayashi, 2011

2011	タイ	バンコクの大規模洪水により、2,600の学校で700,000人が被災した。被害額は224億USドルであった。
	日本	東日本大震災により、6,000の公立学校が被災し、731名の児童・生徒、教職員が死者・行方不明者となった。
2010	フィリピン	巨大台風 Megi により、28の学校が被災し、63の学校が避難所となった。児童・生徒は多くの修学用品を失い、学校では教材が被害を受けた。
2009	インドネシア	マグニチュード7.6の西スマトラ地震により、1,100の学校で3,200の教室が被害を受けた。
	フィリピン	熱帯低気圧 Ketsana により、78の小学校と中学校が被害を受けた。教室や教科書、教材、パソコンなどが被害を受け、被害額は13億USドルであった。122の学校が避難所となり、8,400世帯が避難した。
	台湾	台風 Morakot により、682の学校が被害を受けた。被害額は6億USドルであった。
	ミャンマー	サイクロン Nargis により、2,460の学校が倒壊した。これは、被災地域にある学校の約50%であった。
2008	中国	四川大地震では、7,000の教室が被害を受け、10,000人の児童・生徒が犠牲になった。
2007	バングラデシュ	サイクロン Sidr により、496の学校が被害を受け、2,100人以上が犠牲となった。
2006	フィリピン	巨大台風 Durian により、3つの市で90-100%、他の2つの市で50-60%の学校が被害を受け、被害額は20億USドルであった。
	フィリピン	レイテ島で発生した大規模な地すべりにより、小学校が倒壊し245名の児童と教職員が犠牲となった。
2005	パキスタン	カシミール地震により、学校内で17,000名の児童・生徒が犠牲となり、50,000名が負傷した。また、10,000の学校が倒壊し、300,000名の児童・生徒が被災し、ある地区では約80%の学校が倒壊した。
2004	インド洋	インド洋津波により、インドネシアでは750の学校が被災し、2,135名の児童・生徒が犠牲となった。また、学校外では、150,000名が犠牲となった。スリランカでは51の学校が、タイでは30の学校がそれぞれ被災した。
	カンボジア	洪水により、8つの地域の1000~2000の学校が被災し、5000~10000人の児童・生徒が影響を受けた。
	バングラデシュ	洪水により、1,259の学校が流出し、24,236名が被災した。
2003	インド	調理室からの火災により、93名の児童・生徒が犠牲になった。
	イラン	Bam 地震により、131の学校のうち67校が倒壊した。また10,000名の児童・生徒、1,200名の教職員が犠牲となり、32,000名の児童・生徒が被災した。
	中国	約1000人の児童が教室に戻ろうとした直前に発生した地震により、900の教室が倒壊した。中学校が倒壊し、20名の生徒が犠牲となった。
2001	台湾	3階建ての学校が夜中に倒壊した。
	インド	Gujarat 地震により、971名の児童・生徒と31名の教職員が犠牲となった。しかし、大部分の児童・生徒は、建国記念日の行事のため外にいて無事だった。公立学校の78%である1,884の学校の5,950教室が倒壊した。11,761の学校の36,584教室で長年にわたり使用することができなかった。

上記の事例から、災害に脆弱な学校施設は、児童・生徒、教職員の生命を奪い、負傷させるだけでなく、教育の重要な基盤の崩壊につながり、それは、将来的には国の大きな損失へとなる。しかし、災害に対して脆弱な古い校舎の持つ資産価値と新しく安全な校舎は、Baez ほか (2010) が述べるように、時にコインの裏表のような状態でもある。

事例から学ぶ教訓と課題

本書では、学校の被災と復興に関して 25 の事例を示している。表 2 は、それぞれの事例から得られる教訓を 2 つずつ抽出してまとめたものである。表では、簡略化するためにそれぞれの災害を次のように略している。
E: 地震, TS: 津波, V: 火山, F: 洪水, TY: 台風, L: 土砂災害

表 2. 25 の事例から学ぶ教訓と課題

記号	国名	教訓 1	教訓 2
E-1	中国	教職員への防災教育は、災害時に適切に判断するために重要である	避難訓練の実施と迅速な避難の重要性が証明されている
E-2	インド	復興において地域のとの関わりは不可欠である	児童・生徒の災害に対する認識と環境課題、衛生問題について取り組む必要がある
E-3	インドネシア	企業は、学校再建において大きな役割を果たしている	復興において地域のとの関わりは不可欠である
E-4	パキスタン	企業は、学校再建において大きな役割を果たすだけでなく、子供達の教育にも役割を担っている	復興は、全ての教育の要因となる
E-5	フィリピン	過去の災害記録は重要な資産である	避難訓練は、重要であり効果がある
E-6	台湾	学校と地域が災害に対する脆弱性を理解することが必要である	防災教育は、復興の経験を通じて促進できる
TS-1	インド	巨大な災害の発生は、学校における防災教育の促進につながる	学校と地域が連携した参加型教育は重要である
TS-2	インドネシア	民間企業の参加は、地域の活性化だけでなく、教育の継続性にも影響を与える	学校と地域が連携することが重要である
TS-3	日本	防災教育と避難訓練は、避難行動のために必要である	復興プロセスにおける意思決定にコミュニティが参加することは重要である
TS-4	日本	地形条件によって、学校は地域にとって不可欠な存在となる	学校の復興は、地方行政の復興プロセスの影響を受ける
TS-5	日本	学校は、地域住民の避難場所として、物資を備蓄することが求められている	防災教育は、学校教育の継続性にとっても重要である
TS-6	スリランカ	様々な地域の人々が復興プロセスに参加することが重要である	低頻度大規模災害への対策は、学校施設を安全な場所に建設することにつながる

学校施設が被災したとしても早期に復旧し再開することは、地域が災害から復興するための大きな要因となる。学校が再開され、子供達が学校に通うことで、

両親は仕事に集中することが可能になり、地域も生活のリズムを取り戻すことになる。また、両親が生計を求めて仕事をすることは、地域経済の活性化にもつな

記号	国名	教訓 1	教訓 2
V-1	インドネシア	教職員は、復興プロセスにおいて重要な役割を担っている	学校と地域のつながりは、持続可能な関係性の鍵である
V-2	日本	災害の記録は、次の世代に伝承するために不可欠である	被災した校舎は、博物館や学習の場としての新たな役割を持つ
V-3	フィリピン	早期の避難行動は、予測できる災害から人命を守ることができることを示した	防災教育は、長期間にわたる災害においても有効である
F-1	マレーシア	学校における避難訓練は、災害に対する認識を向上するために効果的である	学校と地域のつながりが重要である
F-2	パキスタン	災害後に行われる要望に関する調査は役に立つ	地域に密着した半官・半民組織の協力は重要である
F-3	タイ	学校と地域が連携する上で、災害への対応力と適応、強力は不可欠である	環境と災害のつながりを理解することは、防災教育において重要である
TY-1	バングラデシュ	学校と地域が連携することは、持続可能な復興のために重要である	防災教育は、教育の持続性のために不可欠である
TY-2	中国	教育の持続性のために、学校が建設される場所は重要である	学校は、復旧・復興の調整役として主要な役割を果たす
TY-3	フィリピン	義援金は、学校施設の迅速な復旧に役立つ	防災教育は、教育の持続性のために不可欠である
TY-4	台湾	学校が建設される場所は重要である	認識と行動が連携している教育が重要である
TY-5	ベトナム	災害前に復興計画を構築することは、学校施設の早期再開につながる	学校が建設される場所は重要である
L-1	日本	学校施設は、早期に再開することが重要である	地域情報は、児童・生徒、教職員に伝える必要がある
L-2	フィリピン	災害に対する認識がある児童・生徒は、適切な防災行動をとることができる	リスク評価を行うことは、学校での防災教育において重要である

がる。本書で取り上げた 25 の事例からも、学校が地域の重要な施設であり、その学校が再開することによって地域の復興が速やかに取り組まれたことがいえる。

Nakagawa ほか (2004) も、阪神淡路大震災とインド西部で発生したグジャラート地震を対象として同様の報告を行っている。

兵庫行動枠組との関係

兵庫行動枠組 (Hyogo Framework for Action =HFA) は、2005 年 1 月に兵庫県で開催された国連防災世界会議で採択された防災に関する行動枠組である。表 3 は、兵庫行動枠組が示す 5 つの優先行動 (Priority) と 22 の実施項目 (Task) の中から、教育に関する 16 の実施項目を整理したものである (Gwee ほか 2011)。この 16 の実施項目は「教育 -HFA」と呼ばれている。

表 3. 兵庫行動枠組が示す教育に関する 16 の実施項目

優先行動 1: 教育における防災の基礎的組織を構築する 実施項目 1. 防災教育の基礎を構築するために、多様な参加者・利害関係者が関わる 実施項目 2. 防災教育のための調整システムを構築または強化 実施項目 3. 防災教育組織の評価・構築 実施項目 4. 防災教育を優先し、適切な資源を防災教育に使用する
優先行動 2: 教育施設において災害リスクを認識・評価・観察する 実施項目 5. 教育施設の危険度調査を実施する 実施項目 6. 効果的なコミュニケーションと意思決定を通じて教育施設の早期警戒システムを強化する
優先行動 3: 防災教育を通じて地域安全に関する文化を構築する 実施項目 7. 防災対策の一般認知度の向上に取り組む 実施項目 8. 防災教育を教育システムの中に取り入れる 実施項目 9. コミュニティレベルで防災トレーニングと学習を実施する 実施項目 10. 防災情報の普及を強化する
優先行動 4: 教育施設における危険要素を軽減する 実施項目 11. 環境：持続可能な生態系、環境、天然資源の管理を理解する 実施項目 12. 防災対策を土地利用や都市計画に取り入れる 実施項目 13. 構造：災害に強い建物と社会基盤によって教育施設の安全性を確保する 実施項目 14. 復興：復興計画に防災対策を取り入れる
優先行動 5: 災害時、復旧・復興時の教育体制を備える 実施項目 15. 教育施設の災害対応力を強化する 実施項目 16. 防災計画において防災対策の実施内容と対応力を評価する

Source: Gwee et al, 2011

教育施設・学校施設の持続可能性を高めるために、全国レベル、コミュニティレベルで教育 -HFA の実施項目に取り組む必要がある。防災教育に取り組むためには、教育カリキュラムの構築だけでなく、校舎の安全性や学校の立地、資金、早期警報システムの運用な

どの課題に取り組む必要がある。教育施設では、総合的な防災の取り組みが求められており、教育 -HFA の優先行動と実施項目は、これらの取り組みを支援している。表 5. は、教育 -HFA の実施項目と本書が紹介する 25 の事例との関係について整理したものである。

表 5. 教育 -HFA の実施項目と本書が紹介する 25 の事例との関係

教育 -HFA		E1	E2	E3	E4	E5	E6	TS1	TS2	TS3	TS4	TS5	TS6	V1	V2	V3	F1	F2	F3	TY1	TY2	TY3	TY4	TY5	L1	L2	合計
優先行動 1	実施項目 1																										0
	実施項目 2																										0
	実施項目 3																										0
	実施項目 4																										0
優先行動 2	実施項目 5																	1								1	2
	実施項目 6																										0
優先行動 3	実施項目 7					1	1	2	2						2	1		2		1	1			2		1	11
	実施項目 8							1									1										2
	実施項目 9	1																									1
	実施項目 10						2									2									2		3
優先行動 4	実施項目 11		2																2								2
	実施項目 12									2		2									1		1	2			5
	実施項目 13				1	1					1	1									2				1		6
	実施項目 14		1	2	2				1	2		2	1	1					2		2		2		1		12
優先行動 5	実施項目 15	2				2				1							1	1				1					6
	実施項目 16																										0

注：1・2 は、表 2 のそれぞれの教訓を示している

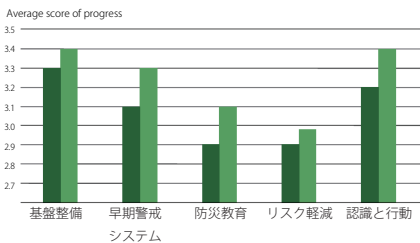
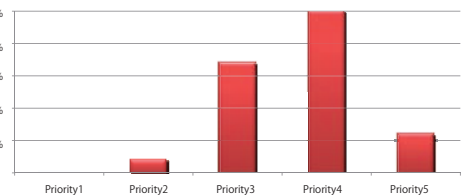


図 1. 兵庫行動枠組の世界的な進捗状況
Source: UNISDR, 2011

本書で紹介している 25 の事例で取り組まれた教育 -HFA の実施項目は、7、12、13、14、15 であった。優先行動 4 に全体の 50% が集中していた。実施項目 1 ～ 4 と 6、16 は 25 の事例の中で取り組み事例がみられなかった。上の図は、本書で紹介している 25 の事例と Global Assessment Report on Disaster Risk Reduction (GAR 2011) で報告されている兵庫行動枠組の世界的進捗状況を比較したものである。



2. 教育 -HFA の優先行動と本書の事例との関係

図 1 から、世界的な動きとしては、基盤整備や早期警戒システム、認識と行動に多く取り組みがなされていることがわかる。図 2 は、本書で紹介した 25 の事例が取り組んでいる教育 -HFA の優先行動を示したものである。この図から、学校施設における防災の取り組みは、優先行動 3 と 4 に集中しており、図 1 で示した世界的進捗状況と逆の傾向を示している。本書で取り上げた 25 の事例では、アジアの事例をランダムに選択したものであり、統計的ではない。この点は比較をする上で注意しなくてはならない。

次ページからは、アジアで発生した災害における、学校の被災状況と復興内容についての事例紹介である。各事例からの教訓を日本語で紹介している。

Earthquake 1 China

Sangzao Middle School

Sangzao, Anxien, Mianyang, Sichuan

Year Established:

1974

Type of School:

Public

2,321 students, 107 teachers

Geographical location:

at the foothills of Longman Mountains



Map of China and of Sichuan Province

Background: 2008 Wenchuan Earthquake



Source: The New San Cai Magazine

In 2008, a 7.9 magnitude earthquake occurred in Wenchuan County in Sichuan Province and aftershocks affected Mianyang



Source: Board of Education, Anxien

The 2008 Wenchuan Earthquake hit the school buildings of Sangzao Middle School

- The 2008 Wenchuan Earthquake, with a magnitude of 7.9, occurred on May 12, 2008 in Sichuan Province of China. The earthquake left about 4.8 million people homeless, although the number could be as high as 11 million.
- Approximately 15 million people lived in the affected area. In this earthquake, as per government estimates, over 7,000 schoolrooms collapsed, killing over 10,000 children. In all, about 12,000 students and teachers were killed.
- When the Wenchuan Earthquake struck the Sangzao Middle School, all 2,600 students and teachers were able to evacuate the building in less than 3 minutes, before the building started to incline and collapse.
- Some of the buildings partially collapsed and all of the 8 buildings including student dormitories were determined as dangerous buildings. The school's director had been very conscious of the risks associated with seismic activity and had required students and teachers to take part in regular drills. When the earthquake struck, students and teachers evacuated according to well-rehearsed instructions.
- Since there was no safe space or classroom available, students were required to return to their homes and the class stopped until the temporary wooden house were built for schoolrooms within 10 days.

Prevention, Mitigation, and Recovery Action:

Reconstruction Plan of Sangzao Middle School

- Around 2,400 students, falling into 34 classrooms, took lectures in the wooden houses which were built across from the original location of the school on the other side of the street. However, the power supply did not support the lighting or ventilation steadily.
- On June 20, the Central People's Government of the People's Republic of China enacted the recovery plan for the worst-hit area. Liaoning Province was assigned to financially support the recovery work for Anxien, including house and infrastructure rebuilding for 2 years.

- According to the Anxien Board of Education and Strategic Planning, Sangzao Middle School was relocated to a public wheat field one kilometer away from the original site. The reconstruction works started on May 4, 2009

and was completed on January 16, 2010, lasting only 258 days. The school came into use on the next day, January 17.

- The new campus is located in a 62-acre flat field with convenient accessibility to the downtown, with 1,800 students and 36 classes. The campus consists of teaching building, student dormitories, cafeteria, and playground. The construction standard is highly valued and all the buildings were steel structure to withstand earthquake.
- Earlier in 2009, the China Red Cross Association held national emergency and rescue training in the middle school mainly in wound dressing and rescue skills.



2010 Reconstruction Plan of Sangzao Middle School

Lessons Learned:

- The school's director had been very conscious of the risks associated with seismic activity and had required students and teachers to take part in regular drills. It appeared that the Sangzao Middle School has been practicing disaster risk reduction. Risk was identified and action for risk reduction was developed and implemented. Appropriate education in the process of risk reduction was provided.

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教訓

- 校長は、児童・生徒と教職員に、地震に関する危険性を認識することと、防災訓練に参加することを取り決めた。
- Sangzao 中学校では、災害リスクは認識されており、それに対する防災対策に取り組んでいた。防災対策を実施する一環で教育が実施されていた。

Earthquake 2 India

Kumar Shala Boys School

Vavaniya, Rajkot District, Gujarat State

Year Established:

2002-03 (reconstructed)

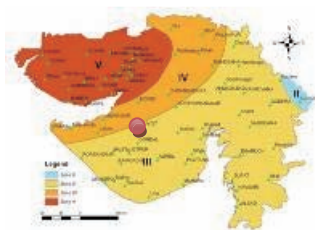
Type of School:

Public

360 students

Geographical location:

in Earthquake Zone IV



Map of India and of Gujarat State

Background: 2001 Gujarat Earthquake



2001 Gujarat Earthquake



Vavaniya Kumar Shala School damaged in the earthquake

- The magnitude 7.7 earthquake that struck Gujarat, India at 8:46 a.m. on January 26, 2001 killed approximately 20,000 people and devastated a large number of villages and towns over a wide area in western Gujarat. Over 600,000 people were rendered homeless. The damage was particularly severe in the Kutch Region. Damage was estimated to be about USD 1.8 billion.
- Vavaniya, a village in Maliya (Miyana) of Rajkot District of Gujarat, having a population of 3,962, was affected badly. Even though the loss of life was not much (3 deaths) nearly 70 percent of the houses were severely damaged requiring reconstruction. Added to this, the village was already giving shelter to about 133 families who relocated from nearby Navlakhi port during the cyclone of 1998. This necessitated relocating these families also under one operation.
- 765 shelters were constructed in Vavaniya, along with public institutions, at a relocation site close to the village. The funding partners got in touch with United Nations Development Programme (UNDP) to get the project implemented through an NGO. Thus Centre for Environment Education (CEE) came into the picture.
- The primary school buildings were very badly damaged during the earthquake and therefore could not be used and the school had to be run from a temporary set-up outside the village for a year. The Kumar Shala School used to sit at the entrance of the village and along with the temple complex, the police outpost building, and the guest house formed a public space that had developed into the bazaar street.

Prevention, Mitigation, and Recovery Action:

Community Participation in Rehabilitation

- The design of the boys' school was a copy of the much-loved original, with one significant change: it was earthquake resistant. Other additions included a water-harvesting system, toilets, and a central courtyard dotted with trees.
- The first anniversary of the earthquake was observed by organizing a children's fair, "Balmela" in the village. The activities comprised exhibition, demonstration, activities, and games all focusing on environmental sanitation, hygiene and earthquake safe construction practices. The entire village and three nearby villages participated.

- The Balmela had a very positive impact on the participation by the community in the programs planned and carried out later, because of their involvement in rehabilitation.
- The school enrollment increased to a great extent because of increased awareness amongst the backward class and artisans, who previously did not send their wards to school.



Balmela in the village

Lessons Learned:

- Involving the community in the rehabilitation using vernacular materials known to them is economical as well as it gives a sense of pride to the community.
- While the physical infrastructure of the schools was under construction, the children of the village were being actively addressed through various modes. The activities include awareness generation on environmental sanitation and earthquake safe construction practices through events on special days and involvement of teachers in training programs for exposure to different approaches to teaching and learning.

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教訓

- 学校再建に地域固有の資源を活用したことで、地域と学校が連携し、地域の活性化につながった。
- 学校再建工事が行われている間、地域の子供たちは環境公衆衛生や地震に対して安全な建物などについて学習するなど、様々な活動に参加した。これらの活動は教職員の教育にも影響した。

Earthquake 3 Indonesia

Giwangan State Elementary School

Tegalturi Street, Giwangan Village,
Giwangan District, Yogyakarta

Year Established:

1975

Type of School:

Private

413 students, 52 teachers

Geographical location:

coastal plain area



Map of Indonesia and of Yogyakarta City

Background: 2006 Yogyakarta Earthquake



Yogyakarta Earthquake Damage in 2006



Giwangan State Elementary School after recovery in 2010

- The earthquake's magnitude of 5.9 on the Richter scale and duration of 52 long seconds, struck the inhabitants of Yogyakarta and Central Java on May 27, unprepared. Occurring at 5:54 in the morning, many people were trapped within their damaged homes and perished in the succeeding 750 incidences of aftershock, claiming more than 5,716 lives and destroying over 240,396 homes, to become the third major calamity to hit Indonesia within 18 months. Subsequent investigations found that the earthquake's epicenter was in the Indian Ocean, south of Bantul district. Fifty-two seconds of violent geological activity initially occurred at a shallow depth of 33 kilometers in the Sunda plate above the subduction zone of the Australian zone. Due to its relatively shallow placement below ground surface, the tremors were more intense than those produced by deeper earthquakes of the same magnitude. This accounts for the intensive damages in the Bantul and Klaten areas.
- The Giwangan State Elementary School stood on Sultanate Ground (SG) and is located directly in Yogyakarta City. It was completely destroyed. Since the earthquake occurred in the early morning, the classes had not started. Therefore no casualties were noted.
- Since the school was completely destroyed, after the earthquake, learning-teaching activities continued to be conducted in emergency tents set up at the school for 120 calendar days; which was the total amount of time for school reconstruction completion.

Prevention, Mitigation, and Recovery Action:

Engaging the Corporate Sector

- The school at that time did not have a recovery plan. The school recovery and reconstruction process was a decision made by the Indonesian Bank Association (PERBANAS) as part of its corporate social responsibility activities. The Giwangan State Elementary School and other elementary school (Kabregan State Elementary School) were chosen due to their strategic location and as well as their status as the core schools in the area.
- PERBANAS chose Giwangan State Elementary School and Kabregan State Elementary School as the focus for its rebuilding effort based on its commitment to fulfill its corporate social responsibility by advancing education in Indonesia. Therefore, certain criteria were established that the chosen schools would have to meet. The selected school is completely destroyed (100%) and has a good record of past performance and the potential for future development, in terms of number of students enrolled and determining if that number was still ideal/feasible for an effective learning-teaching process.

- The reconstruction of Giwangan State Elementary School was launched with a first-stone-laying ceremony on August 28, 2006, led by the Mayor of Yogyakarta City and representative of PERBANAS and was completely rebuilt and transferred to their respective regional governments on March 2, 2007.

- Yogyakarta City Regional Government and Education Office (PEMDA Co-operation and Educational Office), Architectural and Engineering Team of Gadjah Mada University (UGM), School Owner, and the School Committee were involved in the reconstruction and recovery process.



An elementary student took the final exam in the emergency tent

- Local labor was hired in order to empower the local community. Total amount of funds allocated for the two schools was IDR 2,104,459,000 (USD 210,000).
- The recovery has initiated earthquake-resistant building standard of educational facilities.

Lessons Learned:

- Stakeholders from the Corporate Sector can be engaged in school recovery since possible funding is available. In addition, the school committee was involved in all decision making process, ensuring the school's future safety.
- With the new opportunity of reconstruction following building specifications for educational facilities, safety standards are met.
- In rebuilding the school, the local community was engaged, giving them a sense of ownership.

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教訓

- 企業の社会的責任の枠組みで、学校に資金提供を行い、学校再建計画は学校が意思決定権を持ったことで、安全性の高く学校が求める施設が建設された。
- 教育施設の再建に関する新しい安全基準を構築し、その基準を適用した。
- 学校再建に、地域住民が参加したことにより、学校が地域の共通財産となった。

Earthquake 4 Pakistan

Government Girl's Primary School

Northern Balakot

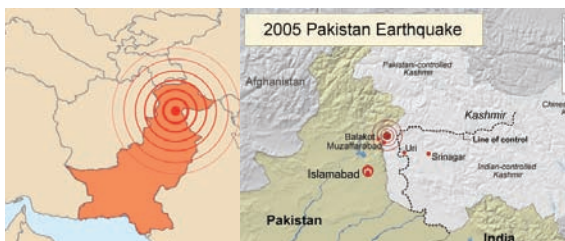
Type of School:

Public

over 200 students

Geographical location:

mountainous region



Map of Pakistan and of Balakot City

Background: 2005 Kashmir Earthquake



In Balakot, survivors pray at a makeshift mosque next to the one destroyed by the earthquake



Reconstructed school in year 2007

- The Northern areas of Pakistan suffered catastrophic damages as a result of the devastating October 2005 earthquakes.
- The earthquake occurred at 08:52 AM on October 8, 2005. It registered a moment magnitude of 7.6. The government of Pakistan's official death toll was 75,000. The severity of the damage caused by the earthquake is attributed to severe upthrust, coupled with poor construction.
- Around 1,200 government and private schools were among the numerous homes and buildings destroyed.
- As a result of earthquake the students were forced to study in tent schools without any proper facilities.

Prevention, Mitigation, and Recovery Action:

Corporate Social Responsibility in Rehabilitation

- The school's construction was started in December 2006 and school building was completed on schedule in July 2007. The school was inaugurated on November 20, 2007 and the building was handed over to the Provincial Education Department through the Earthquake Reconstruction and Rehabilitation Authority. The total cost was USD 170,000.
- Before the disaster the school was operating in a rented building with only two rooms and no other facility. It now consists of eight rooms, two offices and other facilities which helped increase the enrollment from 60 to 200 at present.

- The modern, furnished and earthquake resistance facility was built to accommodate over 200 students. The project was funded by the ICI Pakistan Foundation and employees of ICI Pakistan Group also contributed 1 and 2 days gross salaries to this cause.
- The ICI Pakistan Foundation (a trust made in 1991 to manage and regulate financial support to bona fide health care, education and social welfare organizations) announced scholarship awards for the top three students in each class and pledged the provision of three school teachers' salaries.



An elementary student took the final exam in the emergency tent

Lessons Learned:

- Stakeholders from the Corporate Sector can be engaged in school
- Corporate Social Responsibility plays an important role in the rehabilitation and normalization of the lives of the people affected
- Prior to the quake, enrolment stood at around 60 students but after completion of the new school building parents reacted positively and enrollment rose to 180 students.

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UNHCR/B.Baloch, 2005, Retrieved from <http://www.flickr.com/photos/unhcr/3479155595/>

教訓

- 企業の社会的責任による参画が、学校の建設と地域の再建に大きな役割を果たした。
- 地震前は約 60 名の生徒が通っていたが、新しい校舎が完成した後は、約 180 名の生徒が登録した。

Earthquake 5 Philippines

Dagupan City National High School

Dagupan City, Pangasinan

Established:

1943

Type of School:

Public

Geographical location:

between two rivers



Map of the Philippines and of Pangasinan Province

Background: 1990 Luzon Earthquake



Several areas in Dagupan experienced serious liquefaction



Some roads in Dagupan became unpassable

- An earthquake of 7.8 magnitude on the Richter Scale jolted the Island of Luzon on July 16, 1990, affecting the whole of northern and central Luzon (Regions I, II, III, and Cordillera Autonomous Region) and part of southern Luzon, including Metro Manila. There were 18,337 barangays (villages) in 13 cities and 231 municipalities in 23 provinces that were severely affected. The worst hit cities were Cabanatuan, Baguio, and Dagupan.

- In Dagupan City, about 20 collapsed and about 90 buildings were partially destroyed. Some structures sustained damage because liquefaction caused buildings to sink as much as one meter. The earthquake caused a decrease in the elevation of the city and several areas were flooded. The city suffered 64 casualties of which 17 died and 47 survived. Most injuries were sustained during stampedes at a university building and a theater.

- Among the educational facilities damaged were those of the Pangasinan Maritime Academy, Dagupan Institute of Technology, Luzon Colleges, Pangasinan Universal Institute, Dagupan City National High School (DCNHS), and others. The Lyceum Northwestern and University of Pangasinan suffered cracks, but school officials said the damage was minor.

- Overall, in terms of the number of fatalities, the 1990 Luzon Earthquake ranks fourth among all the natural disasters that occurred in the Philippines since 1901, with 2,412 persons dead. A total of 1.73 million persons were affected.

Prevention, Mitigation, and Recovery Action:

Commemorating the Anniversary of the July 16, 1990 Earthquake

- As the killer quake hit at 4:26 in the afternoon, some classes were still ongoing at the Dagupan City National High School during that time. For 47 seconds, thousands of panic-stricken teachers and students scammed out of swaying school buildings in a mad dash for safety. The magnitude 7.8 tremors caused major damage to nearly all structures in the school premises.
- But since education is very important, its flow must be kept unhampered. So, while aftershocks were still occurring at regular intervals, frantic efforts of reconstruction began. The school campus was cleared of debris and slightly damaged classrooms were prepared to accommodate returning students. To ease the serious lack of classrooms, army field tents were put up and were used as temporary classrooms and construction

of makeshift schoolhouses were rushed. As funds became available, condemned structures were torn down for new and permanent facilities. Slowly and painfully, the road to full recovery began. The wounds left by that killer quake have already healed and the scars have disappeared.

- Since then, earthquake drills had been carried out in all public and private elementary and secondary schools in Dagupan in observance of the July 16, 1990 earthquake. DCNHS is one of the actively participating schools. As former secretary of the Department of Environment and Natural Resources, Fulgencio S. Factoran, Jr., put it, "To have learned nothing from the tragic events of July 16 would be callousness of the highest degree. To have done nothing to develop strategies to prevent injury and damage should another earthquake occur would be irresponsibility of the most serious proportions."



DCNHS holds an earthquake drill every year

Lessons Learned:

- It is important to keep on remembering the lessons from past disasters so that the people will continually be alert and prepared for future emergencies.
- Commemorative activities allow young students who were not yet born when the 1990 Luzon Earthquake happened to know about the disaster and be able to contribute to and participate in disaster preparedness and emergency response.

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教訓

- 過去の災害からの教訓は、将来の災害対応力につながっている。
- ルソン島地震の後に生まれた生徒が、災害について学んでいたことで防災対策と緊急対応力が向上しており、災害時に的確に行動することができた。

Earthquake 6 Taiwan

Tong-Lin Elementary School

Tong-Lin Village, Wufeng District,

Established:

1950

Type of School:

Public

91 students, 14 teachers

Geographical location:

on a mountain



Map of the Taiwan and of Taichung City

Background: 1999 Chi-Chi Earthquake



Piles of debris near Tong-Lin Elementary School



Damage to a building of Tong-Lin Elementary School

- At 01:47 AM on September 21, 1999, the central part of Taiwan was struck by a 7.6 magnitude earthquake. The resulting loss of life and damage to property put it among the worst natural disasters of the past century in Taiwan.
- The seismic moment was 10 times that of the 1995 Kobe, Japan earthquake and there were more than 10,000 aftershocks, including three of magnitude 6.8 and one of magnitude 6.5, all of which triggered strong ground motions resulting in damaged schools, residences, dams, embankments, and bridges. The government estimated that the total reconstruction would likely cost USD 150 million.
- Ground subsidence also contributed to bridge damage at a few locations including Wufeng area. In Wufeng, there were heavy losses to public facilities and schools. Two elementary schools and one junior high school were totally destroyed and affected 1,208 students.
- There were 6 classes with 102 students in Tong-Lin Elementary School in a mountain area in Wufeng. Since the earthquake happened before daybreak and no students were in school at that time, no one was injured. However, the main building housing 14 classrooms was totally damaged and was demolished after the earthquake.
- The Government estimated that the total reconstruction will likely cost USD 1.6 million in two years. During the period of reconstruction, some students took class in 10 temporary combination houses while others were distributed to the nearby Ji-Feng Elementary School, taking courses in the stairways.

Prevention, Mitigation, and Recovery Action:

Quick Campus Reconstruction after the Disaster

- After the earthquake, students were sent to a neighboring school, Ji-Feng Elementary School, for 5 weeks. The temporary constructed classrooms were completed within 50 days after the earthquake and all the students were able to return to their original school.
- The Ministry of Education put up capital to build simply constructed classrooms. Ten classrooms and two restrooms were constructed from October 16, 1999 to November 8, 1999.

- The Taiwan Red Cross committed to financially support the reconstruction and Tzu Chi Foundation rebuilt the new campus. The work began from August 10, 2000 to August 27, 2001. It took one year to complete the construction. New buildings were constructed with steel and with a seismic design to make sure students would have a safe and comfortable place to study.
- Using lessons learned from the earthquake, Tong-Lin has now continually included disaster education classes in the school curriculum for different grade students. The courses consist of: (1) Using the evacuation instruction and preparing emergency bags, (2) Learning the mechanism of seismic activity from the fault causing Chi-Chi earthquake and disaster, and (3) Learning the building construction quality related to earthquake in terms of safety of buildings.



The new campus completed in 2001

Lessons Learned:

- During the two-year rebuilding effort, students and teachers felt grateful for the help provided by society.
- After the school was struck by an earthquake, students and teachers realized the necessity for disaster education.
- Students and teachers involved in cleaning up the campus realized the necessity for disaster prevention, reduction, mitigation, and recovery efforts.

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<http://www.tles.tcc.edu.tw/frame1.htm>

Tzu Chi Foundation, at
<http://www2.tzuchi.org.tw/921/book/15tles-tcc/index.htm>

教訓

- 災害後のがれき撤去を通じて、防災教育と防災対策の必要性を理解した。
- 2年の復興期間に、生徒と教職員は、地域コミュニティの重要性を再確認した
- 災害を経験したことで、防災教育の重要性が明らかになった。

P.S. High School (North)

Mylapore, Chennai

Established:

1916

Type of School:

Public

447 students, 20 teachers

Geographical location:

coastal area



Map of India and of Chennai

Background: 2004 Indian Ocean Tsunami



Destroyed Marina Beach, Chennai



P.S. High School (North), Chennai

- On December 26, 2004, a magnitude 9.1 earthquake in the Indian Ocean caused a tsunami wave which was responsible for the death of more than 230,000 people in 14 countries.
- In India, 10,749 casualties were reported and most of them were living in the State of Tamil Nadu (7,960). In addition, half a million of people evacuated and 310,000 refugees were caused due to this disaster. In Chennai itself, 206 people lost their lives.
- The total damages (short- and long-term) in the State of Tamil Nadu are estimated at USD 868 million. The biggest share amounted in the housing (USD 329 million) and fisheries (USD 229 million) sectors.
- The Government of India provided financial assistance of 100,000 Indian Rupees (USD 2,000) to the next of kin of each deceased. The same amount was provided to families of each deceased person by the State Government of Tamil Nadu.
- The presented school was not directly affected by the tsunami wave, but at 34 of its pupils' houses damages were recorded, indicating the vicinity of the school to the affected area.
- Accordingly, a large number of students were paralyzed due to the massive devastation and chaos caused by the tsunami.

Prevention, Mitigation, and Recovery Action:

Disaster Education at Schools

- In the aftermath of the deadly tsunami, Disaster Management was mainstreamed as a subject to be taught at public schools in Tamil Nadu and took effect by 2005.
- In the P.S. High School (North) in Chennai, disaster education is now taught in science classes of the standards 6-10.
- A science exhibition organized by the Tamil Nadu State Government in 2008, brought the P.S. High School as a winner for the Chennai District where a model was presented on how to explain to school children the impacts of a tsunami.

- Further activities at the P.S. High School (North) include programs of tree planting and town watching supported by the United Nations International Strategy on Disaster Reduction (UNISDR), the Madras University (local university), and Kyoto University (Japan). These programs took place in 2008.
- Today, disaster education is continuously taught at this school to sensitize students about potential disasters. This is still done in cooperation with Madras University.



Demonstration of an occurring tsunami (model)

Lessons Learned:

- The consequences of this tsunami were felt beyond physical damages on properties, but much more caused, particularly children to be paralyzed due to it.
- Disaster Management was started as an individual subject in science classes.
- Disaster education is crucial to be taught as school children are valuable transmitters to their wider communities.

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Tamil Nadu Government, at <http://www.tn.gov.in/tsunami/>

教訓

- 津波被害は、社会基盤だけでなく教育システムに大きく影響を与えた。
- 災害後に防災教育は理科教育の一環として取り組みが始まった。
- 学校における生徒への防災教育を通じて、地域の防災教育に影響を与えることが明らかになった。

Tsunami 2 Indonesia

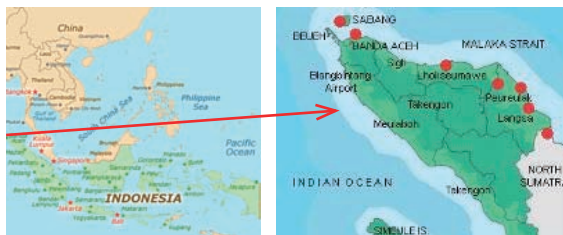
SDN 81 Banda Aceh School

Banda Aceh City, Aceh

Established:
in 1980s

Type of School:
Public
200 students and teachers

Geographical location:
2 km from the coast



Map of Indonesia and Banda Aceh

Background: 2004 Indian Ocean Tsunami



The devastated area of SDN 81 Tibang, Aceh



SDN 81 Tibang, Aceh

- The December 26, 2004 the Indian Ocean Tsunami had caused unimaginable devastation to Aceh, Indonesia. It was the most powerful disaster the world has seen in a generation. Forty-five minutes later after the mega-thrust earthquake, the tsunami wave hit Aceh and within minutes it swept clean an 800 km coastal strip of Aceh – equivalent to the coastline from San Francisco to San Diego. Approximately 130,000 people were killed and 37,000 remain missing. In the education sector, the disaster had caused the casualties of 2,500 teaching and non-teaching staff and had damaged almost 2,000 schools and around 150,000 students lost their education facilities.
- Since the SDN 81 Tibang is located only two kilometers from the coast, the school building was completely destroyed and swept away by the big waves of the tsunami. It caused the casualties of students and teachers, of which 62 students survived.
- The classes were suddenly interrupted. The school children and the teachers were evacuated to a safer place. The school education was performed in an emergency manner. Some of the classes were conducted in emergency shelter and temporary classes and some classes were conducted in open ground. The school children and the teachers of SDN 81 Tibang, Banda Aceh conducted and resumed the school education by every means that they could possibly think of.

Prevention, Mitigation, and Recovery Action:

Build Back Better Hand in Hand with International Donors

- SDN 81 Tibang was built using Allianz Germany employees' donation of 210,000 Euro and with Allianz Indonesia as the facilitator. In the wake of the disaster, Allianz also provided initial relief for victims via the Indonesian National Commission for Child Protection and initiated a water purifying project in partnership with some local and international NGOs.
- In 2005, the Allianz Group in cooperation with the German Agency for Technical Cooperation (GTZ) constructed a school in Tibang village, Banda Aceh. The old school had been completely destroyed by the tsunami. Allianz employees worldwide donated money to fund the school construction project. Staff of Allianz Indonesia identified, coordinated, and monitored the project. Thus, initial decision was made through the initiative of an international donor, who saw the urgency to support Acehnese schools.

- The school rebuilding process commenced directly in the beginning of 2005 and it was accomplished one year later, in January 2006.
- Aside from Allianz Germany and Indonesia, a national commission (National Commission for Child Protection) and a bilateral technical cooperation (Indonesian-German Technical Cooperation, GTZ) were involved in the recovery and reconstruction process.
- With six classrooms, a library, a prayer house (Musholla), a ritual cleaning place, and a school guardian house, the school provides basic community support. Two of the classrooms are linked and can be used as a community assembly room, and in the event of extreme weather conditions, the second storey can be used as a shelter for up to 900 people.
- In addition to the essential role as a project coordinator, employees of Allianz Indonesia have volunteered to become foster parents of Tibang's schoolchildren. As foster parents, every year employees sponsor textbooks, uniforms, and school supplies, as an effort of supporting the continuation of students' education, especially in disaster education.



Learning-teaching activity of SDN 81 Tibang, Aceh in temporary school

Lessons Learned:

- The recovery process cemented a bond between the students, teachers, and donors.
- Along with the newly built school, a new education perspective, especially for disaster, is strengthened.
- By the provision of a community assembly room in the school area, it allows mutual attachment of school and community education.

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教訓

- 復興プロセスによって、生徒と教職員、資金提供者とのつながりが深まった。
- 新しい学校施設を通じて、新たな防災教育システムが構築された。
- 学校内に地域の集会所が設置されたことで、学校と地域の交流が深まった。

Tsunami 3 Japan

Toni Elementary School

Toni Town, Kamaishi City, Iwate

Established:

1873

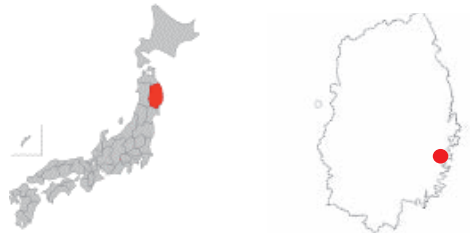
Type of School:

Public

68 students, 14 teachers (March 2011)

Geographical location:

coastal area



Map of Japan and of Iwate Prefecture

Background: 2011 East Japan Earthquake and Tsunami



Damage at the Toni Elementary School



Damage at the Toni Elementary School

- On March 11, the Great East Japan Earthquake (magnitude 9.0) and Tsunami occurred. More than 15,000 died and number of the missing persons is more than 3,400 (December 2011).
- Toni Elementary School is located at the coastal area (about 100 m from the sea). There is a coastal levee between the sea and the school. The height of the coastal levee is about 12 m. It was constructed in 1999.
- In Kamaishi City, the height of tsunami reached about 10 m and the coastal area was destroyed. In Toni Town, the tsunami overcame the coastal levee. As a result, Toni Elementary School was flooded up to ceiling of the third floor. When the earthquake happened, about 70 students were in the school. But there was no victim because they immediately evacuated to a shrine located on a hill behind the school.
- The school building was destroyed by the tsunami, leaving only the outer frames. So, it is impossible to use the building.
- After the disaster, students went to another school located in the neighboring town. According to the government of Kamaishi City, a temporary school building will be constructed in another place in Toni Town in the autumn.

Prevention, Mitigation, and Recovery Action:

The role and recovery plan of educational facilities

- The Kamaishi City Education Committee considers constructing a new school in Toni Town. According to the plan, Toni Elementary School and Toni Junior High School will be integrated with the community center, feeding center, and children's hall.
- People worry that if elementary school and junior high school are not integrated on this occasion, the school will disappear in Toni because the number of children is decreasing. People are thinking that the school and children are the source of vigor in Toni.

- People feel the need to build a memorial hall or memorial room of the tsunami in Toni Town. It is the afflicted people's mission to pass on memory and experiences of the tsunami to the next generation. Therefore, it is better to build it.



Damage at Toni town

Lessons Learned:

- During disaster happens, teachers must decide on the behavior of students immediately.
- In the disaster drill, students evacuated to a shrine on a hill behind the school in order (first in line were 1st grade students, last in line were 6th grade students). But, this method was not good for evacuation. As a lesson, teachers decided to change the evacuation method on March 11, 2011 by reversing the order of students in line. As a result, students could evacuate smoothly.
- Educational facility must be safe. Actually, so many schools were destroyed by the earthquake and tsunami. We have to construct safe schools to protect people.

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Kamaishi City Education Committee, at <http://www.city.kamaishi.iwate.jp/index.cfm/10,0,109,html>

Saigaitaisaku Honbu (Disaster headquarters), at <http://www.city.kamaishi.iwate.jp/saigai/index.html>

Toni Junior High School. 2010. Toni Junior High School Guide 2010

Reconstruction Headquarters in Response to the Great East Japan Earthquake, at <http://www.reconstruction.go.jp/>

教訓

- 災害が発生後、教職員は直ちに児童・生徒の避難行動を決定しなければならない。
- 避難訓練では、低学年から高学年の順番で移動していたが、先頭部が停滞するという課題があったため、3月11日は高学年から低学年の順番で避難したため、円滑に移動することができた。
- 学校施設は地域の重要な社会基盤であり、学校施設が設置される場所の安全性を確保することは重要な課題点である。

Tsunami 4 Japan

Yuriage Elementary School

Natori, Miyagi

Established:

1873

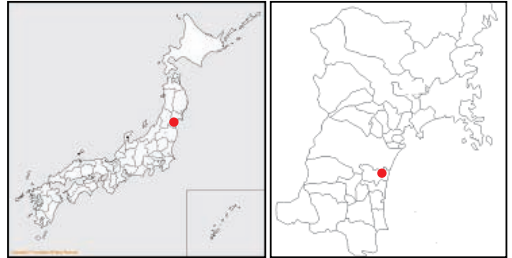
Type of School:

Public

229 students (May 2011)

Geographical location:

coastal area



Map of Japan and of Miyagi Prefecture

Background: 2011 East Japan Earthquake and Tsunami



Tsunami at the Yuriage Elementary School

- On March 11, the Great East Japan Earthquake (magnitude 9.0) and Tsunami occurred. More than 15,000 died and number of the missing persons is more than 3,400 (December 2011).
- In Natori City, the height of tsunami reached about 9 m and the coastal area was destroyed. Yuriage Elementary School and Yuriage Junior High School (which stood about 2 km from the sea) were flooded up to the first floor and many local people evacuated to the second and third floors. 14 students died in these schools.
- Immediately after the earthquake, the electric power was cut off and the wireless station for disaster prevention was not working well. That was why the methodology to get tsunami information was limited. Although teachers of Yuriage Elementary School got information by portable radio, teachers of Yuriage Junior High School didn't get information.
- After the earthquake some parents picked up their children. However, because a tsunami warning was announced, Yuriage Elementary School didn't allow the parents to pick up their children. Owing to this, all of the students who were in school at that time survived. On the other hand, some neighboring schools permitted students to go with their parents. A parent and child died on their way.
- On April 21, the class of Yuriage Elementary School was resumed in Fujigaoka Elementary School, located at the central area of Natori City. A pick up bus was utilized because many students lost their house and moved to various areas. About 70 students relocated.

Prevention, Mitigation, and Recovery Action:

The role and recovery plan of educational facilities

- 8 schools are used as official evacuation place in Natori City.
- The Natori City Education Committee considered continuing the operation of both Yuriage Elementary and Junior High Schools. Because they regarded the role of school facilities for local people as base of community (concretely, the heart and soul for local people and place for communication) and for children as place to overcome hardships in the company of friends who had same the experience. In addition, residents mentioned "children are our treasure and hope for the future."
- The recovery of education facilities in Yuriage was discussed and a recovery plan was drawn up. The place for building educational facilities was focused on. During the 8th Mirai-kaigi on August 21 (a conference organized

by Natori City to make sure that the revival plan reflected the residents' opinion), a new central area of Yuriage was suggested. This area would consist of educational facilities and other public buildings like the public hall and firehouse to increase the efficiency of disaster measures and allow children to interact with various generations.



Tsunami at Yuriage

Lessons Learned:

- As preparedness against a tsunami disaster, equipment like radio should be installed to get tsunami information when electricity is cut off, a standard operating procedure (SOP) for parents picking up their children before and after a tsunami must be established, and disaster training involving the community must be conducted.
- During a disaster, the school head should not be confused need to take immediate decisions based on disaster training.
- Educational facilities serve local people not only as evacuation center during disasters but as base of the community. Recovery of educational facilities is essential for the recovery of the city. Location of educational facilities highly affects the recovery of the city.

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Natori City: The 8th Mirai-kaigi
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http://www.city.natori.miyagi.jp/soshiki/kensetsu/fukkou/node_11840/node_13486

Yuriage Elementary School
 Available at
<http://academic4.plala.or.jp/yuriagee/>

Yuriage Junior High School
 Available at
<http://academic4.plala.or.jp/yuri-jhs/index.html>

教訓

- 津波災害からの教訓として、学校にラジオ等の災害時に情報を得る道具等を準備すること、児童・生徒を保護者へ引き渡す際の基準を設置すること、地域と協働した防災訓練を実施することなどが明らかになった。
- 校長の意思決定によって、緊急時の対応が円滑に行われる。
- 学校施設は地域の避難場所だけでなく、地域の重要な社会基盤であるため、学校施設の復旧が地域の復旧と深く関連している。

Tsunami 5 Japan

Arahama Elementary School

Wakabayashi Area, Sendai City, Miyagi

Established:
1873

Type of School:
Public
94 students, 16 teachers (March 2011)

Geographical location:
coastal area

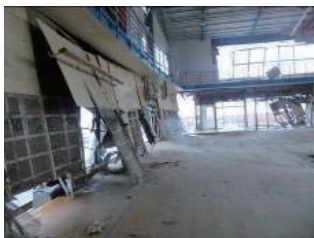


Map of Japan and of Miyagi Prefecture

Background: 2011 East Japan Earthquake and Tsunami



Damage to Arahama Elementary School



Damage to the gymnasium

- On March 11, the Great East Japan Earthquake (magnitude 9.0) and Tsunami occurred. More than 15,000 died and number of the missing persons is more than 3,400 (December 2011).
- In Natori City, the height of tsunami reached about 9 m and the coastal area was destroyed. Yuriage Elementary School and Yuriage Junior High School (which stood about 2 km from the sea) were flooded up to the first floor and many local people evacuated to the second and third floors. 14 students died in these schools.
- Immediately after the earthquake, the electric power was cut off and the wireless station for disaster prevention was not working well. That was why the methodology to get tsunami information was limited. Although teachers of Yuriage Elementary School got information by portable radio, teachers of Yuriage Junior High School didn't get information.
- After the earthquake some parents picked up their children. However, because a tsunami warning was announced, Yuriage Elementary School didn't allow the parents to pick up their children. Owing to this, all of the students who were in school at that time survived. On the other hand, some neighboring schools permitted students to go with their parents. A parent and child died on their way.
- On April 21, the class of Yuriage Elementary School was resumed in Fujigaoka Elementary School, located at the central area of Natori City. A pick up bus was utilized because many students lost their house and moved to various areas. About 70 students relocated.

Prevention, Mitigation, and Recovery Action:

The role and recovery plan of educational facilities

- Earthquake and tsunami evacuation drills were conducted every year on June 12 (date of the 1978 Miyagi Oki Earthquake) in the school and the community.
- Local community has high interest in school and education and has a strong communication within the school. Community members formed a local safety volunteer group and participation in the local festival (Arahama Festival).
- On February 27, 2010, the Chile Earthquake and Tsunami occurred, which triggered a review of tsunami warning system and disaster management plan. Thinking of the time required to evacuate to the designated evacuation center (4 km away), the school decided to take shelter in the building itself. Emergency food was

stored for 800 people and it was kept on the 3rd floor.

- Local community members usually enter the school during the emergency drill and are well versed with the structure and function of the school. This has a strong implication on people's behavior during the disaster.
- Earlier, since Arahama ES was located in the coastal area, during the evacuation drill, students used to take shelter on the roof because the area was prone to tsunami. However, the temporary school (Higahi Miyagino ES) is away from the coast and, therefore, during the evacuation drill, students usually take shelter in the playground (considering earthquake hazard).
- In comprehensive learning program, specific emphasis is given on "safety," where students are urged to develop self-thinking, self-behavior in a specific time and space, given a specific set of conditions.

Early Warning System in school



Lessons Learned:

- Arahama ES became the shelter in time of disaster. The evacuation shelter was very effective with strong participation of the local community.
- Currently, the affected people are living in different areas in temporary housing or rented apartments. Thus the students are spread over a vast area, which has logistic issues (in terms of arranging school bus for commuting) as well as community cohesion and relation issue.
- Education in emergency time becomes one of the key important elements. Although there were some initial obstacles, the school was able to restart the education soon.

教訓

- 荒浜小学校は、地域の代表者の協力を得たことで避難所運営を円滑に行うことができた。
- 住民が数カ所の仮設住宅へ移転したため、地域のつながりを維持することやスクールバス等の学校運営に課題が生じている。
- 被災後多少の課題が存在していても、早期に学校を再開させることが教育の持続可能性につながる。

Tsunami 6 Sri Lanka

Akurala Junior School

Akurala, Ambalangoda

Type of School:

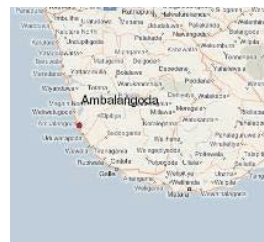
Public

100 students, 12 teachers

Geographical location:

coastal belt, 70 km

away from the capital Colombo



Map of Sri Lanka and of Ambalangoda City

Background: 2004 Indian Ocean Tsunami



School damaged after it was hit by the tsunami



Relocated and newly built three-storey building

- The December 26, 2004 Indian Ocean Tsunami caused severe damages to the coastal communities in twelve of the fourteen coastal districts of Sri Lanka, including Galle where Akurala Junior School is located. It was the worst disaster in Sri Lankan history. Seawater penetrated from tens to hundreds of meters inland, killer waves as high as six meters crashed into villages and drained away within 30 minutes, sweeping away people, property, and even a train with 1,700 passengers.

- Akurala Junior School, situated in the coastal belt of Southern Sri Lanka, was also damaged due to the tsunami waves. Fortunately, since this happened during the school vacation, no students or staff members were there at the premises.

- But several of them died or were injured outside the school. The school buildings were severely damaged and some had collapsed. Furniture and other equipment were washed off to the sea or were broken.

- When the school reopened after several weeks the building was not in a proper state of occupancy due to the damage and vulnerable status of the school and the psychological impacts to the survivors.

Prevention, Mitigation, and Recovery Action:

Creating a Safe Environment to Learn: Stakeholder Involvement

- The government with the help of the local authorities, NGOs, and international donors took necessary actions to reconstruct the damaged buildings and provide necessary resources. The recovery strategies included uplifting the lives of victims through material donations and providing services such as health care and psychological support to help them cope with post-tsunami trauma. The government, local and international NGOs, and community organizations extended their full support.
- Parents of the students as well as teachers felt that the need for disaster safety is essential for an effective learning environment and all made a request to the authorities. Meanwhile, the government took a decision

to make the immediate coastal belt free of any new buildings. Recognizing the need of locating schools in tsunami-safe zone to reduce vulnerability of the school community, the Provincial Education Authorities relocated the school 2 km inland. The international donors provided this school with new buildings with spacious classrooms, upgraded sanitation services, and furnished them with school supplies such as desks. Several organizations donated school books and accessories. This was completed in six months. The stakeholders were students, parents, teachers, local educational authorities, Ministry of Education, and international donors.



Awareness programs on disaster mitigation for school children

- Now the students are being educated about the disasters, preparedness, and mitigation measures that include drills and first aid in an emergency. Evacuation routes are being familiarized and when a disaster occurs the students are requested to evacuate the premises and rush to a safe emergency camp at Galdoowa Monastery. They are emotionally satisfied with the new location and with regaining of the facilities lost.

Lessons Learned:

- Authorities and all stakeholders should take collective actions to provide a safe learning environment to students. This should include building schools in safe areas, providing the students with necessary information and building capacity to mitigate adverse impacts of disasters.

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Official website of Disaster Management Centre, Sri Lanka: www.dmc.lk

教訓

- 役所や様々な利害関係者の協力により、安全な場所に学校を設置、学習に必要な情報の整備、防災訓練などの実施を通じて、児童・生徒が安心して学べる環境を整えることが重要である。

Volcanic Eruption 1 Indonesia

SD Negeri Sewukan School

Dukun Sub-district, Magelang, Central Java Province

Established:

1980's

Type of School:

Public

276 students, 17 teachers

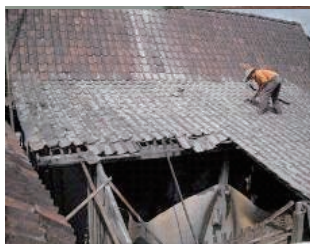
Geographical location:

slope of a mountain



Map of Indonesia and of Yogyakarta City

Background: 2010 Eruptions of Mount Merapi



Roof and building damage due to Merapi Eruption in 2010



SD Negeri Sewukan after it was rehabilitated

- In late October 2010, the eruptions of Merapi Volcano in Central Java, Indonesia began, following an increasingly violent series of eruptions that continued into November. Seismic activity around the volcano increased from mid-September onwards, culminating in repeated outbursts of lava and ashes. Large eruption columns formed, causing numerous pyroclastic flows down the heavily populated slopes of the volcano. Merapi's eruption was said by authorities to be the largest since the 1870s. Over 350,000 people were evacuated from the affected area. However, many remained behind or returned to their homes while the eruptions were continuing. As of November 2, 2010, the Ministry of Health had noted 42 casualties during the eruptions, many as a result of pyroclastic flows. The ash plumes from the volcano caused major disruption to aviation across Java as well. The mountain continued to erupt until November 30, 2010. On December 3, 2010 the official alert status was reduced to level 3, from level 4, as the eruptive activity had subsided.
- The school of SD Negeri Sewukan is located on the slope of Merapi Volcano. Although there are no casualties reported, 8 out of 12 classrooms were heavily buried under the volcanic ashes.
- The learning-teaching activity was interrupted since many classrooms are damaged by the ashes. Different classes were joined together and had caused disturbance as well as narrowness of study spaces among students and teachers.

Prevention, Mitigation, and Recovery Action:

Teacher-Led School and Community Empowerment

- Seeing the bad learning-teaching condition, the teachers looked for support for the rehabilitation of the classrooms, which at the latter stage could smoothen the school recovery process.
- The teachers, in seeking the recovery of the school's classrooms, obtained generous donation of IDR 100 million (USD 10,000) from the local bank as well as IDR 30 million (USD 3,000) from the community.

- In total, it took 90 days to have complete classrooms fully functional as before the disaster.
- Overall, the stakeholders involved were mainly the school principal, teachers, community, as well as local donors from the private sector who wanted to see that the education in the area was continued and that their children's education was sustained.
- The repair of the classrooms had taken human resources, which came from local labor, as well as financial sources that enabled the learning-teaching activity on its path again.
- Although there are no certain guidelines for school recovery due to volcanic eruption, but the school, supported by families and communities, agreed to strengthened volcanic disaster awareness and preparedness.



Some classrooms of SD Negeri Sewukan were used as community temporary shelter for a few days

Lessons Learned:

- Teachers can be a gear in initiating the school recovery process, resulting to the empowerment of the school and community.
- Due to this disaster, the school and community have established a strong bond. In time of disaster, the school can offer spaces for community temporary shelter. In turn, the community is willing to lend a hand by voluntarily donating money for the school rehabilitation.

REFERENCES:

Tribun Jateng. 2011. Lilik senang punya ruang kelas baru. Lilik is happy to have new classrooms.
<http://jateng.tribunnews.com/2011/06/15/lilik-senang-punya-ruang-kelas-baru>

World Health Organization (WHO). 2010. Mt. Merapi Volcano Eruption, Central Java Province, Republic of Indonesia. Emergency Situation Report ESR (4)2 November 2010. Emergency and Humanitarian Action (EHA), WHO Indonesia.

教訓

- 教職員は、復興プロセスにおける学校と地域の連携に大きな役割を果たした。
- 緊急時に学校が避難場所になったという地域貢献から、学校の再建に地域の人々から時間や経費等の支援があり、学校と地域の連携が深まった。

Volcanic Eruption 2 Japan

Oonokiba Elementary School

Minamishimabara, Nagasaki

Established:

1886

Type of School:

Public

124 students, 14 teachers (April, 2011)

Geographical location:

at the foot of a volcano



Map of Japan and of Nagasaki Prefecture

Background: 1991 Eruption of the Unzen Fugen Volcano



Volcanic eruption at Mount Unzen-Fugendake
An area completely destroyed by lava flow and the school covered with volcanic ash
The school surrounded by smoke

- On June 3, 1991 at around 4 p.m., a large flow of lava occurred in Unzen Fugendake in Shimabara in Nagasaki prefecture in Japan. The lava flow resulted in 40 deaths, 3 missing persons, and 9 injuries (among them 6 local residents). From June 7, the residential area was designated as restricted area.
- On September 9, the school at the foot of the volcano was burned by the lava flow. Luckily, because all the students, teachers, and local residents had been evacuated, there was no harm to human life.
- The lava flow from the volcano continued until 1995. In all there were 41 deaths, 3 missing persons, 12 injuries, and 2,511 damaged buildings.
- According to the administration, because the area where the school was located was designated as a restricted zone, local children and students were forced to become refugees and change schools. There was a large impact on the school's educational function.
- In 1995, the volcanic activity returned to normal level and in the following year the restricted area status was lifted from the town areas. In total, the restricted area status was in effect for 5 years and 9 months. Even now, there is still volcanic activity and because there is danger of lava flow, the Unzen Reconstruction Office managed by the Ministry of Land, Infrastructure, Transport, and Tourism conducts constant monitoring.

Prevention, Mitigation, and Recovery Action:

Affected School for Disaster Education and Local Memory

- In 1992, an erosion control dam construction was planned in the area of the school that was completely burned by the lava flow. Due to this, the possibility arose that the school would have to be demolished. Although, through signature collection of the residents who "wanted to leave the school standing at the place that was a foundation for the heart of the area" in 1993, the residents presented a request to the town with 1,078 signatures. Moved by the enthusiasm of the town, the Ministry of Construction at the time changed the plan for the erosion control dam in order to preserve the school.

- Now, the former Oonokiba Elementary School building has been preserved as is, and has become a focus for the area's disaster prevention education, born from the awe of this disaster and ferociousness of natural disasters. In addition, next to the former elementary school, an area to view the landslide and volcanic damage has been established.
- As part of a disaster countermeasure plan, the federal government constructed a forest saving dam and an erosion control dam and rebuilt a new elementary school close to the location of the former school building. In addition, every year at the school a "memorial day" is held on the day that the former school burned and presentations about natural disasters and lectures by people who experienced disaster are held in addition to disaster prevention activities by the federal government. The goals of these activities are to make sure that the lessons learned during the volcanic eruption will be passed down to younger generations and that they are never forgotten.



Students from other prefecture at the preserved school

Lessons Learned:

- The residents, who "wanted to leave the school standing at the place that was a foundation for the heart of the area" find the school to be essential. Their enthusiasm guided the preservation of the burned school and the school now performs an important function in connecting the region.
- The preservation of the former school, which was destroyed through the natural disaster, is an effective means to pass on knowledge about this disaster and disasters in general and a way to convey to children what exactly a disaster is.

教訓

- 被災した校舎を復興の象徴として保存することで、学校と地域の間に新たな関係性が生まれた。
- 被災した校舎の保存は、災害の教訓を次の世代へ伝承すること、また地域外の人々の防災意識の向上に貢献している。

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Volcanic Eruption 3 Philippines

Travesia Elementary School

Guinobatan, Albay

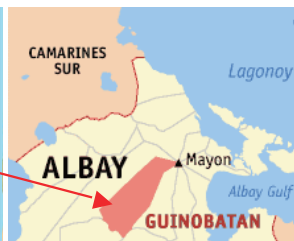
Type of School:

Public,

1,174 students, 33 teachers (2010-2011)

Geographical location:

near Mayon Volcano



Map of the Philippines and of Albay province

Background: 2009 Mayon Volcanic Eruption



Lava cascading down the slopes of Mt. Mayon



Children riding a military vehicle to the evacuation center

- Mount Mayon is located in the province of Albay, in the Bicol Region, on the island of Luzon, in the Philippines. It is renowned because of its almost symmetrically conical shape. Mt. Mayon is the most active volcano in the Philippines, having erupted 50 times in the past 400 years.
- On December 17, 2009, due to increased volcanic activity in the past few months, the Provincial Disaster Coordinating Council (PDCC) of Albay declared the entire province under a State of Calamity. During the Mayon Volcano operations, 45 schools were designated as evacuation centers: 21 in Albay province, 11 in Legazpi City, 6 in Ligao City, and 7 in Tabaco City. Around ten thousand families or 50,000 persons were evacuated.
- Classes in all schools within the 8-kilometer radius of Mayon were suspended and school authorities were advised to devise scheduling and shifting strategies that would enable pupils using these evacuation classrooms to revert to regular classes as soon as possible and for the evacuee pupils to hold classes within the premises of the evacuation school. This was to minimize disruption in classes particularly given that the evacuation period for Mayon eruption was expected to last for several weeks. Displaced teachers from affected schools were tapped to assist the teachers in the host schools.
- It was recommended that in order to assist the people staying at the evacuation centers, adequate and appropriate relief support for at least 4 months should be ensured and that health and sanitation support needed to maintain a safe evacuation center should be sustained.

Prevention, Mitigation, and Recovery Action:

Pre-emptive Evacuation for Zero Casualty

- On November 13, 2009, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) raised the Alert Level to 3 (in a scale of 0 to 5, 0 being quiet and 5 signifying that a hazardous eruption is ongoing). The provincial government of Albay quickly responded with pre-emptive evacuation (one-step ahead of the warning level). When Alert Level 4 was raised on December 14 and minor eruptions started on December 21, 100% of vulnerable families were already evacuated to evacuation centers like the Travesia Elementary School.

- Although expensive, pre-emptive evacuation remains as Albay's disaster mitigation strategy for Mayon in order to achieve zero casualty. There is no other alternative to pre-emptive evacuation when it comes to volcanic eruption: distance is key and evacuation is the means. This strategy had been put to the test: When the volcano last erupted, in 2006, 30,000 people were moved to safety and no lives were lost. The approach drew on lessons from a 1993 eruption, which killed at least 77 people. Most of those who perished had refused to leave the danger zone, preferring to stay and protect their crops, livestock, and other possessions from looters.



Soup and bread for children evacuees at Travesia ES

- In a letter to Albay Governor Joey Salceda dated February 18, 2010, UNDP Country Director Renaud Meyer congratulated Salceda for his excellent handling of the 2009 Mayon eruption emergency. "Your pre-emptive evacuation strategy and preparedness resulting in 'zero casualty' is a solid example of good governance in disaster risk management," Meyer said.

Lessons Learned:

- Pre-emptive evacuation has become a proven instrument to save lives and thwart casualties in disasters. There had been zero casualty in the Mayon volcanic eruptions in 2000, 2001, 2006, and 2009.
- Since evacuation due to volcanic eruptions can be protracted (lasting up to several weeks), continuity of education must be planned and the psychosocial needs to children should be addressed.

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教訓

- 防災教育と事前避難によって、2000、2001、2006、2009年のマヨン火山噴火では犠牲者が0であった。
- 火山災害による避難は、長期間にわたることが予測され、教育の持続可能性について計画をすることと、また、子供の精神的ケアが重要となる。

Sekolah Kebangsaan Pulau Beluru School

Kg Pulau Beluru, Palekbang, 16040 Tumpat, Kelantan

Year Established:

1957

Type of School:

Public

381 students, 30 teachers

Geographical location:

an island on the river



Map of Malaysia and of Kelantan state

Background: 2009 Kelantan Flood



Flooding in front of Sekolah Kebangsaan Pulau Beluru



Around 2,000 people evacuated during the flood

- Sekolah Kebangsaan Pulau Beluru (SK Pulau Beluru) is a school that is located on an island along the Kelantan River. The only mode of transportation to the school is using a speed boat.

The school experiences flood every year and it always happens during the monsoon season in October and November. It prolongs to the month of January, sometimes even until March. The intensity of the flood and the duration of the flood differ every year. Villages usually have early warning signs, and the community could then predict that the river waters would increase and floods could occur in a matter of days. SK Pulau Beluru buildings are located on higher grounds, but when flood occurs, the river water can increase to about 2-3 feet of the school gate. This normally causes a lot of damage to the school.

- In case of the flood in 2009, the river water increased to about 3 to 5 feet that covered most of the front area of the school. The school had to be shut down for 2 weeks and was later reopened once the flood subsided. As SK Pulau Beluru is located on a higher ground, the school is normally used as an evacuation area for communities.
- To date there has not been any loss of life, injuries, or damage to buildings at the school compound due to the flood.

Prevention, Mitigation, and Recovery Action:

Preparedness Activities for Anticipated Annual Floods

- As the school experiences a flood every year, it considers the awareness-raising on flood preparation as critical. The following activities are conducted regularly:

School Drills: A school drill is organized three times a year with participation of all teachers and students.

Session/ Workshop: A session on disaster preparedness for students and teachers is conducted by the Department of Civil Defense, Department of Health and Firefighters. School Watching Workshop (SWW) and Training of Teachers on SWW were conducted by MERCY Malaysia in 2008 and 2010.

Evacuation Plan: An evacuation plan is placed in school operation rooms (where meetings and ceremony are held) and in every classroom.

Disaster Preparedness Demonstration: A one-day demonstration is carried out in the school hall for school students as well as community members organized by the Department of Civil Defense. The session includes: How to wear a life jacket, Who to report in case of missing person, Where to go in case of a flood (evacuation points), Step on getting into a boat, What are the early warnings.

Competitions: the school organizes a poster drawing and essay writing competition every year for school students with regards to a flood disaster.

Installation of Sirens by Department of Irrigation and Drainage: This is for early warning for the flood. Schools and communities learn about the usage at drills including what does the sound mean and how does it work.



Students during a School Watching workshop

Lessons Learned:

- It is effective for the team that consists of government officials and school and community members to work together and conduct drills and demonstration especially to disseminate the information as widely as possible.
- It was highlighted by a school teacher that the regular disaster education, both in theory and in practical exercises, is best to test their capacity and increase their confidence on preparedness.
- The collaboration between schools and community helps increase attention and interest to disaster preparedness both from school children and community.

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Pulau Beluru Counseling teacher (2011)

教訓

- 防災訓練の実施と情報伝達には、地方行政と学校、地域との連携が重要である。
- 日常的に防災教育と学校教育を結びつけることが、教職員の人材育成につながる。
- 学校と地域の連携により、児童・生徒と地域の防災対策が向上する。

Flood 2 Pakistan

GBPS Garhi Haleem School

Shikarpur District

Year Established:

1986

Type of School:

Public

Geographical location:

near Indus River



Map of Pakistan and of Sindh Province

Background: 2010 Sindh Flood



Damaged House



Partially Damaged School

- Hundreds of thousands of people in southern Pakistan were forced to flee due to a super flood in Sindh on August 6, 2010. The quantity of the flood water was huge and exceeded expectations. Over 20 million people were affected. 7,277 villages were damaged and more than 1,098,720 houses were destroyed.
- There were 199 deaths and 1,072 were injured. More than 80% of the women and children in the area were affected. According the assessment in Sindh province, 2,627 schools were fully destroyed while 2,790 schools were partially damaged due to the super flood in Sindh.

Prevention, Mitigation, and Recovery Action:

Responsibility in Rehabilitation

- The construction of school was started in January 2011 and completed on schedule in July 2011 with the support of DFID-UKAID in the district Shikarpur. The objective of the project was to ensure a good start in life for 100,000 young children in Sindh. The building was handover to the Education and Literacy Department of the Government of Sindh. The total cost of school was PKR 420,000 (USD 4,600).
- Health and Nutrition Development Society (HANDS) repaired and renovated school buildings, latrines, and hand washing facilities. HANDS also provided students bags, copies, slates, sports kits, weight machines, steel cupboard water cooler, education charts, flash cards and stationary. HANDS likewise provided teacher tables and chairs and benches for students.

- HANDS conducted training of teachers, CBOs, and SMC members on Disaster Risk Reduction (DRR) and School Development Plan (SDP) and Psycho Social well-being, child development, child rights, child protection and classroom management. After the successful completion of trainings, an enrollment campaign was launched the purpose was to ensure the attendance of the students in schools.
- HANDS strongly believes that this project as a successful project in the History of Public private partnership. This project can fill the gap and could be a showcase for others so that a quality education can come in rural areas.



Lessons Learned:

- Initial assessment (feasibility) must be done carefully. Pre-defined specification and standards helped.
- Flow of funds through CBO account for empowerment, trust and transparency.
- Community mobilization can counter many challenges. Strict observance of timeline must be observed.
- Training on DRR helped in current rain and flood. Productive outcomes are generated by Monthly Progress Reviews.

REFERENCES:

WB and ADB's joint Damage and Need Assessment

HANDS Flood 2010 –ISAR Project Document

<http://www.pdma.gos.pk>

教訓

- 災害後の学校建築には、標準的な仕様や基準を一律に適用するのではなく、地域特性に見合うように慎重に議論される必要がある。
- 学校建設に関する経費の管理は地域団体と共に厳しく行うことで、信頼性の構築と透明度の獲得、計画期間内の完成につながる。
- 日頃の防災訓練が、洪水災害時に効果を発揮したことから、定期的に実施することが重要である。

Flood 3 Thailand

Wat Kor Pai School

Moo 3, Ban Bang Loung Dode,
Bang Ban District, Ayutthaya Province

Year Established:

1930 (approx.)

Type of School:

Public

Geographical location:

near a major canal



Map of Thailand and of Ayutthaya Province

Background: October 2010 Flood



Flooding in front of Sekolah Kebangsaan Pulau Beluru



Around 2,000 people evacuated during the flood

- The inundation of the area along the bank of Bang Loung Canal by overflow water from Bang Loung Canal during October 10, 2010 and November 15, 2010. The flood began around 10 PM of October 10 as floodwater overflowed into school area. Bang Loung Canal is a major canal that branching out from the Chao Phraya River. The water flow of the canal is influenced by the flow in the Chao Phraya River. The inundation of area is seasonal. The area experiences periodical flood approximately 3 to 4 times during rainy season (June to November). So flooding in the area is part of living environment and resilience and adaptation is a key to sustainability of human life and landscape. The evidence of resilience and adaptation are the architectural characteristics which were built on a series of tall columns high above flood level.
- There were no casualties from the flood. Only minor damage to the floors and walls of two main buildings, walkways and tree and shrub planters. The major damage was drinking water machine and some appliances and electrical wiring system. Estimated cost of damage was approximately 400,000 Baht. The amount of damage was unexpected because the flood level was a lot higher than past floods. Also, the flood began at the time when only one person was at school to face the rising level of flood water and difficult task to move heavy appliances. A better flood warning system should prevent this kind of damage in the future.
- The classes were not affected by flood because all the classrooms are in the second floor. The classes would be stopped only the flood threatened the safety of students during their trips to and from school. The school did not function as an evacuation area but serve the communities as a daycare center for communities to look after young children while their parents went to work during flood period.

Prevention, Mitigation, and Recovery Action:

School and community resilience and adaptation and co-evolution

Since flooding is a part of living environment of the area which experiences flooding every year. Moreover, communities have a long history of prevention, mitigation and recovery actions that co-evolved into the way of life of people in the communities. The prevention, mitigation, and recovery actions can be described as:

- Prevention by preparation and planning: Architectural type provides safe area for classrooms and other school activities during flood period.
- Mitigation: Using designated areas, structures, furniture to mitigate flood water level. Improving electrical zoning and wiring system such as move electrical outlets and switches about the highest flood level (October 2010 flood) and separating the electrical circuit between ground floor and second floor.
- Recovery (October 2010 flood): The first task was cleaning up mud deposition while flood water receding. The second task was fixing damaged parts of the building and appliances.
- The recovery process was start as soon as water receding and took about a week to finish cleaning through strong co-operation among teachers, students and communities.
- Teachers, students and communities were the stakeholders. Labor, skill, time, co-operation and materials and monetary donation were their contributions.



Students during a School Watching workshop

Lessons Learned:

- Resilience and adaptation and co-operation are very important for the sustainability of the school and the communities
- Disaster education was carried out by guiding and teaching student about safety issue and preparation for flood events.
- The important observations of the school-community linkage are interdependency and symbiosis relationship.

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教訓

- 学校と地域の持続可能な関係性において、防災に対する適応力、対応力、協力が重要である。
- 児童・生徒の安全に対する知識と洪水対策をテーマとした防災教育を実施している。
- 学校と地域がつながるために、お互いに必要とし共生していくことが求められる。

Typhoon 1 Bangladesh

75 No South Pakhimara Registered Primary School

Shyamnagar, Satkhira

Year Established:

1995

Type of School:

Public

151 students 4 teachers

Geographical location:

coastal area



Map of Bangladesh and of Satkhira District

Background: 2009 Severe Cyclonic Storm Aila



Flooding in front of Sekolah Kebangsaan Pulau Beluru



Around 2,000 people evacuated during the flood

- Cyclone Aila appeared as a disturbance in the Bay of Bengal on May 21, strengthening quickly to a Tropical Cyclone with wind speeds gusting up to 120 kph and became a severe cyclonic storm on May 25 that made landfall both in Bangladesh and India.

- It was the second tropical cyclone that maintained a cyclonic intensity for approximately 15 hours after making landfall. It brought tidal surges up to 6.5 meters affecting 11 coastal districts of Bangladesh directly impacting some 3.9 million people, destroying the homes of one million people and the majority of protection embankments.

- The direct and immediate impact of Cyclone Aila resulted in 190 deaths and approximately 7,100 injuries. Some 100,000 livestock were killed and nearly 350,000 acres of crop land were destroyed.

- Cyclone Aila also destroyed 445 educational institutes/facilities and partially damaged 4,588 others across the affected districts impacting approximately 500,000 children. School infrastructure, furniture, and teaching-learning materials were badly affected.

- Shyamnagar and Assasuni of Satkhira were the worst affected sub-districts in Bangladesh, where Cyclone Aila caused partial damage of 351 and complete damage of 17 educational institutions, respectively. Cyclone Aila destroyed different infrastructure of the schools like walls, roofs, windows, doors, floors, and educational materials. Consequently, students as well as teachers could not start their normal classes. Some schools conducted their lessons in the open field or to some extent in the destroyed school buildings.

Prevention, Mitigation, and Recovery Action:

Education Restoration Support to Cyclone Aila Affected Schools in Shyamnagar Sub-districts

- The school was located at the bank of the river of this village. But following the aftermath of Cyclone Aila, the school building was totally damaged. There was no room to conduct the classes and the teachers were bound to stop the class due to the destruction of the school.
- The community people, teachers, and school managing committee selected a higher place at the embankment of this village for regulating the school. They decided to conduct the class at this place.

Therefore, the students were taking class at the open sky at that time.

- Afterward UNICEF immediately started the Emergency Education Cluster to ensure regular schooling and provided an average cost of USD 3,550 for reconstructing the school building. At that moment, ActionAid Bangladesh, along with its partner organization, Uttaran, helped to make the teacher and students' room and established latrines for this school within 4-6 months. Uttaran used this fund and developed this structure in December 2009.



Students during a School Watching workshop

- The students were very happy to have a complete and secure school where they could start their normal schooling again. In addition, they mentioned that this type of school which has separate classrooms is useful for full concentration in their study.

Lessons Learned:

- Community as well as organizational participation is important for mitigation and recovery action after a disaster.
- Community people now believe that they are at the part of the school and their effective contribution can play a role in school development.
- A strong relationship is developed between students, teachers, community people, and different organizations as well.

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教訓

- 防災対策と災害後の復興には、地域と様々な団体の参加が必要である。
- 復興には、地域が学校と強いつながりを築き、今後の教育プロセスに地域が参画すること、また、児童・生徒、教職員、地域住民、様々な地域団体の協力が不可欠であることが明らかになった。

Typhoon 2 China

Dashi Elementary School

Maguei Township, Maoming City,
Gaozhou County, Guangdong Province

Year Established:
1950

Type of School:
Public

234 students, 9 teachers

Geographical location:
at a shallow-cut low mountain



Map of China and of Guangdong Province

Background: 2010 Typhoon Fanapi



The downpour brought by typhoon Fanapi left many roads submerged and houses collapsed



Flooded school yard of Dashi Elementary School

- On September 21, 2010, Typhoon Fanapi, the strongest typhoon to hit China in 2010 struck Maoming's two county level cities, Xinxi and Gaozhou, in South China, leaving 96 killed, 21 missing, and 297 injured.
- The worst torrential rains in two centuries forced the evacuation of 44,629 people, and caused 12,523 houses to collapse. Roads were blocked, farmlands flooded, commutation networks paralyzed, and power supply cut. The whole city was severely battered by the raging storm, with direct economic losses estimated at USD 590 M.
- Typhoon Fanapi wreaked the most havoc in Western Guangdong Province and most areas in Xinxi and Gaozhou have witnessed precipitation of more than 600mm in 24 hours. Most deaths were caused by rain-triggered geological disasters, such as floods, landslides, house collapse, mudflow and the bursting of mine dams.
- The elementary school was affected by the flash floods with rocks strongly damaging the 4-storey main teaching building. Mud and drifting woods entered into the classrooms. Even worse, near the riverside, the ground base was eroded by flood water and the building started to tilt and the river basin changed because of mud flow next to the campus.

Prevention, Mitigation, and Recovery Action:

Not Taking Chances with Damaged Buildings

- Since the school buildings were badly damaged and considered unsafe, the Board of Education leveled the tilting buildings to make spaces to build combination houses as temporary classrooms.
- School relocation of 4-stories building started in February 2011 sponsored by the National People's Congress of the People's Republic of China at USD 46 M and is to be finished in 200 days. The construction plan in the 500 square metres field includes one main building for classrooms, instrument room, library, sports room and teacher's dormitory.
- The school resumed lectures on October 8, 2010, with 8 classrooms, for 6 grades plus nursery class (around

230 students). Students had desks and chairs donated from personages of all circles and electricity supply for lighting. Some students lived in the far villages away from the school took more than an hour to the school. The accessibility was not stable and dangerous since the roads were severely damaged and it was difficult to pass when it rained.

- Implementation of disease control and food security was required by the Boarder of Education. In addition, school teachers watched the students on their way home and to school along the roads to make sure of the students' safety and gave students and parents counseling for mental health in the post-disaster phase. Students who lost family member in the disaster could also have maintenance support.



Elementary school students resumed classes in temporary classrooms

Lessons Learned:

- The campus was determined as a dangerous place so that classes were stopped and moved to temporary tents.
- Schools can coordinate response and recovery efforts in the aftermath of a disaster and also provide a hub and learning place for an entire community in mental health and short-term life support.

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<http://www.mmjynet.com>

教訓

- 危険度調査を実施し、その結果をふまえて、学校が安全な場所へ移転した。
- 災害後、学校施設の安全を確認した後、緊急対応および復興、地域の人の心のケア等のコミュニティ活動の場として貢献した。

Typhoon 3 Philippines

Maconacon Central School

Maconacon, Isabela

Type of School:
Public

Geographical location:
coastal area facing the Pacific ocean



Map of the Philippines and of Isabela Province

Background: 2010 Super Typhoon Juan (Megi)



All the houses in Maconacon were damaged



Maconacon Central School was totally destroyed

- The strongest typhoon in 2010 affected a total of 427,962 families or 2,008,984 persons in 3,434 barangays (villages) of 240 municipalities and 17 cities of 23 provinces in 6 regions of the Philippines. Super Typhoon Juan caused 71.2 million pesos (USD 1.7 million) worth of damage to schools and instruction materials in Northern Luzon, aside from disrupting classes for more than 1.6 million public elementary and high school students, according to the Department of Education (DepEd).
- The DepEd's Rapid Damage Assessment Report (RADAR) pegged the damage to classrooms at 70.4 million pesos (USD 1.6 million) and the damage to computers and textbooks at 803,650 pesos (USD 19,000). DepEd said damage was seen in some 246 schools in three regions, worst in Region 2, where the toll reached some 50 million pesos (USD 1.2 million).
- Classes have been suspended in some 6,218 public elementary and high schools. DepEd's Physical Facilities and Schools Engineering Division dispatched field engineers to monitor typhoon-affected regions to assess school damage. Education Secretary Armin Luistro had stated that field officials were already drawing up plans on where classes might be held during the rehabilitation of damaged schools.
- To restore classes in affected areas, several alternative delivery modes were identified: 1) for schools with damaged classrooms, modules will be provided to students for them to study at home; 2) teacher's visits to students, and 3) tents to be used as temporary classrooms.

Prevention, Mitigation, and Recovery Action:

Quick Response Fund of the Department of Education

- In 2010, the Department of Education (DepEd) had some 320 million pesos (USD 7.4 million) in its Quick Response Fund (QRF), according to DepEd chief engineer Oliver Hernandez. The QRF is included in DepEd's annual budget in order to address immediate needs for reconstruction and/or repair/rehabilitation/ replacement of school buildings damaged by different calamities such as fire and typhoons. This is a stand-by fund and the release of the said budget shall be necessitated only by the occurrence of calamities. As of 2010, a total of 374 new construction/replacements and 1,060 repairs of existing classrooms were completed using the QRF. DepEd had issued guidelines on the availment of QRF for school repairs in line with Secretary Armin Luistro's call for a more prudent use of education funds.

- Reports from DepEd showed that 246 schools were damaged by Super Typhoon Juan. In Region 2, 160 damaged schools – 135 elementary schools (ES) and 25 high schools (HS) – incurred an estimated cost of 50 million pesos (USD 1.2 million).
- One of the badly hit areas in Region 2 was the municipality of Maconacon, which consists of ten barangays (villages). The entire town was destroyed to the ground. Schools which would have served as evacuation centers were not spared. It is in cases like this that the availability of emergency funds like the QRF can be very helpful in quickly starting the school rebuilding process and returning a sense of normalcy in the life of affected children.



Children in Maconacon could not go to school for weeks

Lessons Learned:

- The availability of a stand-by fund allows the Department of Education to conduct prompt repairs, rehabilitation, and reconstruction of schools destroyed by natural calamities.
- Given the frequency and intensity of natural disasters in the Philippines, it would be to the best interest of Filipino students to have a readily available fund for rebuilding so as not to disrupt classes for extended periods.

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教訓

- 教育委員会が独自に所有する特別予算を用いたことにより、被災した学校の修繕工事や再建に大きく貢献した。
- フィリピンは災害大国であることから、学校施設が被災した場合の教育の持続可能性について、教育委員会および地方自治体が特別予算を所有することが重要である。

Typhoon 4 Taiwan

Tai He Elementary School

Tai He, Meishan Township, Chiayi County

Year Established:
1942

Type of School:
Public
43 students, 14 teachers
Geographical location:
near a river



Map of the Taiwan and of Chiayi County

Background: 2009 Typhoon Morakot



Kezhilin Mountain landslide



Mudflow at Tai He Elementary School

- On August 8, 2009, torrential rains brought about by Typhoon Morakot devastated mountainous areas in Chiayi. Typhoon Morakot's total rainfall of 3000mm in three days was the highest level of precipitation over the past 50 years. This was equivalent to the year-round rainfall all over the whole of Taiwan.
- The rainfall triggered slope collapse. Soil and rocks were loosened and there was a debris flow in Chiayi County. According to an emergency operations center in Chiayi, on August 14 over 10,000 people were trapped in the townships of Alishan, Meishan, Chuchi, Zhongpu, and Fanlu since the roads were cut off by a massive mudslide and survivors were on the verge of starvation.
- Mudflow occurred at the rear slope of five schools in Chiayi County and caused them to be buried in the mud and resulted to interrupted access. In Tai-He Elementary School, the building with offices and classrooms, sports ground, nursery school, and the facilities were all damaged. The typhoon caused no casualties in the school but one student was swept away by mud flow out of school hours.
- The school was the pre-programmed shelter of Tai He Village. According to the village chief, it seemed safer for the villagers to remain at home rather than go to the shelter. Nearly 70 years since the school was established, it was the first time the school was affected by a disaster.

Prevention, Mitigation, and Recovery Action:

Early Resumption of Classes Using Temporary Location

- On September 30, 2009, the school resumed classes and the semester started a month later than the scheduled time. Since it was difficult to clean the huge amount of debris stuck in the school without any hydraulic excavator able to enter the village due to broken roads, the classes were held at a tea factory provided by a local tea farmer.
- Since there has never been a similar flood recorded within the past 70 years in that area and the location is not near any potential debris flow, the government decided there was no need to relocate the school.

- Students who were affected received allowance for lunch and tuition fee; for those who injured or lost their parent received additional subsidy. Students were also given post-trauma counseling.
- For school reconstruction, Formosa Plastic Group has committed to rebuild the campus. The plan is yet to proceed since landslides are very serious in Kezhilin Mountain. The central government plans on moving the village which is still pending due to issues of land rights.



Students being taught temporarily at a tea factory

Lessons Learned:

- Students and teachers realized the necessity for disaster prevention education due to the typhoon.
- Disaster prevention education has been promoted here since 2007. Due to high awareness and early evacuation during the typhoon, loss of life was prevented.
- Local residents realized the high risk of living in a landslide-prone area and have agreed to village relocation.
- Local residents have agreed to move their residence but they still need to work on their tea and betel nut plantations in this high-risk location.

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教訓

- 台風災害を経験したことにより、児童・生徒、教職員の防災意識が向上した。
- 2007年より防災教育に取り組んでいたことから、住民に高い防災意識が構築され、早期の避難行動につながり人的被害の発生防止に貢献した。
- 防災教育の実践は、地域住民の土砂災害に対する危険度認識につながり、村単位の集団移転を合意するに至った。しかし、住居は新天地に移動したが、職場はこれまでと同じなどの状況が発生した。

Typhoon 5 Vietnam

Dinh Bo Linh Primary School

473 Nguyen Tat Thanh, Danang City

Year Established:

1983

Type of School:

Public

850 students, 71 teachers

Geographical location:

coastal area



Map of Vietnam and of Danang City

Background: 2006 Typhoon Xangsane



Dinh Bo Linh School after Typhoon Xangsane left



One corner of unroofed classroom

- Typhoon Xangsane slammed into the central provinces of Vietnam on Sunday, October 1, 2006, packing strong winds and rains that cut power and caused widespread devastation and disruption. Approximately 1.3 million people were reported to be affected, 325,282 houses collapsed, and the estimated cost was more than USD 5 million.
- Dinh Bo Linh Primary School is facing the East Sea with a distance of only 100 meters from the beach. Therefore when the Typhoon Xangsane entered Da Nang with the wind power above level 13 (according to the Beaufort scale), this school was severely damaged. All classrooms in the third floor were unroofed, windows were totally broken, and many concrete pillars collapsed. No death or injury was reported as the typhoon struck in the early morning.
- Though school was strongly impacted by the typhoon, only one week after, the students could already go back to school to continue their education.

Prevention, Mitigation, and Recovery Action:

Quick Recovery from the Typhoon

- The school has its own recovery plan of shifting classes and rescheduling study programs before the time of typhoon. This school has two campuses. The damaged campus borrowed some classrooms from the other campus and rescheduled all classes from two shifts to one shift. In order to minimize the interruption time of education after the typhoon, the Principal first prioritized the use of all undamaged rooms such as staff rooms, meeting room, and library for study activities.
- All decisions related to the recovery process were made by the Principal and then were reported to the Sub-department of Education and Training and local authorities.
- The total time for roofing all classrooms in the third floor and rebuilding some parts of school was 4 months.

- Aside from the support from local authorities, Red Cross, and local community, the school also received support from a company named Southern Steel Company, which provided iron sheets.
- After the typhoon, it is planned to relocate the school to a safety place.

Cleaning and rebuilding after the typhoon



Lessons Learned:

- The recovery plan is very important as it can help to reduce the interruption time of education and quickly recovery.
- The location of school should be prioritized to maintain school safety.

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教訓

- 災害前に復興計画を構築することは、学校施設の早期再開につながる。
- 学校が設置される位置は、学校の安全性を維持するために最優先されるべきであるため、現在の学校の位置を評価すること、今後新設される学校には設置基準を設けることが必要である。

Landslide 1 Japan

Uenohara Elementary School

Okaya, Nagano

Established:

1973

Type of School:

Public

306 students, 30 teachers (May, 2010)

Geographical location:

on a foot of a mountain



Map of Japan and of Nagano Prefecture

Background: 2007 Okaya City Debris Flow



Debris flow in the Uenohara area



Debris flow at the Uenohara Elementary School

- On July 19, 2007, in the area of Okaya City in Nagano prefecture a massive slope failure occurred and caused damage such as a debris flow and flood inundation.
- Also, in Uenohara-district in Okaya City, on the same day in the early hours of the morning a debris flow (landslide) occurred. From the slope of a mountain behind the Uenohara Elementary School, an estimated 8000 cubic meters of debris 250 meters long, with a width of 30 meters, flowed down and directly hit the school. Sand and rocks broke through windows, filling half of the gymnasium, and muddy water filled classrooms and offices. Luckily, the time that the landslide occurred there were no people at the school and so there were no human-related injuries.
- The school was not recognized as an area at risk for natural disasters and so, it had been, in fact, designated as an evacuation site in the case of natural disasters. At the time, there were no evacuation warnings, so when the landslide happened, the school wasn't being used as an evacuation site.
- The damage to the gymnasium was great, but it can also be said that the gymnasium itself acted as dyke against the flow of debris.
- In Okayama City, which has an annual rainfall of 1200 mm, over the period from July 15 to the 19, a record heavy rain of a total 400 mm, which was the largest amount ever recorded there, occurred. With this heavy rainfall as the trigger, because of the damage from the resulting landslide, the total impact on Okaya City was 8 deaths, 12 injuries, partial or total destruction to 29 residences, and a flooding of 271 buildings.
- According to information gathering by the Nagano Prefectural administration, that because the area was one that had such little experience with landslides, this was the main reason that there were so many victims of the disaster.

Prevention, Mitigation, and Recovery Action:

Coordinated clean up and protective measures

- The sand and earth that flowed into the school building and the gymnasium was not able to be removed with heavy machinery, and they only had the manpower of the teachers, students and towns people, so the conditions were extremely hard. More than half of the gymnasium was filled with earth and mud over a meter high.
- Volunteers from in and outside of the prefecture came to help remove the earth and mud from the elementary

school. Summer vacation had begun from the 21st and, under the direction of the prefecture, education related office workers and people from various public schools throughout the prefecture, along with other good Samaritans participated as volunteers. Along with volunteers from the local area, the amount of volunteers at that school from July 19th to August 8th came to 2,345. Through the great effort of the volunteers all of the earth and mud was removed from the school.

- The school was repaired and even now is in the same location, but in upstream area where the landslide came from, forest management precautions have been taken such as the building of a wall and channel for water. In addition, in the marsh behind the school and the gymnasium, a protective dyke was completed.
- Downstream, erosion control was enacted to weaken the flow of landslides.
- When looking at the Okaya City disaster prevention map, now, the area that the school is in is designated as area of caution for landslides, but the school is also registered as an evacuation area and evacuation facility. The city government made a comic book about the land slide to teach children about the disaster there in an easy to understand way.



Removal of sediment by volunteers at the gymnasium

Lessons Learned:

- Under the direction of the prefectural government, and through the combined cooperation of the education related workers and good Samaritan volunteers, the quick restoration from the disaster was possible.
- The importance of the collection of the large amount of local information for disaster prediction and the connection that allows for that information is quickly transmitted to the community, due to the fact that repeated disasters happened in various locations in the area, was recognized.

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教訓

- 地方自治体からの協力、教職員およびボランティアの活動が、教育施設の早期再建に貢献する。
- 土砂災害予測に関して、地域に蓄積されている伝統的な住民知識や経験を記録し、次世代へ伝達することが今後の早期避難につながる。

Landslide 2 Philippines

Santa Paz National High School

San Francisco, Southern Leyte

Type of School:
Public

Geographical location:
at the foot of a mountain



Map of the Philippines and of Southern Leyte Province

Background: 2006 Southern Leyte Mudslide



2003 San Francisco Landslide



2006 Southern Leyte Mudslide in Guinsaugon, St. Bernard

- At about 10:30 in the morning on February 17, 2006, a cliff face of a ridge straddling the Philippine Fault collapsed in a combination rockslide-debris avalanche event, translocating and subsequently burying Guinsaugon village in the town of Saint Bernard in Southern Leyte province.
- The local elementary school, located nearest to the mountain ridge, was completely buried as the landslide occurred when school was in session. 246 students and seven teachers died.
- The deadly landslide followed a ten-day period of heavy rains and a minor earthquake of magnitude 2.6 on the Richter scale. The official death toll was 1,126. The landslide buried 281 houses and affected some 8,000 people.
- After the incident, the Mines and Geosciences Bureau of the Department of Environment and Natural Resources (DENR) conducted a risk assessment of landslides in Southern Leyte, identifying that eight areas were at high risk within the Municipality of San Francisco.
- Earlier, in 2003, government geologists had listed 82.6 percent of Leyte as prone to hazards such as landslides. In December 2003, a landslide destroyed most of the town of San Francisco, killing 200 people.
- According to DENR, Southern Leyte is characterized by steep slopes with highly fractured rocks underlying the area. Extended heavy rains could easily trigger landslides.

Prevention, Mitigation, and Recovery Action:

Students persuaded authorities to relocate their school

- Acting upon the landslide risk assessment by the Mines and Geosciences Bureau that identified their school as high risk, the students of Santa Paz National High School — with the help of Plan International and key community members — voted to move their school to a safe location away from the landslide zone.
- The children's organizations in the schools (Supreme Student Council and Student Government Organization) embarked on an education campaign about the physical processes of landslides and a great many students

wrote to the School Division Superintendent expressing their desire to relocate. The students' proposal won the vote 101 to 49 in a community-wide referendum and the students were quickly relocated to a temporary school in a more desirable location.

- The new school, which was constructed in Pasanon (a safer location) with co-financing from Plan, includes earthquake mitigation measures such as steel ties on the roof. Because schools are often used as evacuation shelters, the new school also had toilets constructed in each classroom to accommodate prolonged stays by larger numbers of people. The children said they were excited about the whole process and did not express any regret about the decision to move. They did report difficult conditions in the temporary school, particularly the heat in the temporary tents, though the children helped to line the tents with banana leaves to cool them.



Children in the temporary school before relocation

Lessons Learned:

- Children have the potential to initiate change within their communities as demonstrated by the school children of Santa Paz National High School in Southern Leyte, Philippines.
- Children and young people's capacity to participate in disaster risk and reduction efforts is much greater than most realize and can be invaluable in effective disaster preparedness, response, and recovery.

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教訓

- 災害に対する認識と地域とのつながりを所
有する児童・生徒は、適切な防災行動をと
ることができる。
- 児童・生徒、および若年層の防災に対する
能力を高く評価し、今後の効果的な防災対
策、復旧・復興期において貴重な人的財産
として活用する。

Relevance of Lessons to East Japan Earthquake and Tsunami



Recovery efforts are most effective when they are informed by the lessons learned from previous disasters as well as by knowledge of new risk reduction measures. Recovery plans that incorporate these aspects can reduce disaster losses in the future. Reconstruction that is not supported by an effective recovery plan frequently leads to rebuilding the conditions of risk, which existed before the disaster (UNISDR, 2007). However, each disaster is different and recovery lessons cannot be automatically transferable (ADB, 2008). This is particularly the case when transmission is from one cultural or economic setting to another. Hence it is difficult to draw universal lessons on recovery from large-scale disasters in the past and from different regions.

In addition, it is important to recognize that the 2011 Great East Japan Earthquake and Tsunami disaster has very distinctive characteristics that might make comparative analysis problematic, and which could make the application of lessons from other disasters difficult. The magnitude 9 earthquake that hit Japan on March 11, 2011 was one of the five most powerful earthquakes since modern record keeping began in 1900. The earthquake triggered powerful tsunami waves that reached up to 40.5 meters (in Tohoku) and traveled up to 10 km inland (in Sendai). The tsunami caused a number of nuclear accidents, making the disaster a complex emergency. The World Bank's estimated economic cost of USD 235 billion make it the most expensive disaster in the history of the world. Transferring recovery lessons from developing countries to a country which already have manifold encounters of disasters and have considerable experiences of disaster risk reduction education can appear daunting.

School damages in the affected areas need further detailed investigations to understand the reasons for the damages and their potential future remedy. Broadly, the key lessons can be categorized into: Structure, Location, Layout, Function, Human Resources and Training, Effectiveness of Disaster Education, and Educational Continuity. In several school buildings structure was one of the key issues. In spite of a magnitude 9 earthquake, there were no major damages to school buildings in terms of partial or total collapse. However, the damages due to tsunami were observed to be widespread. Several schools were retrofitted for seismic safety, as part of national- and prefecture-led programs. This shows a high level of education governance, linked to the HFA Priority 1. However, in terms of structure, many of the school buildings had curved roof, instead of flat roofs, which prevented the students and community members to take shelter on the rooftop. This is also linked to the school layout. It was found that the schools which were located perpendicular to the coastline had less damage, as against those parallel to the coastline. The location of the school was another crucial issue. Many of the damaged schools were located very close to the coastline, within 100 or 200 m only. All these issues point out the need of a detailed risk assessment, which is the HFA Priority 2. Human resources, teachers' training, and emergency manual were other issues. In many cases, the school principal had to take decisive actions for the evacuation of the students, where there was no clear information on the tsunami timing and height. Although in the evacuation or emergency manual, one evacuation site was identified and designated, the teacher had to take their own decision based on the local situation, and in some cases, they moved with the students to four or five different places for safer evacuation. Therefore, it shows the need of



teacher training and need of emergency education. The educational continuity is another key area, which was found to be very challenging in the first few months after the disaster. Therefore, proper management plan for education in emergency is required, which point to the need of HFA 5. Finally, in several cities disaster education helped the students to take proper evacuation behavior, not only in the school but when they were outside the school. A classic example is the "Kamaishi Miracle," where many students evacuated spontaneously as part of their disaster education programs. Thus, HFA 3 is found to be extremely important.

From the current analysis of the lessons learned from Asian examples, the key messages, which can be transferred to the recovery of Tohoku educational facilities, are possibly the innovative approaches involving the soft components of recovery actions. Traditionally, recovery or reconstruction of school buildings was the responsibility of the governments at the city or prefecture or national level. However, in the current megadisaster, educational recovery should not remain as the responsibility of the education board or the Ministry of Education. Multi-stakeholder collaboration is a key factor which needs to be identified and recognized. Discussion with the local community members, local business associations, local NGOs is extremely important to understand the needs and resources of the community. In this way, the recovery process can be considered a learning exercise on what is safe and sustainable for the community (Nakagawa and Shaw, 2004).

Based on past experiences, post-disaster education funding tends to focus on rebuilding schools but neglects the quality of education delivered (ADB, 2008). While infrastructure needs should certainly not be ignored, it does not help much to create new venues for learning without good education quality adequate to meet the needs of society. Disasters destroy education systems yet provide opportunities to "build back better" (Rognerud, 2009). The affected areas can take this opportunity to introduce and strengthen DRR education, improve the quality of education in general, offer child-centered teaching and learning methods, train competent education planners and managers, and produce disaster-resistant, safe, and accessible schools. Hopefully, the lessons from the 25 case studies presented here can be used as a starting point for the specific recovery plans of the education system in Tohoku.

東日本大震災における教育の復興にむけて



復興計画に取り入れる今後の防災対策に、過去の災害からの経験や教訓を反映させることは大切である。過去の教訓や反省を取り入れた復興計画は、将来的に災害からの被害を軽減すると考えられており、そうでない復興計画による地域再建は、新たな危険性を作り出すことにつながることを UNISDR (2007) は報告している。しかし、それぞれの災害状況は異なり、教訓も様々であるため、地域でも教訓活かされるとは限らず (ADB、2008)、災害からの教訓は地域的伝承・地域的事象として閉ざされてしまう傾向にある。それゆえ、他の地域が過去の大規模災害から得た教訓を共有することは難しい。

2011年3月11日に東北地方を震源に発生した地震はマグニチュード9.0を記録し、1900年以降に観測された巨大地震の上位5つに記録される。地震によって発生した津波は、最大高度40.5メートルに達し、最大約10km内陸まで浸水し、多くの被害をもたらしただけでなく、津波は福島第一原発の事故の原因となった。地震、津波、原発事故という複合災害がもたらした経済的損失は、世界銀行の試算によると2350億USドルである。東日本大震災は、先進国である日本における災害であり、複数の要因が絡み合っていることから、この災害からの教訓を他の地域で応用することは難しい可能性がある。しかし、この災害から学ばなければならないことは多い。

東日本大震災により、多くの児童・生徒、教職員、学校施設が被災したが、これらの詳細な被害内容が明らかになり、学校再建が再建するためには、さらに詳細な調査を必要とする。しかし、既に学校の建設位置や学校構造、敷地内でのレイアウト、防災機能、防災教育の効果と災害後の教育の持続性について、その教訓を学ぶことができる。

津波によって全壊した事例はみられたが、マグニチュード9を記録した地震であったにも関わらず、地震によって校舎が完全に倒壊した被害はなかった。これは、国や地方自治体が学校施設の耐震化に取り組んだ成果だと考えられ、教育HFAの優先行動1が遂行されていたと考えられる。東日本大震災では、多くの人が校舎の屋上に逃れ、屋上からヘリコプターにより救助されている。そのため、屋上を設置していない校舎構造は、人々が津波から逃れるためにさらに上へ避難することを妨げることとなる。また、海岸線に対する校舎の向きも被害の大きさと関連する。校舎の広い側面が海岸線へ向いていた場合、津波とぶつかる面が広いだけでなく、壁には教室や廊下などのガラスが多く使用されているため強度が低くなる。このように、学校施設が持つ機能やレイアウトから得られる教訓がある。

更なる大きな課題として、学校が設置されている地理的位置が挙げられる。被害を受けた学校施設は、海岸線から100または200m以内に位置していた。これらの課題を改善するために、立地に関する危険度調査を実施する必要があり、教育HFAの優先行動2の実行にあてはまる。

教育HFAの優先行動5に該当する課題として、防災教育、災害後の教育の継続性、教職員の研修、避難行動、非常時のマニュアル等が挙げられる。正確な津波情報や避難に適した高台が不足している状況で、学校長は児童・生徒の安全を確保し、適切な避難行動をとる判断をせまられた。災害時の避難マニュアルに沿って用意されている避難場所は1カ所の場合が多く、より安全な場所を求め移動を繰り返すなど状況に応じて教職員は現場での判断を求められた。このような状況での確な判断を支援する防災教育を、教職員に実施す



る必要がある。

災害時、教職員は児童・生徒の安全確保と安否確認の後、学校再建と教育の継続性に向けて取り組む必要がある。これは、教育 HFA の優先行動 5 にあてはまる。しかし、東日本大震災の事例では、災害後の数ヶ月間は、状況の把握や教育スペースや資源の確保など様々な要因が重なり合い、質を維持した教育を実施することに困難さがみられることが明らかになった。そのため、学校は非常時の避難行動だけでなく、被災後の学校再建と教育の持続性に関しても焦点をあてて防災計画を構築する必要がある。

2004 年に発生したインド洋津波で、10 歳のイギリス人少女が地理の授業で学んだ津波の知識を基に、周辺の人々に避難を呼びかけたという事例にみられるように、児童・生徒への防災教育は、学校内だけでなく自宅や地域などでも効果をもたらすことが期待される。東日本大震災における一つの事例として海外にも広く発信されたのが、岩手県釜石市鶴住居小学校と東中学校の児童・生徒が、長年取り組んできた防災教育を基に自主的な避難行動を行った「釜石の奇跡」といわれるものである。このように、教育を受ける児童・生徒が自分の命を守るために、教育 HFA の優先行動 3 が示す防災教育は非常に重要な内容である。

これまで、学校の再建は、国・地方自治体の責任として取り組まれてきたが、東日本大震災のような巨大災害では、被災する学校施設も多く、地方自治体自体も被災しており、行政だけで教育を再建することが困難である。そのため、地域住民や NGO/NPO 団体、企業、大学機関などが学校再建に包括的に関わっていくことが求められる。また、学校の再建と地域の復興が関連していることを、Nakagawa ほか (2004) が阪神淡路大震災とインド西部で発生したグジャラート地震を対象

として報告をしており、学校再建に地域や他団体が関わることは、早期の地域復興にもつながることが期待される。

災害により学校施設が被災すると、校舎や体育館などの施設の復旧に莫大な経費が短期間集中する傾向があるが、学校施設の再建と同じに重要なのは教育の質を維持することであると ADB(2008) は述べている。教育のインフラを整えることは、教育の環境を整えることにつながり非常に重要であるが、学校施設が地域の公共施設であることを考慮すると、地域社会の要望を十分に反映せずに学校施設を再建することは難しい。Rognerud (2009) は、“より良い将来に向けて (build back better)” という言葉を述べているが、災害により被災したことを機会として、改善するべき点を改善し、現在よりもよい将来を迎えようという考え方は、現在アジアの地域で多く取り入れられている考え方である。災害がもたらした被害は大きい、防災教育の導入、教材の改善や教職員の研修、安全な学校建築物、地域の防災リーダーの育成や地域と学校の強固な連携構築などを、復興を期に取り入れることにより、災害に強い地域社会の構築へとつながることが期待される。

最後になるが、先進国である日本にアジアからの教訓がどれだけ適用できるかわからないが、本書が紹介する 25 の事例が少しでも役に立てばと願う。

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