CLIMATE CHANGE EDUCATION FOR SUSTAINABLE DEVELOPMENT
in bangladesh

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BANBEIS
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Educational, Scientific and
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ABBREVIATIONS

ADP	Annual Development Plan
BANBEIS	Bangladesh Bureau of Educational Information and Statistics
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BHWDB	Bangladesh Haor and Wetland Development Board
BWDB	Bangladesh Water Development Board
CBO	Community Based Organization
CCA	Climate Change Adaptation
CCE	Climate Change Education
CCESD	Climate Change Education for Sustainable Development
CDMP	Comprehensive Disaster Management Program
CDS	Coastal Development Strategy
CEGIS	Centre for Environmental and Geographic Information Services
CoP	Conference of the Parties
DDM	Department of Disaster Management
DESD	Decade of Education for Sustainable Development
DM	Disaster Management
DoE	Department of Environment
DPHE	Department of Public Health Engineering
DRR	Disaster Risk Reduction
DTWs	Deep Tube Wells
FCD	Flood Control and Drainage
FCDI	Flood Control, Drainage and Irrigation
FYP	Five Year Plan
LGD	Local Government Division
LGED	Local Government Engineering Division
LGIs	Local Government Institutions
MoDMR	Ministry of Disaster Management and Relief
MoEF	Ministry of Environment and Forests
MoE	Ministry of Education
MoWR	Ministry of Water Resources
NAPA	National Adaptation Plan of Action
NES	National Education Survey
NGOs	Non-Governmental Organizations
NPDM	National Plan for Disaster Management
PPE	Post Primary Education
R&H	Roads and Highways Department
RS	Remote Sensing
SoD	Standing Orders on Disaster
TVET	Technical Vocational Education Training
UNESCO	United Nations Education Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WaSH	Water Sanitation and Hygiene

EXECUTIVE SUMMARY

Relief, rescue and recovery actions used to dominate the disaster management activities in Bangladesh in the past which received a shift in approach by adopting pre-disaster planning through Cyclone Preparedness Program (CPP) in 1972 under the auspices of the then the League of Red Cross that is now supported by Bangladesh Red Crescent Society. Standing Orders on Disaster (SoD) appeared in 1997 which allocated emergency management responsibilities at different levels. The third major disaster management framework (Comprehensive Disaster Management Program, CDMP I) appeared in 2003 which outlines the disaster risk reductions culture in the country to deal with disaster and climate change induced challenges. A little departure from disaster management to climate change induced impact reduction through adaptation got prominence after the emergence of CDMP I in 2003. This was evidenced with the introduction of NAPA in 2005 (National Adaptation Plan of Action) and BCCSAP in 2008 (Bangladesh Climate Change Strategy and Action Plan). Appearance of NPDM in 2010 (National Plan for Disaster Management 2010-2015), DM Act in 2012 (Disaster Management Act) and CDMP, Phase II in 2010 (Comprehensive disaster Management Program 2010-2014) also indicates that DRR (Disaster Risk Reduction) and CCA (Climate Change Adaptation) strategies, approaches and actions showed progress in parallel, but proper integration between these two never happened effectively. However, these policy frameworks created solid foundation to implement operational interventions for addressing disaster impacts and vulnerabilities. But lack of information and interpretation of available information did not allow going deep inside the roots of vulnerabilities and thus many programs showed less promising results. Information on education sector in relation to disaster and climate change impact contexts has been also less like many other sectors; this lack of data and information put off agencies to design effective intervention for addressing vulnerabilities in education sector. In this backdrop, this CCESD study contributed in generating disaster-climate change-education information for all disaster affected areas on sample basis (from 12 disaster clusters). Thus the CCESD project may find its niche in the phase subsequent to policy formulation in the DM realm of Bangladesh.

Both quantitative and qualitative data collection methods were applied in gathering data for this study and rigorous review process were followed including national stakeholder consultation in order to develop the data collection instruments. This study thus contributed in producing disaster-education data and information covering twelve different disaster affected areas such as central coast (Char Fasson, Bhola), south-eastern coast (Maheshkhali and Pekua, Coxs Bazar), river adjoining areas (Chauhali, Sirajgonj), river island areas (Char Rajibpur, Kurigram), areas close to rivers (Madarganj and Melandaha, Jamalpur), deep floodplain areas (Keshabpur, Jessore), southwestern coastal regions (Shyamnagar, Satkhira), Haor regions (Mithamain and Itna, Kishoregonj) and Barind Tract (Nachole, Nawabgonj). These regions experience hazards like cyclone, floods, river and sea erosion, flash floods, heavy rainfalls associated with strong floods and landslides, Tsunami, high temperature with burning terrain, waterlogging, unusual/abnormal high tides, salinity intrusion, drought conditions, cold bites, earthquake, fire hazards etc. Key results of the study are given in the following sections.

Key results

Structures of institutions are fragile (**57%** are non-concrete) may become easy prey to upcoming hazards

Nearly half **(47%)** of the classrooms are not-usable

Seasons and locations determine the pattern of challenges to access to educational institutions; communication by local roads is the major means (**80%** cases) to access to school

Coastal area institutions are more used as disaster shelters, thus more prone to damage of assets and loss of education by the shelter users (central coast **53%**, offshore island **41%**, southwestern coast **71%** for primary schools)

One third of educational institutions (**28.88%** for primary schools) still remained out of safe water supply systems

About half of the educational institutions in disaster hotspots suffers from good sanitation facilities (**47.78%**)

Poor school facilities (**50%** educational institutions good usable playground facilities) and support services provide weak education opportunities

Forty percent institutions situate two kilometers beyond of nearest health care centers

More than 50% institutions do not get benefits from First Aid Box; **70%** do not have training on its use

Access difficulty is the most significant challenge faced by students in disaster affected areas

Displacement of families is the main reason of students dropouts in river dominated areas

Sickness of teachers and their family members is a prime reason of teacher's irregular attendance in educational institutions (**69%** mentioned own sickness and about **70%** mentioned about sickness of family members)

Flood and cyclonic disasters return in **2-5 years** interval

Sea erosion floods cyclones and Tsunami are important risk factors in central coastal areas

Abnormal high tides create serious threats to education in southwestern coastal regions (**73.53%**).

Coupling hazards are phenomenal characteristic in southeastern (flashfloods-landslides) and southwestern coastal regions (salinity-waterlogging)

Flood frequency intensity and impact duration are location specific; floods and related hazards (river bank erosion and water logging) are common in river influenced regions

Seasons (wet and dry) determine the nature of challenges in Haor regions

High temperature, tornados (in summer) and biting cold (in winter) trigger many secondary hazards in Baring Tract areas

Bank erosion caused by river and sea and inundation due to floods are major challenges in river and offshore island areas (About 81.67% respondents from river island areas told that they face flood problems almost every year while 74.49% in the offshore island areas mentioned the similar problem

Earthquakes fire hazards and water congestion (urban flooding) are major threats in urban areas

Institutions those situate in Hydro-meteorological hazard regions devastated maximum 6 times in their disaster memoire; in majority cases impact intensities were moderate

April to June is the most challenging time of the year

English Mathematics and Social Sciences are major subjects where learning competencies fall as a result of disaster impacts

Community people (with their limited capacity) act as support agents of the institutions to recover disaster loss

Unsafe and unusual conditions are reported as the main challenge to resume education immediate after disaster occurrence; at least one week is required to create conditions for resuming education (About 55.22% of the educational institutions reported unusual and unsafe conditions in the institutions immediate after disaster)

More than two thirds institutions (80%) do not have and training on disaster management and climate change issues including loss and damage assessment and reporting processes/formats

Death by drowning is a major threat as majority institutions got ponds (about 57% of the educational institutions got ponds) in school premises but insignificant efforts for swimming training

Unrecovered residual impacts cause institutions to remain weak to face upcoming hazards (Institutions located in the central coastal areas reported damage of building structure (50%), furniture damage (71.17%), doors and window break down (70.72%). These figures stand at 69.77%, 67.44% and 62.79% for river island areas and 65.96%, 63.56% and 60.11% for south-western coastal areas)

About 80% Institutions do not have DM (Disaster Management) plans in hand; 85% no contingency funds; 95% no alternative place to continue education in emergencies

Recommendations

Recommendation 1 (resilient building structure): Non-concrete and fragile structures of educational institutions should be properly identified and based on the relative location (location in the context of the surrounding areas) of the institution in different disaster affected areas appropriate designs should be made so that the structures are more resilient to face disaster impacts and maintenance activities is done in regular time intervals irrespective of impact conditions (to avoid inspection-decisions-budget allocation process of the government which is time consuming). Disaster affected areas like Haors, river bank erosion prone areas, coastal areas, hills, Barind tracts etc. requires special types of structures that fits for that regional characteristics.

Recommendation 2 (disaster contingency funds for sustainable education): The major percentage (53%) of classrooms was found to be malfunctioning due to disaster impacts which create space shortage (per capita space allocation) resulting to discomfort for boys and girls while they are in teaching-learning processes in the classrooms. In extreme cases, scheduled classes are cancelled due to classroom shortage. This special phenomenon, especially in disaster affected areas should be addressed by allocation of necessary funds. A 'Disaster Contingency Funds for Sustainable Education (DCFSE)' could be established at national level that might be channeled through Upazila Nirbahi Officer (UNO) at grassroots level for this purposes.

Recommendation 3 (adjusted class routine): The educational institutions should be allowed to adjust their class schedules as per the pattern of disaster prevalence of the area. For example, institutions in Barind Tract regions should not be opened in the afternoons in the months of April, May, June to avoid thunder storms and lightening threats (which appears to be significantly high in frequency in recent times under climate change conditions). Similarly, students and teachers in river island areas, coastal areas, Haor regions face different forms of challenges in accessing to schools, specially in summer and wet seasons.

Recommendation 4 (special allocation for schools used as shelter places): The schools those are used as disaster shelters should be given with special allocation of funds so that the damages that are accrued as a result of the institution was used as shelter could be recovered quickly. In addition, if the disaster episode prolongs provisions should be made to continue education in alternative places, in makeshift places if required and necessary supports in this regard should be given.

Recommendation 5 (secured WasH facilities for education): One third of educational institutions in disaster affected areas still suffer from proper WaSH services. Government agencies (e.g. DPHE), local government agencies including Union Parisads, NGOs should come forward with solutions in terms of technology and finance to address the issues. The private sectors agencies could also be engaged in this regard through their CSR (Corporate Social Responsibility) commitments. Bangladesh Bank could play a role in this regard (as they are now fostering Green Banking provisions).

Recommendation 6 (proper sanitation for regular school attendance): Poor sanitation facilities in schools discourage both students and teachers to appear to the institution regularly. In addition, use of school neighboring homes as an alternative, specially by girls, would be risky too. Therefore, allocation of required resources for development, repair activities and maintenance has to be done in this regard; also regular inspection by authorities has to be ensured.

Recommendation 7 (educational institutions should have usable playgrounds): There should be a school playground policy which may outline the existence of playgrounds (of a certain size based on the number of students of the institution) minimum standards of it (e.g. elevation), use of this resource. In addition to recreational use the playgrounds could be used to continue education in emergencies in makeshift facilities and also for disaster drill exercises.

Recommendation 8 (health care facilities for educational institutions): Educational institutions located in different disaster affected areas sometimes need health facilities (for drowning, falling from high places, injuries and poisoning from bites of insects and snakes, sickness of diarrhea, hot ambient conditions etc.) from health care centers. Because of communication difficulty in these disaster affected areas, location of health care centers beyond two kilometers of the school is a challenge to receive timely treatments. The government should take necessary actions so that existing health care centers establish satellite centers nearby educational institutions.

Recommendation 9 (First Aid Box and related training): There should be a policy that educational institutions should have First Aid Box facilities in the institution (number might be one unit for every 200 students). Training on the use of its resources should be mandatory for the teachers and staffs.

Recommendation 10 (better access to educational institutions): It was evidenced that more than two-thirds of the students get to the institutions using local roads of various types. Local government agencies like Union Parisads and LGED should be given directives so that they give priority to build school neighboring road communications so that students could access to educational institutions more safely and easily. Government also could take special projects to build necessary roads within two kilometers of buffer circle area of the institution so that educational institutions are better connected with nearby settlements and with major roads.

Recommendation 11 (unique and permanent registration number for all students): The students should be taken into a formal registry process, where primary attributes will be stored for long time. A registration number (may be birth identification number) should be allocated so that students can be tracked all along the displacements (to avoid counting for multiple times in case of dropouts) and progress.

Recommendation 12 (adequate number of teachers in the educational institutions): More teachers should be recruited in the schools located in different disaster affected areas so that absence of one teacher could be substituted by the other since challenges back home of teachers is appeared to be a concern for the institutions located in disaster affected areas. 'Disaster Risk Allowance' could be given to the teachers to encourage them regular attendance in the schools.

Recommendation 13 (repair activities should follow impact cycles): It was observed that disaster induced sufferings return every 2-5 years interval in the educational institutions. Therefore, repair activities, review of contingency planning and disaster preparedness activities should be aligned to this recurrent timeframe.

Recommendation 14 (create Disaster Education Directorate, DED): Institutions in different disaster affected areas face multiple challenges (sometimes in cumulative forms when one issue is added to the other), therefore construction of building structures should be appropriate for that region, their requirement for financial allocations (to repair disaster damages) is much higher compared to institutions located in other places. An agency to be named 'Disaster Education Directorate' could be established at Ministry of Education so that it can regularly assess/monitor the challenges and provide suggestions about required activities so that education is not impaired as result of disaster induced challenges.

Recommendation 15 (Local Government agencies for sustainable education in Haor): It was observed that students in Haor regions in both dry and wet seasons face acute difficulty in accessing to schools. Government through local government agencies should provide transportation facilities to the students in Haor regions so that students and teachers are safe in communicating to the institutions. In addition, schools could be given financial subsidies so that they can operate safe modes of transportation for students and teachers during disaster emergencies.

Recommendation 16 (morning shifts should use used more effectively in Barind Tracts): Morning shifts in schools should be more utilized so that students could go home early in hot and wet seasons (April, May and June) since thunderstorms and lightening hazards are common in afternoons in regular conditions. The institutions should plant more (shade) trees so that temperature impacts are less in classrooms conditions.

Recommendation 17 (movable structures in river bank erosion areas): Government built structures in educational institutions are generally concrete made in river bank erosion affected areas, which are sometimes devoured by the river because of its fixed state in the ground. In this areas government should build movable structures so that it can be relocated in need.

Recommendation 18 (disaster preparedness training): Disaster preparedness training of the teachers and school staffs (with special focus on fire and earthquake hazards) should be mandatory so that they can play important roles in case of such emergencies. Working First Aid Box, usable playgrounds (which may act as emergency meeting places) should also be ensured in the urban area schools.

Recommendation 19 (cumulative and residual impact conditions): Cumulative and residual impact conditions put the educational institutions in multiple challenges conditions and keep the institution in a fragile state. An assessment framework (i.e. residual impact assessment) should be developed under the 'Loss and Damage' assessment framework outlined in the UNFCCC's COP 16 (Cancun meeting) for the educational institutions so that they can identify impact conditions and assess the financial requirements. This assessment results may be used to allocate necessary funds from local funding resources and also from upcoming global Green Climate Fund (GCF) to recover those challenges and to reduce vulnerability of the institution.

Recommendation 20 (recovering learning competencies): It was appeared that the learning competencies of students drop in subjects like English, Mathematics and Social Sciences as a result of disaster impacts. Educational institutions make different measures like taking extra class to recover competency loss; Government should support these initiatives by providing necessary resources. Government agencies and other partners may develop multimedia based demonstration of lessons on these subjects so that teachers could use these resources to recover competency loss easily and quickly. Student volunteers and other community level volunteers could also be used in this regard.

Recommendation 21 (partnerships with community): Community members and local institutions could be motivated to contribute in disaster contingency funds of the institution so that small contributions can support in developing a strong funding framework for performing disaster risks and climate change impact reduction activities. It requires a policy regarding contribution of funds, guidelines for use and for related transparency aspects.

Recommendation 22 (avert losing one week immediate after disaster): It was reported that unsafe and unusual conditions in the premises of institution and in the surrounding areas cause educational institutions delay at least one week to return to regular teaching-learning activities. This delay discourages both the teachers and students to regular attendance in the institution. The local (government) administration, authority of the institution, PTA (Parent Teachers Association) and SMC (School Management Committee) all should be aware of this fact and take prior actions and planning so that this delay is prevented and education is continued.

Recommendation 23 (Disaster Management training): Many government and NGOs took initiatives to arrange training on disaster management aspects for the teachers. But field impression suggests that the schools authorities still need training on aspects like Loss and Damage assessment, important government forms like "D Form" of DDM (Department of Disaster Management) on disaster impacts, new cyclone signal systems etc. The respondents also urged for training on topics/areas like pre disaster preparedness, during disaster actions, continue education if disaster prolongs (e.g. water logging), handling traumatic situation, loss and damage assessment, introduce with government disaster management processes, institutional coordination, training on First Aid, contingency resources management. A regular refreshers course is also necessary in regards to these trainings.

Recommendation 24 (introduce Disaster Skills Training, DST): Survey suggests that drowning related deaths and injuries of children become more common in disaster affected areas especially in wet seasons when rivers, canals, ponds remain full of waters. In this regard it could be recommended that different small but important skills training components (e.g. swimming training, First Aid Training, DRR on education to practice at home to prevent damage of education materials, safety and precautions in commuting to schools etc.) could be brought together and make a comprehensive training package for the students, may be termed as 'Disaster Skills Training, DST'. A DST Guideline and other necessary provisions should also be developed for this purpose.

Recommendation 25 (Schools Disaster Management Plan, SDMP): Educational institutions should have School Disaster Management Plans (SDMP) so that they can assess their risks, residual impacts (the earlier impacts that they did not able to recover), know about their capacities and gaps and operational strategies and corresponding activities to address impact conditions. A guideline in this regard should be developed and necessary training should be provided to the institutions so that every school can do the exercise and has their own SDMP and supply to relevant parties when necessary. This SDMP should be properly aligned with national (NPDM, NAPA, BCCSAP) and international policies (HFA 2005-2015, Sendai Framework for DRR 2015-2030) and instruments (e.g INEE guidelines).

CHAPTER 1:

The CCESD Project

The CCESD Project

1.1 Contexts and rationale of CCESD project

Bangladesh Bureau of Educational Information and Statistics (BANBEIS) has been generating information for education sector in Bangladesh since 1993 from about 36000 educational institutions. This government agency, working under the auspices of Ministry of Education (MoE), generates and disseminates information on school infrastructure and asset-base, registration and management related information, physical facilities (e.g. furniture, water sanitation and hygiene); also on students, teachers etc. (e.g. backgrounds of parents of the students, qualifications/training related information of the teachers etc.). BANBEIS also conducts National Education Survey (NES), Sample Education Survey (SES) on post-primary education (PPE) and publish reports for policy formulation and planning purposes. But the data generated by BANBEIS are not sufficiently aligned with climate change or disaster risk reduction related data requirements. This gap leaves policy makers and education planners in Bangladesh in dark about the need of actions/programme to make education sector resilient to disasters and climate change impacts. In this background premise and the time when UNESCO and allied agencies are observing UN Decade of Education for Sustainable Development (DESD), the CCESD project is taken that aims to generate school vulnerability information to help develop capacities of policy planners as to strengthen their educational responses to mitigate and adapt to Climate Change for sustainable development. UNESCO and other related agencies might consider this project as an opportunity or entry point for promoting the principles and practice of sustainable development through education. The project may help in mainstreaming Climate Change Education (CCE) in the Education system of Bangladesh through country policy and programs.

1.2 Aim and objectives of the pilot study

The aim of CCESD study is to facilitate the education planners and administrators to ensure that the education systems in Bangladesh could respond more effectively to the needs of disaster impacts as well as climate change adaptation processes. This can happen only when required information about the vulnerability of education sector is generated and available for the researchers, policy planners, practitioners and professionals. In this backdrop, this country assessment attempts to identify most needed Disaster Risk Reduction (DRR), Climate Change Adaptation (CCA) related variables so that these could be integrated into the existing data collection process of BANBEIS. Once data are generated it will help to evaluate the situation of the sector in relation to climate change and disaster induced vulnerabilities. However, the study objectives could be summarized as follows,

- To undertake a country analysis to identify most needed DRR/CCA/CCE variables
- Integration of the identified variables into existing questionnaire.
- Data generation and report preparation including case studies, sub-regional CCESD recommendations and lessons learnt.

Once this pilot study is done it will assist to identify the gaps in capacity and preparedness of educational institutions of various kinds (i.e. primary, secondary, madrassa and college) to cope with disaster and climate change induced conditions. The results will also be useful to develop plan and act accordingly towards fill in the gaps and do further improvements. The CCESD study project has prioritized key activities in this connection and these constituted the CCESD roadmap. The roadmap activities are,

- capacity development of policy makers so that they can better contribute in national plans and policies
- capacity development in teacher education on CCESD
- capacity support for curriculum development specialists and education planners to curriculum review, reform and development.

1.3 Alignment of national CCESD program to international instruments on Climate Change

A number of international agencies emphasized the need for promotion of education to tackle climate change induced challenges. This can happen when the educational institutions, the key component of the education sector, are strong enough to deliver services in climate change contexts. In countries like Bangladesh which is severely affected by climate change threats, educational institutions has been struggling to continue education, even sometimes to secure their existence. In this connection international agencies such as UNESCO, member states through UNFCCC CoP meetings have been keeping their voice high so that pertinent agencies in the member countries can take necessary steps to strengthen their capacity to cope up with the changed situations. For instance, UNESCO considered education as the key sector to fight against disaster impacts and negative consequences of climate change since education provides long lasting and effective capacity development window for the people living in delicate environmental and hazard conditions. Importance in this regard are echoed in Bonn[2] Declaration (2009), UNESCO's international seminar[3] held in 2009 in Paris, written in UNESCO strategy[4] for the second half of the DESD, also reflected in the UNESCO expert meeting on CCESD and adaptation in SIDS (Small Island Developing Countries). In addition, UNFCCC Article number 6 (education and outreach) also indicated that education, training and public awareness and access to information in relation to climate change could help communities, local governments and nation states to combat climate change and also to reduce disaster impacts. In this connection UNESCO developed and adopted national CCESD project aiming to support the capacities of education policy makers and teacher training institutions in member states to strengthen their educational responses to mitigate and adapt to climate change. In preamble of the project, UNESCO says "responding to the international pronouncements and recognizing that education offers an untapped opportunity to combat climate change, UNESCO will use Climate Change Education as an entry point for promoting the principles and practice of sustainable development through education (UNESCO Roadmap on CCESD)". UNESCO's Programme and Budget Action 3 and Expected Result (number 8) also strongly aligned to this call.

National CCESD projects support member states through capacity development in the areas of education policy and planning, curriculum development, teacher-training,

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[2] The Bonn Declaration, the outcome of the UNESCO World Conference on Education for Sustainable Development (Bonn, Germany, 2009) requests UNESCO, as lead agency for the DESD, to "intensify efforts and initiatives to put climate change education higher on the international agenda, in the framework of the DESD, in the context of UNESCO's strategy for action on climate change, and as a component of UN-wide action."

[3] Seminar participants at the UNESCO International Seminar on Climate Change Education (Paris, July 2009), which placed particular emphasis on the challenges faced by Small Island Developing States (SIDS), suggested that UNESCO should take a lead on climate change education by reinforcing its role within the ESD programme. It should "accelerate the mainstreaming of ESD and with it CCE in all its components, in all sectors and levels of education, public awareness and training worldwide."

[4] The **UNESCO Strategy for the Second Half of the DESD** draws on findings and lessons learnt from the first phase of the DESD monitoring and evaluation (M&E) process, the UNESCO World Conference on ESD and the Bonn Declaration, and the outcomes of other key international ESD meetings. It requests UNESCO to support Member States and other stakeholders in addressing global sustainable development challenges through ESD, by focusing on the following three key action themes: **climate change, biodiversity, and disaster risk reduction and preparedness**.

reforming and greening Technical, Vocational Education and Training (TVET) programmes and developing education plans and programs for disaster preparedness. One of the major activities of CCESD Programme is to develop capacity of policy makers so that they can contribute in national policies and plans by taking or offering appropriate and informed suggestions. This policy making may need required and necessary information on education-disaster related issues so that policy makers can understand the whole range of problem dynamics of education sector.

1.4. Alignment of CCESD project with national drivers

Bangladesh produced its National Adaptation Program of Action (NAPA) in 2005 and BCCSAP (in) was a lead player on NAPAs in the UNFCCC. But weaknesses resulting from relying on selective approach became clear. For example, NAPA adopted a top down approach, participation of the grassroots people was unsatisfactory and education did not receive required attention. Later impelled by Cyclone Sidr (November 2007) and Aila (May 2009) and with the stimulus of the Bali Action Plan (2007), the GoB prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP, Table 1) in 2008/09 to provide strategic direction on climate change actions. Prior to BCCSAP formulation, GoB formulated a number of national and sector specific strategies and action plans including the national water management plan, the national biodiversity strategy and action plan for Bangladesh and different environmental management and regulatory plans that got climate components. All these policy development learning in related sectors contributed in formulating this BCCSAP in 2009. BCCSAP also did not consider education as a separate important sector that can help

Table 1.1: Major themes of Bangladesh Climate Change Strategy and Action Plan.

Theme 1: Food Security, Social Protection and Health:	The first relates to ensuring food and livelihood security, especially for the poorest and most vulnerable in society, including women and children. It focuses on the needs of this group for food security, safe housing, employment and access to basic services, including health.
Theme 2: Comprehensive Disaster Management:	This is to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.
Theme 3: Infrastructure:	This Action Plan is to ensure that existing assets (e.g. coastal and river embankments) are well-maintained and fit-for-purpose and that urgently needed infrastructure (e.g. cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.
Theme 4: Research and Knowledge Management:	This is to predict the likely scale and timing of climate change impacts on different sectors of the economy and socioeconomic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on science, and best practices of climate change management.
Theme 5: Mitigation and Low Carbon Development:	This is to evolve low carbon development options and implement these as the country's economy grows over the coming decades and the demand for energy increases.
Theme 6: Capacity Building and Institutional Strengthening:	This is to enhance the capacity of government ministries and agencies, civil society and the private sector to meet the challenge of climate change and mainstream them as part of development actions.

[5] Participants of the UNESCO **Expert Meeting on Climate Change Education for Sustainable Development and Adaptation in Small Island Developing States (SIDS)** (Bahamas, September 2011) developed recommendations on Climate Change Education for SustainableDevelopment in Small Island Developing States, which they addressed to UNESCO, its Member States, educators and other stakeholders.

[6] UNESCO's Programme and Budget (36/C5), Main line of action 3: Supporting education system responses to contemporary challenges for sustainable development and a culture of peace and non-violence, Expected result 8: Capacities inMember States strengthened to integrate a holistic vision of education for sustainable development, including climate change education and education for disaster preparedness and risk reduction, into educational policies, development plans and programmes.

the nation, through capacity development, better cope with the threats induced by climate change uncertainties; rather it is conceived that different thematic areas such as comprehensive disaster management (Theme 2), infrastructure (Theme 3), research and knowledge management (Theme 4) hold components to address climate change and disaster related challenges for different sectors including education sector. Financial allocation wise all these Themes (i.e. Theme 2, 3 and 4) remained low compared to Theme 6 (capacity building) and Theme 1 (Food security) (see Table 1.2).

Even expenditure of education related Ministries (i.e. Primary and Mass Education and Ministry of Education) is much lower than Ministries like Local Government Division, Ministry of Agriculture etc. (Table 3).

Table 1.2: Climate sensitive expenditures under different thematic heads.

Theme	% of Total Budget Attributable To Climate		
	2009/10	2010/11	2011/12
Theme 6: Capacity building of institutions	28.3%	29.4%	27.5%
Theme 1: Food security, social protection and health	23.5%	24.6%	24.5%
Theme 3: Infrastructure	18.5%	17.1%	19.3%
Theme 2: Comprehensive disaster management	17.9%	17.0%	17.8%
Theme 4: Research and knowledge management	8.4%	9.0%	7.5%
Theme 5: Mitigation and low carbon development	3.5%	2.9%	3.3%
Total	**100.0%**	**100.0%**	**100.0%**

Table 1.3: Key Ministries (Financial Basis) in the Delivery of Climate Activities[7]

Ministry (Lakh Taka)	Total Resources Allocated (2009/10 to 2011/12)	% of Total
Local Government Division	2,038,269	22.1%
Agriculture	1,816,482	19.7%
Disaster Management and Relief Division	1,617,476	17.5%
Primary and Mass Education	537,712	5.8%
Roads and Railway Division, Communication	532,158	5.8%
Water Resources	403,721	4.4%
Social Welfare	365,089	4.0%

[7] Climate Public Expenditure and Institutional Review. Conducted by General Economics Division, Planning Commission, Dhaka. 2013.

Ministry (Lakh Taka)	Total Resources Allocated (2009/10 to 2011/12)	% of Total
Planning Division	338,347	3.7%
Women & Children Affairs	255,426	2.8%
Environment and Forest	250,660	2.7%
Other Ministries / Divisions (27)	1,062,831	11.5%
Totals	**9,218,172**	**100.0%**

More grim picture is depicted in education sector when climate sensitive expenditures in non-development and annual development spending are combined (Table 1.4). The figures in Table 1.4 suggest that education sector expenditures stands at only 0.3% (non-development and annual development) of the total expenditures in the fiscal year 2009/10. This figure showed a slight increase in year 2010/11 (1.5%) but remained the same in 2011/12 fiscal year (1.5%).

Table 1.4: Combined ADP and Non Development Budgets By Ministry. Source: CPEIR Study

Ministry Lakh Taka	Non Dev & ADP 2009/10	% of Total	Non Dev & ADP 2009/10	% of Total	Non Dev & ADP 2009/10	% of Total
Local Government Division	624,328	23.3%	703,905	20.5%	710,036	22.8%
Agriculture	528,719	19.8%	699,397	20.4%	588,366	18.9%
Disaster Management and Relief Division	473,498	17.7%	579,909	16.9%	564,069	18.1%
Roads and Railway Division, Communication	138,419	5.2%	157,337	4.6%	236,402	7.6%
Water Resources	99,260	3.7%	156,824	4.6%	147,637	4.7%
Social Welfare	91,960	3.4%	137,079	4.0%	136,050	4.4%
Primary and Mass Education	212,158	7.9%	213,400	6.2%	112,154	3.6%
Planning Division	67,887	2.5%	161,414	4.7%	109,046	3.5%
Environment and Forest	63,234	2.4%	93,458	2.7%	93,968	3.0%
Women & Children Affairs	74,873	2.8%	91,843	2.7%	88,710	2.9%
Rural Development and Cooperative Division, Local Government	28,860	1.1%	43,077	1.3%	50,154	1.6%
Education	8,712	0.3%	52,265	1.5%	46,911	1.5%
Prime Minister's Office	12,355	0.5%	27,175	0.8%	30,931	1.0%
Fisheries and Livestock	18,249	0.7%	26,640	0.8%	30,409	1.0%
Chittagong Hill Tracks Affairs	19,196	0.7%	35,574	1.0%	30,334	1.0%

Ministry Lakh Taka	Non Dev & ADP 2009/10	% of Total	Non Dev & ADP 2009/10	% of Total	Non Dev & ADP 2009/10	% of Total
Energy and Mineral Resources Division, Power, Energy and Mineral Resources	19,015	0.7%	54,722	1.6%	29,913	1.0%
Housing and Public Works	43,437	1.6%	41,743	1.2%	29,226	0.9%
Shipping	5,379	0.2%	24,812	0.7%	24,499	0.8%
Expatriates Welfare and Overseas Employment	0	0.0%	4,000	0.1%	13,858	0.4%
Public Administration	5,439	0.2%	7,828	0.2%	8,178	0.3%
Home Affairs	1,480	0.1%	1,413	0.0%	5,462	0.2%
Defence	9,513	0.4%	4,433	0.1%	4,933	0.2%
Land	9,932	0.4%	6,779	0.2%	4,331	0.1%
Food Division	2,046	0.1%	3,782	0.1%	2,866	0.1%
Power Division, Power, Energy and Mineral Resources	4,384	0.2%	4,850	0.1%	2,486	0.1%
Health and Family Welfare	108,833	4.1%	93,910	2.7%	1,790	0.1%
Civil Aviation and Tourism	0	0.0%	550	0.0%	1,700	0.1%
Science, Information and Communication Technology	804	0.0%	2,602	0.1%	1,588	0.1%
Textile and Jute	1,625	0.1%	1,325	0.0%	881	0.0%
Cultural Affairs	0	0.0%	522	0.0%	830	0.0%
Commerce	0	0.0%	0	0.0%	612	0.0%
Bank and Financial Institute Division, Finance	411	0.0%	71	0.0%	541	0.0%
Industry	384	0.0%	446	0.0%	478	0.0%
Youth and Sports	119	0.0%	265	0.0%	81	0.0%
IMED, Planning	123	0.0%	10	0.0%	0	0.0%
Jute & Textile	328	0.0%	411	0.0%	0	0.0%
Statistics	0	0.0%	11	0.0%	0	0.0%
Totals	**2,674,960**	**100.0%**	**3,433,782**	**100.0%**	**3,109,430**	**100.0%**

All these figures are reflected in the study titled "Climate Public Expenditure and Institutional Review", conducted by General Economics Division (GED) of Planning Commission, Bangladesh. The purpose of the CPEIR study was to show a comparative assessment how different sectors/Ministries of Bangladesh do spending in climate sensitive sectors. The CPEIR study also aimed to show that institutions in Bangladesh are capable enough to deliver services that will make the people and systems capable of handling disaster impacts. The most important argument that this study made that Bangladesh Government from its own sources spends three quarters of the whole climate sensitive expenditures per year and this figure stands at One Billion USD per year.

Box 1.1: Higher Government Expenditures are Happening in Climate Sensitive Sectors in Bangladesh.

Government is the largest funder of climate actions in Bangladesh – around three quarters of government expenditure is funded from domestic sources. The Government typically spends around 6% to 7% of its annual combined development and non-development budget on climate sensitive activity which equates to an annual sum in the region of US$1bn at current exchange rates.

- CPEIR Study 2013, Planning Commission, Bangladesh.

These facts provide a strong rationale for this CCESD study as well. Because it can be argued that if climate change and disaster preparedness related gaps in education sector is properly identified and facts and figures are produced then the government could do more for strengthening the sector and make it climate resilient since government spending is significantly higher than the donor or other source supported spending in climate sensitive sectors. In addition, at present there are five different funding modalities are occurring in Bangladesh which could also be aligned in their spending if proper figures regarding education sector vulnerability is identified (Box 2 mentioned climate funding modalities in Bangladesh).

It is important to note here that the NAPA, BCCSAP, CPEIR, Climate Fiscal Framework (CFF) and other similar documents produced by Comprehensive Disaster Management Programme (CDMP I and II) have been arguing in recent times that climate change programs should be mainstreamed into regular government programs and thus it will bring more sustained results towards climate resilience than time-bound project mode of program implementation. It is also urged that this mainstreaming should be started from macro planning process such as mmainstreaming into Annual Development Plan (ADP), Five Year Plan (FYP), and the long term Perspective Plan (Currently Government adopted Vision 2021 Plan).

Box 1.2: Sources of funding in climate sensitive sectors in Bangladesh.

- Non development budget
- Annual Development Programme (ADP)
- Bangladesh Climate Change Trust Fund
- Bangladesh Climate Change Resilience Fund
- Donor/NGO funds including PPCR

CDMP II is now promoting mainstreaming approach through programmes of different Ministries. For instance, CDMP II supported NCTB (National Curriculum and Textbook Board) to incorporate climate change and disaster management issues from class 3 to class 12 and also facilitated training for the school teachers. In doing that CDMP II helped to develop Master Trainers who are supposed to train the teachers at the ground levels. CDMP II also facilitated an independent study on the state of incorporation of climate change, disaster aspects in the textbooks, the report made a critical appraisal and developed a set of recommendations for further improvements (see more http://cdmp.org.bd). In

addition, CDMP II developed a partnership with Ministry of Education for training school and college teachers on similar aspects. Moreover, CDMP II helped to improve access to knowledge sources and established two knowledge management decentralized systems, i.e. (i) e-learning facility (http://elearning.cdmp.org.bd/) with 10 e-learning centers[8]; (ii) the solution exchange community on DRR & CCA which now has more than 578 registered practitioners. In addition a total of 887 students have completed or currently engaged in different levels of higher education and diploma certification on disaster risk reduction and climate change adaptation modules; a number of participants in these courses are CDMP II-sponsored government officials.

It is also important to mention here, Government of Bangladesh (GoB) has developed the National Plan for Disaster Management (NPDM) 2008-2015 in 2008 for addressing Disaster Risk Reduction (DRR) and climate change adaptation (CCA) comprehensively in all development plans, programmes and policies. The policy highlights priorities for disaster risk reduction and adaptation through assessment of climate change risk, community-based programmes for risk reduction, public awareness, improving early warning systems, and communication facilities strengthening emergency response systems.

The accounts given above on national policies (e.g. NAPA, BCCSAP), planning processes (e.g. NPDM 2008-2015, CPEIR, National Macro and Sector Plans), existing funding mechanisms and actions (e.g. BCCTF, BCCRF, PPCR), project level interventions (e.g. CDMP II) in areas of climate change and related disaster management aspects indicates that the Government of Bangladesh has supporting disaster impacts reduction efforts and climate actions in many ways and means and resulted in gradual development of institutions and frameworks in this regard. In addition, Ministry of Finance is currently trying to develop a Climate Fiscal Framework (CFF) so that specific budget codes could be introduced for climate sensitive expenditures; once introduced these budget codes will strongly help to make a balanced allocation of financial resources among different sectors and it will also help to better track the impacts and changes happened as a result of interventions. In these contexts, this CCESD project will add value to the existing activity frameworks by facilitating regular/updated supply of necessary information to planning and practice professionals on education sector (specially from educational institutions) generated by BANBEIS.

1.5 Methodological Procedures of CCESD Pilot study

1.5.1 Consultations processes

A number of meetings with UNESCO, BANBEIS professionals has taken place and discussed many practical aspects and set strategies so that the CCESD project is successful at the end of its time in generating education-disaster-climate change impacts data which will finally help to develop a National Report (Compendium) in this regard. However, some of the key observations are important to indicate here, which are given in the following sections.

1. Household level education impacts remain missing in disaster education assessments: Impacts of disasters on education is primarily conceptualized happening at school level, but impacts that happened at household level deeply affect education of children. The impacts include (i) competency loss in certain subjects like Mathematics and English because family members cannot support them while students are in need, (ii) expenditure burden on parents to continue education or send children back to school is always a challenge at household level. These impact conditions on education occurring at household level are generally not recognized or accounted for. Participants in the meeting suggested assessing disaster induced house level disturbances on education while undertaking Country Case Study.

2. Mothers are the change agent for better education: The second suggestion is connected to the first one, where the participants indicated that mothers of children are the primary agents to ensure continuation of education in different phases of disasters like pre, during and post disaster situations. Therefore, the recommendations of the CCESD project should include that mothers should be put at center to reduce disaster impacts on children's education.

[8] These centers are established at BARD, Comilla; RDA, Bogra; Admininistration Academy, Dhaka; Centre for Vulnerable Studies, Dhaka University, Dhaka; Khulna University, Khulna; Shahjalal University of Science & Technology, Sylhet;

3. Health and nutrition of students: Health and nutrition of children are important elements of consideration to make sure that the children are physically capable of receiving lessons. Food and nutritional securities of children are always being threatened during and after disaster times. These food and nutritional insecurity conditions leave students malnourished and participation in educational processes/activities is always difficult for half-fed, malnourished children. In addition, disease prevalence also becomes common during these times. Participants recommended paying attention in these health and nutritional aspects of students for making sure that they are ready and fit for participating educational processes.

4. Inclusion of wider community: The meeting participants indicated that local wider community (outside PTA and SMC) also play important roles in continuing education during and after disasters. Therefore, their roles and state of engagements should be assessed in the pilot study.

5. Gender dimension should not be overlooked: Boys and girls experience disaster induced challenges differently whether it is accessing to schools, during schooling periods and after-school returning homes. Stakeholders also mentioned that during disasters parents generally prefers not to send girls to the schools for security reasons but boy are allowed in the same circumstances. In the similar way, female teachers find it hard to come to schools immediate after disasters because of the poor, disrupted and financially expensive communication systems, where it is not a big problem for male teachers. These gender dimensions are very important considerations for ensuring quality education in the contexts of disasters. The meeting participants suggested paying attention in these areas.

6. Industrial zones to be incorporated in the piloting: The consultant suggested 12 different disaster affected areas for piloting the project. The participants also suggested industrial zones to add in the study.

1.5.2 Expert recommendations to identify key variables

As mentioned before the recommendations were received from the educational sector experts through a consultation process[9]. The purpose of this consultation meeting was to inform the stakeholders about the CCESD project and at the same time to seek suggestions so that the project can effectively facilitate a process that finally help to generate information relating to disaster risks and climate change impacts from about 150,000 primary and post primary educational institutions of Bangladesh (on a sample basis). However, the suggestions and recommendations received from the participants, which are given below.

- ***Changes in education systems that happened in recent years should be properly captured:*** Many new changes have taken place in recent years and interventions introduced in education systems in Bangladesh aiming to improve the education environment in schools and colleges. These changes include introduction of DRR, CCA aspects in school curriculums (i.e. from class III to class XII), many educational institutions developed WaSH (Water Sanitation and Hygiene facilities) facilities, and many others were upgraded as schools cum emergency shelter places. These interventions brought both positive and negative effects in the learning environment and at the same time helped to gain disaster resilience in some cases and in many instances these changes cause more problems to the educational institutions. In this backdrop, the stakeholders suggested that all these changes that happened in recent years should properly be captured in the pilot assessment process so that the measures taken by educational institutions for disaster risk reduction (DRR) and also the adopted interventions for effective climate change adaptations (CCA) could properly be understood. These understanding would help to assess the Loss and Damage[10] of the educational institutions in Bangladesh since the concept of Loss and Damage introduced in

[9] The participants were Representative of Directorate of Secondary and Higher Education(DSHE), Representative of Ministry of planning, Representative of Ministry of Education(MoE), Representative of Ministry of Primary and Mass Education (MoPME), CDMP II, UNESCO, CAMPE(Representative of Rasheda K. Chowdhury), PPRC, FREPED (DR. Professor Kazi Saleh Ahmed), IER(DU), EED(Educational Engineering Department), LGED(Local Government Engineering Department).

[10] Decision 1/CP.16, paragraph 25

Cancun meeting (i.e. CoP16) is mainly based on DRR and CCA schools of thoughts.

- ***School Safety Plans should be read:*** Many educational institutions in Bangladesh have adopted effective disaster management plan, though these are labeled in different names like Disaster Contingency Plan, School Safety Plan or Comprehensive School Safety Plan, Continue Education in Emergencies etc. These approaches finally end up in attaining safe school facilities, better disaster management plan and to ensure resilient education system. The stakeholders suggested assessing the status of these approaches/ plans in the pilot study.

- ***Psychological shocks/trauma should be taken into consideration:*** Disaster events that are generated from hydro-meteorological extremes or geological hazards generally strikes as powerful events and cause huge damage to properties and assets and loss of lives (both human and animal). These damage and devastations cause psychological trauma to the students and teachers that seriously hampers learning processes in educational institutions. Better understanding of these soft, non-quantifiable dimensions of disaster impacts would help to adopt appropriate measures in this regard.

- ***Capturing the impacts of non-extreme, slow-onset climate change induced disasters:*** Estimating the loss and damage happened as a result of big and sudden disaster events is comparatively easy than accounting the loss incurred from slow-onset disasters like sea level rise, salinity intrusion, rapid gradual increase in temperature etc. These slow, minute events gradually, slowly and steadily cause huge internal damage to school infrastructure, furniture and other education support facilities (making these weak and leave susceptible to upcoming disasters) of the educational institutions. These progressive internal fragility conditions cannot be realized properly and thus institutions cannot take appropriate safeguard measures and finally at some point schools experience break down conditions of the facilities. The meeting participants advocated for assessing these issues in the pilot study.

- Secondary information of similar kinds would be useful source for value addition: Different agencies at different levels generate database on different variables and indicators. In the absence of DRR and CCA sensitive education database, these secondary datasets might not provide meaningful insights. But in contrast, coupling with disaster-education data, these secondary information might provide very useful knowledge and understanding. For instance, standalone use of Community Series Data or Labor Survey Data published by Bangladesh Bureau of Statistics (BBS) might not have any meaning, but would provide useful analytical support once disaster-education data is generated. In this connection, the stakeholders suggested to use related secondary information while writing/developing the final report for this CCESD project.

1.6 Key variables and the questionnaire

The purpose of developing and presenting the narratives above is to propose some variables for generating DRR and CCA data from educational institutions of Bangladesh. The proposed variables were used in a pilot study that finally contributed to develop national Education-Disaster report or compendium. The results and recommendations will then be shared at different levels and some of the variables will be incorporated into existing BANBEIS questionnaire. However, the variables proposed and used to develop the questionnaire could be clustered into six thematic heads (Table 1.5).

1.7 The Education-Disaster data collection and sampling procedure

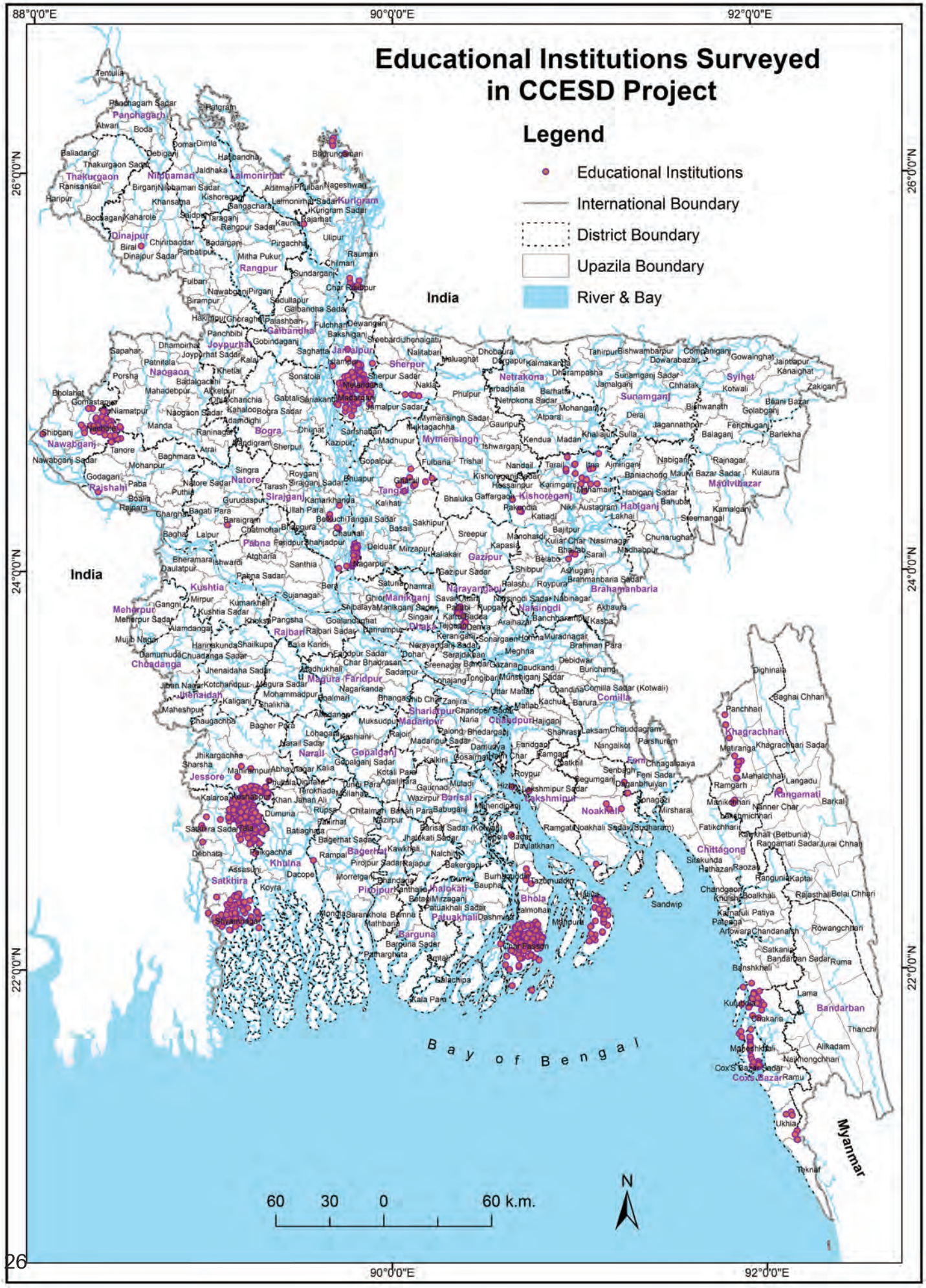
It was decided that cluster survey will be the appropriate method for identifying educational institutions that are to be consulted/interviewed for data collection purposes for CCESD project. The technical professionals based in BANBEIS identified and agreed that data need to be collected from 12 geographically distinct disaster and climate change vulnerable areas in Bangladesh (i.e. floods affected areas, cyclone and related water surge areas, isolated remote rural places, riverbank erosion, landslides, flash flood in haor areas, earthquake, water logging, salinity intrusion areas, drought prone areas, industrial areas, urban hazard representing areas; Map 1.1) as to represent the whole contexts. Thus a total of 12 upazilas (one from each cluster) were randomly selected (1800 educational institutions, Table 1.6) where the questionnaire survey was administered.

Table 1.5: Proposed DRR/CCA/CCE variables.

No.	Variable clusters	Likely areas of use of information generated
1.	General situation related to DRR, CCA	General situation of the selected schools (e.g. physical location, use of school premise)
2.	Impact of disaster	Analysis of impact and risk of disasters on education (vulnerability-poverty-competency loss/dropouts).
3.	Vulnerability	Factors at various levels making primary, secondary, higher secondary education, students, teachers, education managers, vulnerable to disaster (including institutional preparedness).
4.	Level of preparedness	What is the status of preparedness at various levels (preparedness not only for risk reduction of school infrastructure rather to acknowledge and exercise transformational change to ensure reducing risk to education)?
5.	Coordination and stakeholders	Who are key stakeholders and effectiveness of current coordination mechanism? (assuming that vertical coordination/linkage between DRM and education is someway there, but horizontal coordination is missing)
6.	Capacity assessment	About current capacity of the stakeholders, capacity building needs, existing resources and strategies for disaster risk management (DRM) in education.

Table 1.6: List of educational institutions from different disaster affected regions from which quantitative data will be collected.

No.	District	Upazila	Number of school (Secondary)	Number of Primary School	Total Institution	Number of Enumerators
1.	Satkhira	Shyamnagar	83	91	174	9
2.	Satkhira	Tala	112	90	202	10
3.	Bhola	Charfesson	134	88	222	11
4.	Cox's Bazar	Pekua				
5.	Cox's Bazar	Moheshkhalai	38	20	58	3
6.	Sirajgonj	Chowhali	45	58	103	5
7.	Jamalpur	Madargonj	77	84	161	8
8.	Jamalpur	Melandah	72	69	141	7
9.	Jessore	Keshobpur	127	71	198	10
10.	Kishoregonj	Mithamoin	17	30	47	2
11.	Kishoregonj	Itna	21	23	44	2
12.	Chapai Nawabgonj	Nachole	56	35	91	5
13.	Khagrachari	Matiranga	27	30	57	3
14.	Rangamati	Kaptai	15	19	34	2
15.	Noakhali	Hatia	50	93	143	7
16.	Dhaka City	Tejgaon	18	6	24	1
17.	Dhaka City	Pallabi	39	16	55	3
18.	Kurigram	Char Rajibpur	19	27	46	2
			950	850	1800	90


Educational Institutions Surveyed in CCESD Project
Legend
Educational Institutions
International Boundary
District Boundary
Upazila Boundary
River & Bay
India
India
Myanmar
Bay of Bengal
88°0'0"E
90°0'0"E
92°0'0"E
26°0'0"N
24°0'0"N
22°0'0"N
60 30 0 60 k.m.
N

1.8 Conclusion

This chapter provides background contexts under which this CCESD pilot study was commissioned. The discussions suggest that there is a strong call from national drivers and international instruments relating to disaster impact reduction and climate change adaptation that continuation of strong and effective education processes would be one of the most appropriate measures to combat the disaster and climate change challenges. In this regard, this chapter played a transitional role through translating the national and international calls and suggestions given by education sector stakeholders into a study process. The chapter also highlighted the methodological procedures to carry out the pilot study. It indicates how literature review and stakeholder consultations contributed to develop study questionnaire for quantitative data generation and identify checklists for qualitative data gathering. The sampling processes adopted in this study, geographical focus and rationale for selecting twelve disaster hot spots are also illustrated in different sections of the chapter.

CHAPTER 2:

Disaster impacts and education in Bangladesh

Disaster impacts and education in Bangladesh

2.1 Introduction

Disaster impacts are differently affecting educational institutions in Bangladesh. These disasters are originated from strong and rapid events and also from slow onset disasters; both of these events are seriously influenced by climate change effects. This chapter discusses the region specific disaster impact conditions and showed how these challenges affecting education systems and processes in different disaster hot spots of Bangladesh. As mentioned before this pilot study was conducted in 1800 educational institutions located in twelve disaster affected zones of Bangladesh (Map 1.1). Thus this contextual assessment will provide a background understanding to realize the micro level impact situations happening at educational institutions.

2.2 Disaster Impacts and Education

Climate change and disaster impacts are, in most of the instances, interchangeably used in Bangladesh since the most devastating disasters (like flood, cyclones) are spawned from hydro-meteorological (climatic) processes. Therefore experts and professionals generally pay attention and talk about the natural hazards/disasters as proxy to climate change events that results from different climatic processes. The same fashion of introduction and discussion about climate change and disasters is followed in this pilot study, meaning the impacts of common hydro-meteorological hazards like floods, cyclones, salinity intrusion were used to portray climate change impacts as proxy.

It is relevant to mention that in Bangladesh some disasters are regular occurring phenomenon and engulf wide range of areas when it strikes like flood covering vast floodplains and deltaic areas and cyclone impacting wide range of coastal areas. On the other hand some hazards happen in certain regions like flash floods are generally occurring in north-eastern low Haor areas, landslides are confined in hill regions. However, the most important point to consider regarding disasters while putting education sector in the context is that the occurrence of successive disasters contributes in leaving and pilling up numerous residual impacts in educational institutions and this make a big challenge for the schools to recover damages. Because in successive disaster conditions the institutions get less time and resources to address/heal up impacts that happened by last disaster before next disaster strikes. Flood[11] and cyclones are such kinds of disasters in Bangladesh that creates huge impacts (could better be said impact of scale) conditions upon

[11] Brammer (2004), rightly distinguished flood and flooding: flooding is normal seasonal submergence of some flood plains, valley and terrace which occurs every year while flooding and to which people's traditional settlements and livelihood is well adopted.

Box 2.1: 2007 Disaster impacts (Cyclone SIDR and Flood 2007)

- School building collapsed: About 72% of the schools in the flood affected areas reported that one of their school buildings were collapsed due flood hazards (28% for cyclone affected areas)
- Classroom damaged: About 60% of the schools in the flood prone areas mentioned that they have got a mean of 03 classrooms damaged during the last ten years.
- Repeated relocation: Relocation of school and impacts of river erosion also high in the flood affected areas.
- Schools used as cyclone shelter: About 65% of the schools in the cyclone affected areas reported that their premises were used as shelters for disaster victims during the occurrence of cyclone SIRD in 2007, this figure stands at 35% for 2007 flood occurrence.
- Learning materials damaged: About 70% of the schools mentioned that damages happened to the learning materials like blackboard, duster and classroom furniture like chair, bench and table
- Dropouts: The schools in flood and cyclone affected areas reported 3 to 4 percent dropout of students from the schools as an impact of disasters on top of regular dropouts About 60% of the schools indicated in the flood affected areas that relocation is the cause of students' abandoning of education. Schools in the cyclone affected areas reported that engaged in the family income (72%), move to other school (85%), early marriage (52%) are the major reasons of quitting the school.
- Competency loss: The competency of the students fall in Mathematics and English as an impact of disasters. The students of class five suffer the most. Student coming from poor families can not recover the loss. About 40% students in the flood affected areas and 60% from cyclone affected areas can not afford opportunities to lessen the competency loss (students from poor families)
- Location and associated problems: The elevation of the school from regular flood heights, disruption in the communication pathways and modes, likely impacts of river bank erosion and locational closeness to weak embankments were considered by the schools as the prime threats to the schools which may hamper education activities in the upcoming days.
- No support received: About 25% of the schools claimed that they did not receive anything to retrieve the resources in the previous state or in a further better form.

Source: Islam, S.T., Alam, K. and Rahman, K.A. (2010). Baseline Assessment Report: Strengthening Preparedness and Response Capacity in Flood and Cyclone Prone Areas in Bangladesh (Implemented by Save the Children-UK and Plan International). Dhaka.

educational institutions through occurrence of repeated episodes, where similar disasters happening in certain gap intervals create much less impacts. On the other hand, slow and progressive climate change disasters like salinity intrusion, increase in the tidal heights and related inundation, change in the temperature or precipitation pattern cause challenges that are different from the impact conditions mentioned before. Disaster and corresponding impact conditions on education are mentioned below (Table 2.1) for detailed understanding. However, considering the importance (in terms of frequency and magnitude) only flood and cyclonic disaster impacts are briefly discussed here.

Flooding is reported almost every year in Bangladesh, sometime more than one event takes place in a year. Between 1972 and 2009, Bangladesh faced 10 major

floods. In flood 2004, a reported figure of around 400 people died in diarrhea in Bangladesh. Total 50,000 Number of educational institutions damaged and/or destroyed by flood in last ten years where only in 2007 flood around 13000 educational institutions fully and partially damaged (Box 2.1 highlights the 2007 flood and cyclone disaster on educational institutions in Bangladesh).

On the other hand, Bangladesh faced 49 major cyclones between 1584 and 2009. In November 1970, between 300,000 to 500,000 people were lost with 400,000 houses and 3,500 schools completely damaged. During more severe storm in May 1991, about 140,000 people died and damaged and dislocation caused estimated loss of USD 2.4 billion. However, due to the improved warning dissemination system, active role of cyclone volunteers and coordinated effort by the government and non-government agencies, the death toll remain under 4000 in 2007 cyclone SIDR that devastated almost 30 districts and costs 2.3 billion US dollars loss to different sectors. Total 14,799 educational institutions destroyed and damaged in SIDR. Around 5000 educational institutions damaged by Cyclone Aila in 2009 and the death toll was around 400.

Table 2.1: Disaster impact calendar for educational institutions in Bangladesh[12]

Impacts on policy and procedure	Impacts on facilities and materials	Impacts on services and delivery	Impacts on access and participation
Impacts of Cyclone and Storm Surge on Education			
Use of schools as shelter; School repair and reconstruction;	Building collapse; Damage to classroom, Water supply system and sanitation facilities; Loss of furniture and equipment/ teaching learning materials;	Classroom activities and learning sessions are suspended; Water supply and sanitation service become non-functioning; Recreational activities are unobtainable;	Attendance rates diminish due to · Displacement, · Emotional and physical distress, · Loss of learning materials, · Unavailability of water and sanitation service, · Low attendance of teacher Dropout rate increases due to · Migration, · Displacement, · Participation in child labour,
Impacts of Flood on Education			
Use of schools as shelter; School repair and reconstruction;	Damage to classroom, water supply system, sanitation facilities, furniture and equipment/ teaching learning materials;	Classroom activities and learning sessions are suspended; Water supply and sanitation service become non-functioning; Recreational activities are unobtainable;	Attendance rates diminish due to · Displacement, · Emotional and physical distress, · Loss of learning materials, · Unavailability of sanitation service, · Inundated/damaged roads, · Low attendance of teacher Dropout rate increases due to · Migration, · Displacement, · Participation in child labour,

[12] Source: Education in Emergency: Exploring options for continued education during disasters in Bangladesh. Conducted by NIRAPAD for Global Education Cluster in 2014, Dhaka.

Impacts on policy and procedure	Impacts on facilities and materials	Impacts on services and delivery	Impacts on access and participation
Impacts of Flash Flood on Education			
School repair and reconstruction; Timely completion of curriculum and exam schedule;	Damage to classroom, water supply system and sanitation facilities; Loss of furniture and equipment;	Classroom activities and learning sessions are suspended; Water supply and sanitation service become non-functioning;	Attendance rates diminish due to · Unavailability of sanitation service, · Inundated/damaged roads, · Low attendance of teacher Dropout rate increases due to · Participation in child labour
Impacts of Earthquake on Education*			
Restoration of disrupted education activities includes - reconstruction of infrastructure - deployment of teachers - curriculum and service delivery system	Building collapse; Damage to classroom, water supply system and sanitation facilities; Loss of furniture and equipment;	Classroom activities and learning sessions are suspended; Water supply and sanitation service become non-functioning; Recreational activities are unobtainable;	Attendance rates diminish due to · Displacement; · Death and injury; · Emotional and physical distress; · Loss of learning materials; · Unavailability of sanitation service; · Damaged roads; Dropout rate increases due to · Migration; · Death and injury; · No education service; · Participation in child labour;
* Based on the worst case scenario projected in Earthquake Risk Assessment of Dhaka, Chittagong and Sylhet City Corporation Areas, 2009, CDMP			
Impacts of Landslide on Education			
	Loss of classroom, water supply system, sanitation facilities, furniture and equipment;	Classroom activities and learning sessions are suspended; Water supply and sanitation service become non-functioning;	Attendance rates diminish due to · Displacement, · Emotional and physical distress, · Loss of learning materials, · Unavailability of sanitation service, · Inundated/damaged roads, Dropout rate increases due to · Migration, · Participation in child labour,
Impacts of Riverbank Erosion on Education			
School repair and reconstruction;	Loss of classroom, water supply system and sanitation facilities,	Classroom activities and learning sessions are suspended; Water supply and sanitation service become non-functioning;	Attendance rates diminish due to · Displacement, · Shifting of the school, · Unavailability of water and sanitation services, · Damaged roads, Dropout rate increases due to · Migration, · Displacement · Distance of the school, · Participation in child labour,

Impacts on policy and procedure	Impacts on facilities and materials	Impacts on services and delivery	Impacts on access and participation
Impacts of Salinity Intrusion on Education			
Timely completion of curriculum and exam schedule; School repair and reconstruction;	Decay of furniture and equipment; Damage to school building, Water supply system and sanitation facilities;	Water supply and sanitation service become non-functioning; Recreational activities are unobtainable;	Attendance rates diminish due to · Unavailability of water and sanitation services, Dropout rate increases due to · Participation in child labour,
Impacts of Water Logging on Education			
Timely completion of curriculum and exam schedule; School repair and reconstruction;	Damage to classroom, water supply system, sanitation facilities, furniture and equipment;	Water supply and sanitation service become non-functioning; Recreational activities are unobtainable; Limit scope of class room conduction	Attendance rates diminish due to · Displacement, · Loss of learning materials, · Unavailability of sanitation service, · Inundated roads, Dropout rate increases due to · Migration, · Displacement, · Participation in child labour,

2.3 Identifying DRR and CCA variables for CCESD pilot survey

2.3.1 Data collection processes that BANBEIS currently adopts

In gathering information on educational institutions, BANBEIS uses structured questionnaire as data collection tool. The existing questionnaire was developed though consultation processes and tested in the field for ensuring its comprehensiveness and appropriateness/consistency. Once the questionnaire tool is ready, BANBEIS takes measures to orient the data entry personnel/operators with this tool through training sessions/workshops. In training sessions the variables included in the questionnaire tools are explained explicitly so that the data entry operators could understand and gather correct information and then can input data in the system. It is imperative to mention that BANBEIS has developed their own capacity where both the data input and output (reporting aspects) could be done web enabled online systems. This opportunity facilitated data entry operations directly from schools. The headmaster or designated person in the school log on to BANBEIS website and can input data in the specified forms. Before doing that the schools gather/ arrange data by themselves. Once the preparatory data collection activities are done at schools the data entry operators in educational institutions are required to get the collected raw data approved by the Head Master of the school and Thana Education Officer of that Upazila (by receiving their signature at the end of the questionnaire), which ensures the quality and authenticity of the data. BANBEIS, thus ensures education data entry for more that 36000 educational institutions of Bangladesh distributed throughout the country and publish these data in website and in report formats.

2.3.2 DRR/CCA variables are missing in BANBEIS data

The illustrations presented in the sections above indicate that this national agency is playing significant roles in producing education sector data on different variables. But unfortunately they do not gather disaster (neither natural nor man made) related information like impacts of certain disasters on school resources and capacity, impacts on learning competency of the students, disaster preparedness plan and develop capability of students as individuals and school and agency to cope with the situations. However, in a nutshell it could be said that if data on disaster and climate change impacts related variables were generated these could help to

(i) understand the disaster impacts (including the likely impacts) on

physical resources of schools/colleges and on human population,

(ii) know about the DRR measures undertaken by the institutions (e.g. having first aid box, the replenishment status etc.),

(iii) know about the status of disaster management training/capacity of the teachers,

(iv) assess the situation of students in receiving disaster preparation such as drills etc.

2.3.3 DRR/CCA variables and existing questionnaire of BANBEIS

It is already mentioned in earlier sections that different national and international policy drivers urged to generate disaster and climate change related education sector data so that these can help/promote climate resilient education sector planning process. This section specifically indicates how this CCESD project responds to the calls mentioned in different national and international policies. The national and international policy drivers like Standing Orders on Disasters, SoD (i.e. the "D" form; column 23), BCCSAP (i.e. component T2P3), HFA (i.e. priority actions 2, 3 and 4) and Project Document of CDMP II (i.e. 1.3, information management) advocate for generation of information that may assist disaster risk reduction efforts in educational institutions. The information base, if generated, would help to assess the loss and damage of the educational institutions induced from disaster (also climate change induced) impacts; it would also help to know about the degree of DRR/CCA interventions taken from different corners for protecting schools/colleges from disasters. The review of the questionnaire that BANBEIS use to gather primary data from the educational institutions suggests that disaster related variables are missing. It is important to note here that BANBEIS has developed large and efficient (having own 8 computer server systems with high speed/dedicated internet facilities) ICT infrastructure to capture, archive primary data. In that consideration, this initiative will help to generate disaster related education data relying upon on the established operational systems. This disaster-education data collection process would assist to develop effective decision support systems for taking timely and necessary actions as to respond to the needs of pre-during-post disaster conditions of the schools/colleges.

2.4 Reviewing Education in Emergencies results

The research results of multi-party Education in Emergencies project provides the most useful and deep insights on the impacts of disasters on education sector in Bangladesh. Two key documents of this endeavor, i.e. (i) the two volume Baseline Survey results published in 2010 by Plan Bangladesh and (ii) the document titled Exploring Options for Continued Education during Disasters in Bangladesh, published by Global Education Cluster in 2014 showed how occurrence of different kinds of disasters in different times of the year in different parts of Bangladesh create diverse types of impact situations (Table 2.1). This Table was found to be useful to conceptualize the whole problem and finally assisted to suggest key variables for this study.

2.5 Conclusion

The CCESD project could be termed as a second generation initiative in Bangladesh that aims to address climate change induced challenges more effectively, specifically in education sector. The first generation activities may include (i) developing NAPA, BCCSAP documents, (ii) development of institutional architecture of different funding mechanisms like BCCTF, BCCRF, current initiative to develop Climate Fiscal Framework and (iii) pilot project based implementation of some interventions like CDMP Phase I and Phase II. The results and experiences generated in these first generation actions and institutional frameworks helped to identify knowledge/information gap for different sectors (including education sector) which impedes policy planners and field professionals to develop programs required to develop the system strong and resilient to climate change and disaster impacts. In addition, one important suggestion appeared from almost all the corners that mainstreaming climate change adaptation and disaster risk reduction efforts into existing/regular programs is the key to gain sustained success. It can be claimed that at the time when the first generation activities/institutional frameworks have reached at a matured stage in Bangladesh, this UN-Government (i.e. UNESCO-BANBEIS, MoE) initiative will immensely be useful where areas of real gaps/needs in educational institutions will be identified. It is expected that the information to be generated will help government and other stakeholders to effectively mainstream the required DRR/CCA/CCE activities into ongoing/regular programmes that in turn will make the education sector resilient to climate change and disaster induced threats.

CHAPTER 3:

Educational Institutions in Disaster Impact Areas

Educational Institutions in Disaster Impact Areas

3.1 Introduction

This chapter highlights the major characteristics of the educational institutions located in different disaster affected zones of Bangladesh in terms of their resources and capacity gaps in the contexts of disaster impacts and response process. The major areas of vulnerabilities of the institutions were also captured in the chapter.

3.2 Educational institutions covered in the survey

The pilot questionnaire survey was conducted in 1800 educational institutions (46.72% government and remaining 53.27% non-government) distributed in different parts of Bangladesh representing different disaster affected zones. A total of 683737 male and female students (47.64% boys, 52.35% girls) were covered in the survey, while this figure stands at 19523 (72.55% male and 27.44% female) for teachers (Table 3.1, Figure 3.1). It was observed that number of students per teacher in primary schools is high compared to secondary schools, madrassa and colleges (Figure 3.1). But data on the distribution of teachers indicates that secondary schools got highest percentage of teachers (38.18%). In tertiary level educational institutions, especially in the college, both the number of students and teachers are low, though the teacher student ratio is better than other educational institutions (only 23 students per teacher in college, Figure 3.1).

Table 3.1: Number of students and teachers covered in the survey

Type	Total Institution	Student		Teacher	
		Boys	Girl	Total	Female
Primary	843	110,044	114,331	2,091	2,255
School	550	124,917	137,196	5,364	2,090
Madrasha	329	64,195	80,529	4,912	576
Collage	78	26,623	25,902	1,797	438
Total	1,800	325,779	357,958	14,164	5,359

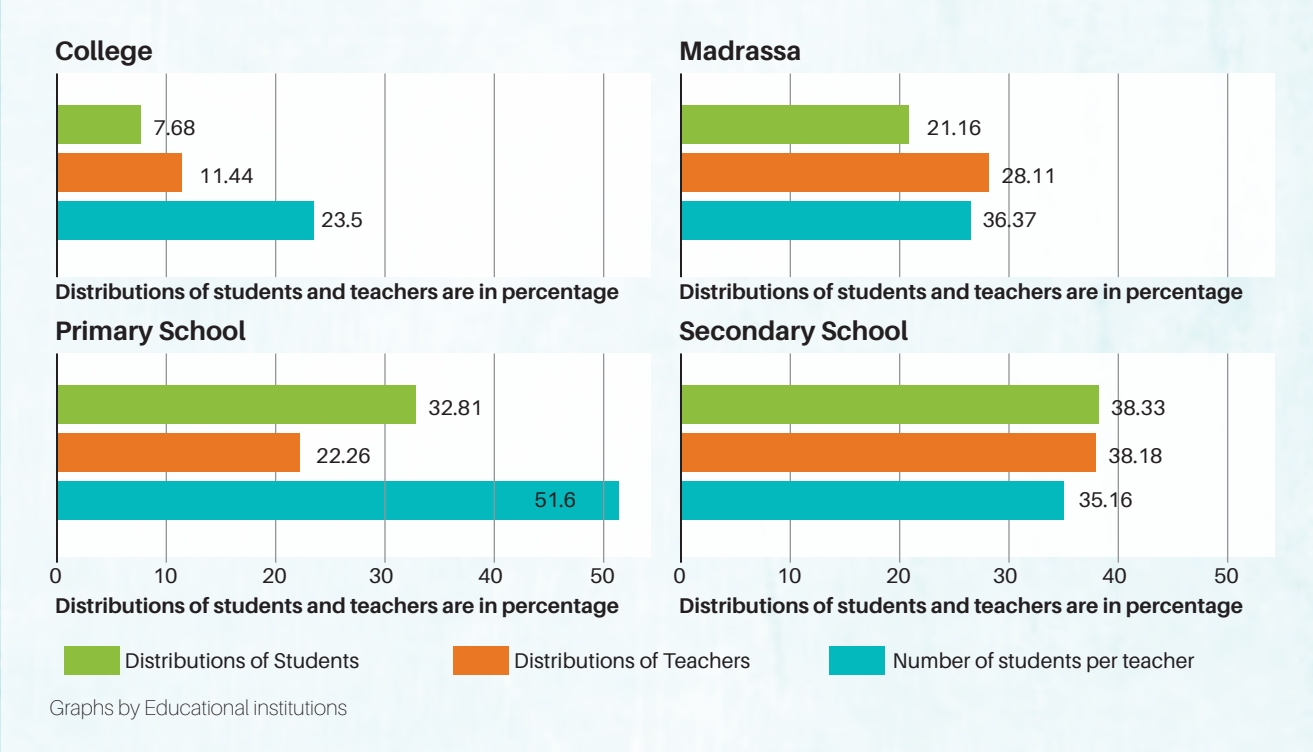


Figure 3.1: Distribution of teachers and students.

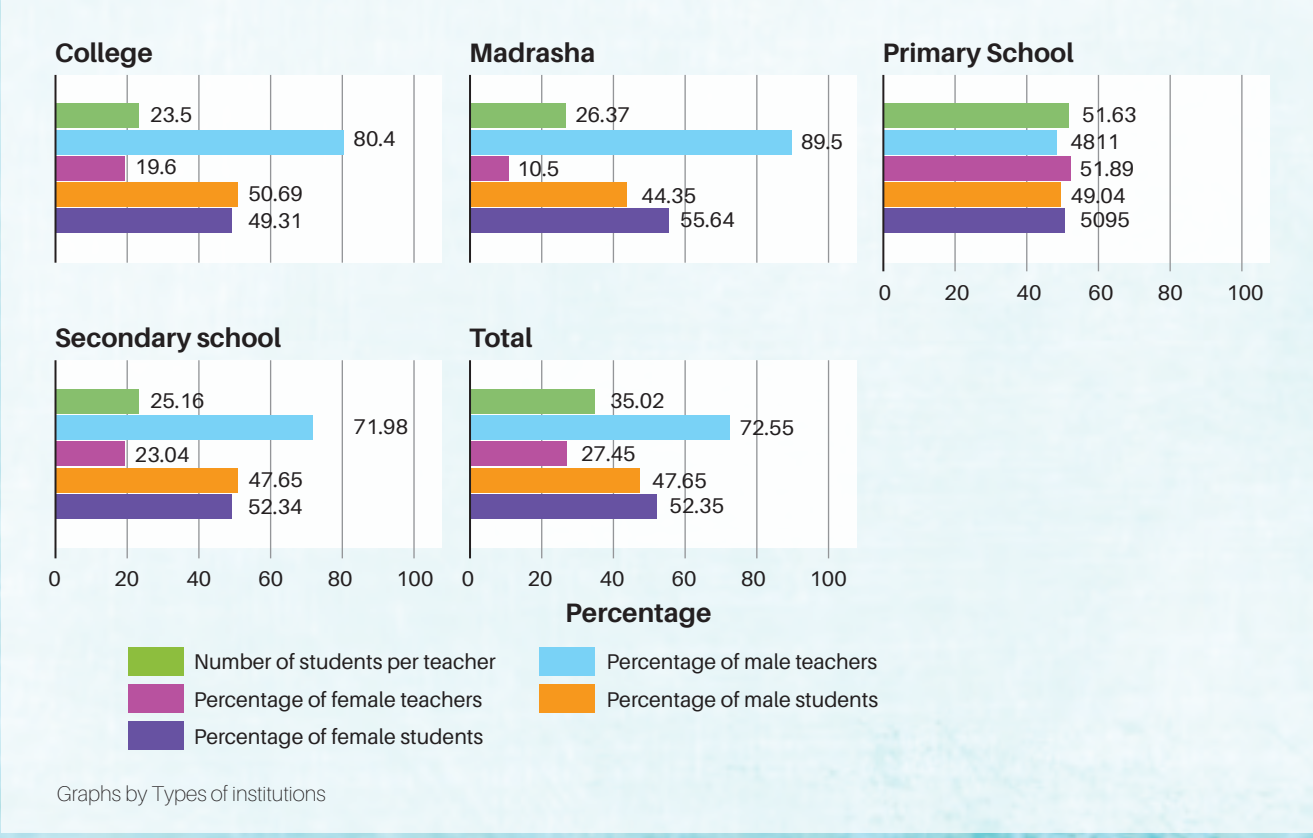


Figure 3.2: Gender disaggregated information on students and teachers

3.3 Infrastructural conditions and disaster vulnerability

Construction materials of building determine the degree of resilience of the school structure to both strong and slow onset natural hazards. Non-concrete structures generally use bamboo or wooden poles for pillars, thatch or grass for roof and bamboo mats for walls and most of the cases floors are earth made. On the other hand, concrete structures are RCC (rod-cement-concrete) made and sometimes these are multi-storied. Strong and rapid hazards like cyclones associated with water surge, strong water current, gusty winds, floods, river bank erosion, earthquakes can easily cause serious damage to the non-concrete (locally known as katcha) structures. On the other hand slow progressive hazards like water logging, salinity intrusion gradually deteriorate the condition of the structure and made the structure susceptible to upcoming hazards. In majority of the cases the concrete made structures are built by the government and their maintenance and repair activities depend on government evaluations-decisions-actions processes which is sometimes time consuming. The quantitative survey suggests that more than half of the surveyed schools (57%) are non-concrete or semi-concrete structures, while the remaining are concrete made. Primary schools got highest percentage (71%) of concrete made school building structures where Madrassas showed highest percentage of semi concrete structures (Figure 3.3). It was also estimated that 1800 surveyed schools got a total of 28383 classrooms among which 53% found to be mal-functioning. (14923 numbers) and the rest 47% (13460 numbers) are currently in working condition. This suggests that a significant portion of classrooms remain unused by the educational institutions. Impacts of recent disasters, cumulative and residual impacts caused by disasters happened in previous years, poor quality construction, lack of maintenance is the factors responsible for damage of these classrooms

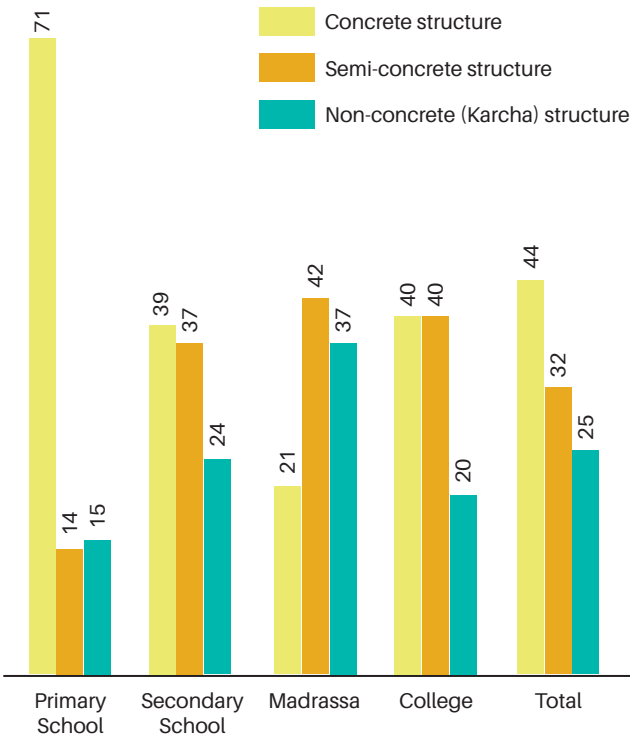


Figure 3.3: Building materials of educational institutions.

Table 3.2: Conditions of classrooms.

Classroom	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Total number of non-functional classrooms	3,935 (54%)	5,719 (52%)	4,057 (52%)	1,212 (52%)	14,923 (53%)
Number of functional classrooms	3,399 (46%)	5,176 (48%)	3,770 (48%)	1,115 (48%)	13,460 (47%)
Total	**7,334 (100%)**	**10,895 (100%)**	**7,827 (100%)**	**2,327 (100%)**	**28,383 (100%)**

Many schools located in coastal areas were found to be located in low lying areas (23% on an average, Table 3.2) from surrounding lands (Figure 3.4 and Table 3.2). This lower elevation also cause poor drainage conditions resulting to wet and dumpy conditions in the school environment. These dumpy conditions also may cause damage of school infrastructure and furniture.

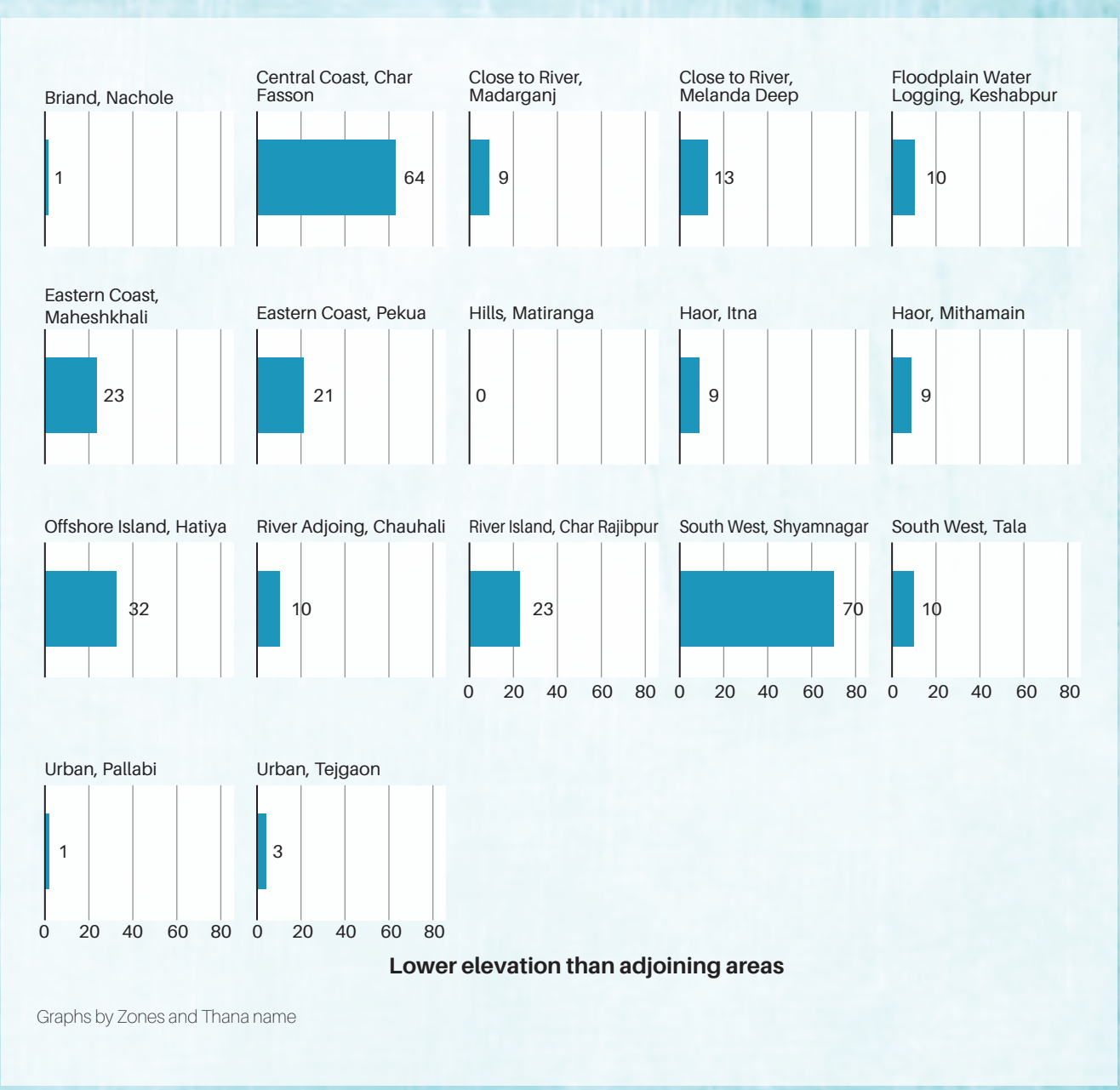


Figure 3.4: Ground elevation of educational institutions in different disaster zones.

Table 3.3: Ground elevation of educational institutions compared to adjoing areas.

Surrounding areas of the institution	Primary school	secondary school	Madrassa	College	Total
Lower than adjoining areas	207 (25%)	118 (21%)	69 (21%)	14 (18%)	408 (23%)
Higher than adjoining areas	115 (14%)	71 (13%)	31 (9%)	14 (18%)	231 (13%)
Equal to adjoining areas	498 (59%)	343 (62%)	216 (66%)	48 (62%)	1,105 (61%)

3.4 Access to schools

Students at primary, secondary levels and madrassa generally prefer institutions those are located nearby to their residence. The Figure 3.5 indicates that more than 80% of primary school students use non-asphalt roads in dry seasons (in the winter) to go schools and this figure remains almost the same in wet season. The Figure also shows that most of the college students prefer (88% in

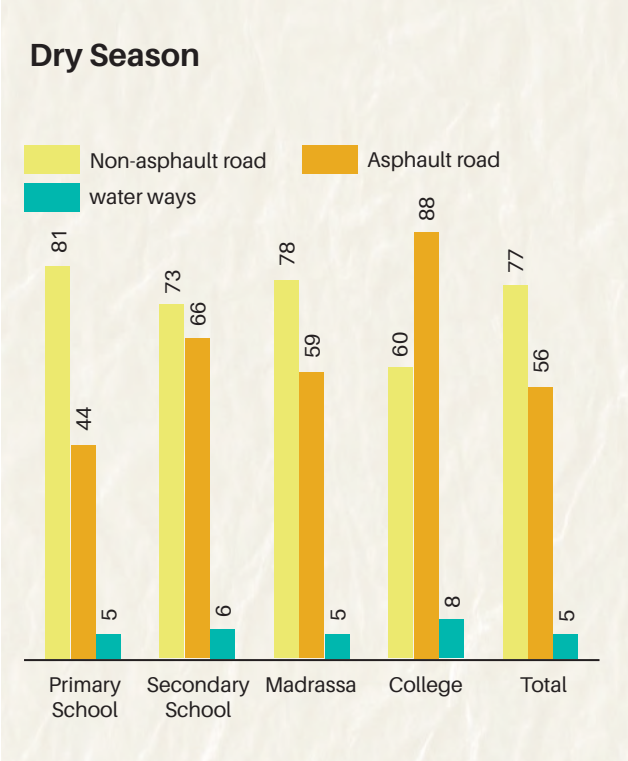


Figure 3.5: Communication modes for students to come to school.

both the seasons) road communications to come to their institutions. A relatively low percentage of students take water ways to access to their educational institutions; in wet season the average percentage stands at 16% which drops at 5% in dry season. This suggests that small boys and girls (i.e. primary school students) have to walk to access to school; these walkways might not be serviceable during wet or rainy season due to rainfall or flooding conditions. In addition, the small portion of students who take water ways to communicate to schools are also take risks during wet season when the rivers, canals or vast water terrains (especially in north-eastern Haor areas) remain full of water with strong water currents and waves. Even the use of walkways during dry seasons, especially in summer times, becomes difficult for those who live in riverine char lands where lands are exposed, sandy and lacks vegetation cover.

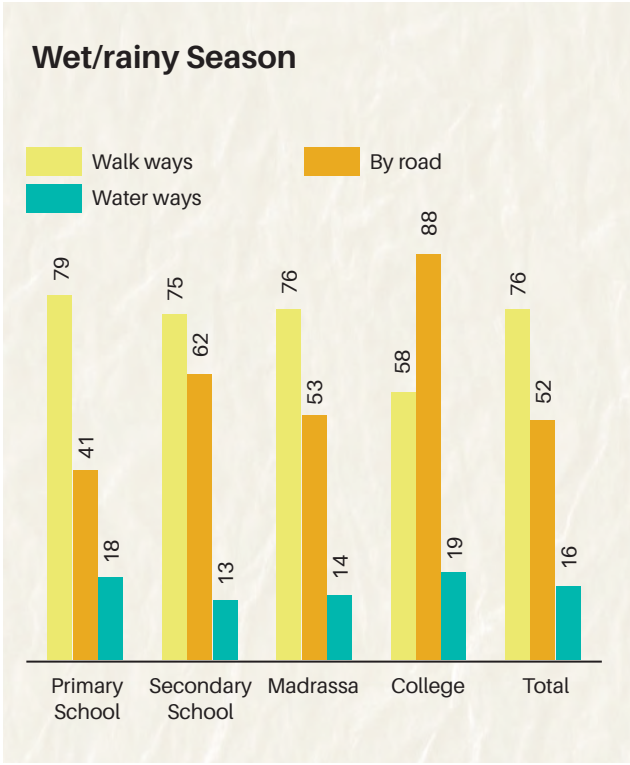


Figure 3.6: Seasonal difference in communication modes.

3.5 Use of school and disaster shelter

Primary and secondary schools in Bangladesh are generally used as temporary disaster shelter places where occurrences of disaster are frequent and devastating. Three related questions were asked to the educational institutions to know the degree of use of their school premises immediate before, during and after disaster times. It was seen that institutions located in the coastal areas where cyclonic disturbances are prominent were used more as shelter places compared to institutions located in other disaster affected zones. Thus the institutions situated in the central coast (Char Fashion upazila), southwestern coast (Shyamnagar and Tala upazilas), offshore island areas (Hatia upazila) show highest percentage of response in regards to the use of institution as disaster shelter. It is also evidenced that primary and secondary schools used more than madrassa or colleges. The significant percentage of primary and secondary schools mentioned (50% in Char Fashion and 35% in Shyamnagar) that the institutions was built as shelter therefore there remains a formal obligation to leave their space to disaster victims during emergencies and this is also reflected through the fact that the institutional premises were used as shelters (central coast 53%, offshore island 41%, southwestern coast 71% for primary schools). The institutions located in south-eastern coastal areas like Moheskhali and Pekua also mentioned that their structures were built and used

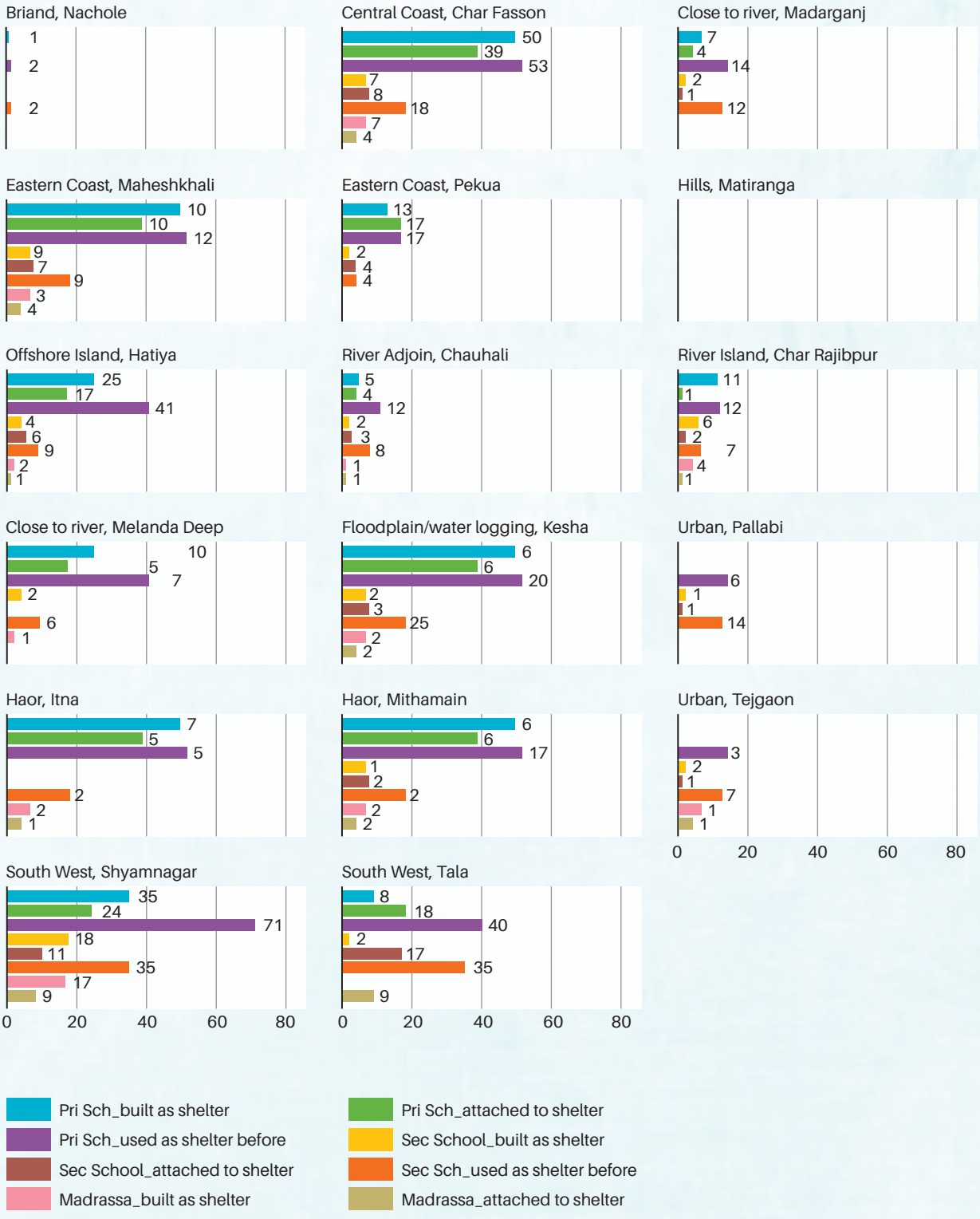


Figure 3.7: State of educational institutions built as shelters, attached to shelters and used as shelters by disaster zones

as disaster shelters, but percentages in these area are low (<20%) compared to central or south-western coastal areas. In many instances the educational institutions in inland riverine and floodplain areas were built as flood shelters and institutions in Char Rajibpur in Kurigram district, Chouhali in Sirajgonj district, Kesabpur in Jessore district responded that their premises were used as shelter places before (Figure 3.7).

Table 3.4: Impacts of disasters on water sanitation and hygiene (WASH).

Disaster and climate change impacts	Immediate consequences	Ultimate results
Water supply		
· Ponds dry out. · Alluvium (sediment) carpeting made the water retention capacity of the ponds poor. · Freshwater availability becomes season specific. · Frequent damage of the water sources (both tube well and ponds). · Increase of salinity in the natural water systems make both surface and ground water saline.	· Require more time for water fetching · Drink less water · Drinking of saline water cause hypertension/blood pressure among the community members · Skin disease is common among the people, specially among the female members of the community	· Increase in medical expenditure · Loss of (both primary and secondary) income · loss of time and energy · Loss of confidence · Insecurity problems of women
Sanitation systems		
· Frequent break down and poor functioning of latrines happen now a days. · High water table during rainy seasons and during the occurrence of cyclonic events make the functions of latrines inefficient since latrines are generally made at the bottom levels of the homesteads. Sometimes latrines left unused. · The ring-slab components are not constructed considering salinity problems. Therefore the toilet making components and toilet structure becomes fragile in a short span of time. · Increased temperature make toilets, which use iron sheets/ tin in roof and walls, uncomfortable for the children, elderly and disabled people. Due to this reason children prefer to visit backyard bush for defecation.	· More bad smell from the toilets · Children, elderly people and women face problems in using toilets · Need frequent repairing of toilet structure, polythene tops damaged · Latrine structure becomes short lived, therefore needs more money to building new ones	· Women feel shy in using other's, public place, community toilets, resulting to prefer not visiting toilets for a long time · Health hazard · Surrounding places becomes dirty and polluted as babies go near by bushes and people use open places for urination. · Insecurity problems of women
Hygiene behaviors		
· Less water near the toilets, thus washing hands after defecation becomes irregular. · Access mechanism to latrine places sometimes break down as an impact of disasters and thus discourage people to use sandals while visiting toilets. · Washing of pots/utensils is less frequent now a days due to lack of water. · People generally do not clean toilets during intense rainy conditions, sometimes faecal matters spread around. · Disposal of kitchen garbage and wastes of babies becomes a problem in a more humid and increased temperature condition. · During humid and cloudy conditions women can not dry napkins, which becomes frequent in current days.	· Increase of insects and pests · Increased probability of germ infestation and thus more exposure to disease pathogen. · Babies suffer from worms. · Unhealthy surrounding environment. · Health hazard of women.	· People, specially the children becomes less interested to visit toilets for defecation. · Elderly and disabled people suffer the most

3.6 Water supply and sanitation facilities

Disruption in the water supply systems, sanitation processes and related challenges in hygiene practice is one of the major areas of disaster impacts faced by educational institutions in Bangladesh. Table 3.3 lists some of the impact conditions, consequences and ultimate results on WaSH (Water Sanitation and Hygiene) as a result of disaster occurrences.

Table 3.4 suggests that majority of the educational institutions got water supply facilities in their premises (78% said water facilities exist), but many institutions reported that existing water supply options are broken or mal-functioning. If the absent and mal-functioning water supply facilities are added then the figure stands at 28.88% for primary schools (i.e. 520 number of educational institutions out of 1800 institutions surveyed which got students about 190 thousands), 9.82% for secondary schools, 18.54% for madrassa and 8.87% for college. Table 3.5 suggests that shallow tube wells are the major water supply sources (58.68%) in the educational institutions and 34.54% institutions depend on deep tube wells for water supplies. This dependence on shallow tube wells for water supplies suggests that water supply options at school remains at unsteady states since dry seasons generally show drop in the ground water table in almost all the parts of the country. Data on sanitation options gives (Table 3.6) more grim pictures, where only 52.22% educational institutions reported having good toilet facilities for all. The primary schools show worst scenario in this regard where only 42.82% (57.18% reported negatively) schools mentioned that they have good toilet facilities for students, teachers and staffs. It can easily be assumed that this normal time (disaster free) state of sanitation facilities further deteriorate in the occurrences of disasters. People participated in the FGD sessions informed that girls are the most sufferers of the ineffective sanitation facilities in the schools.

Table 3.5: State of water supply systems

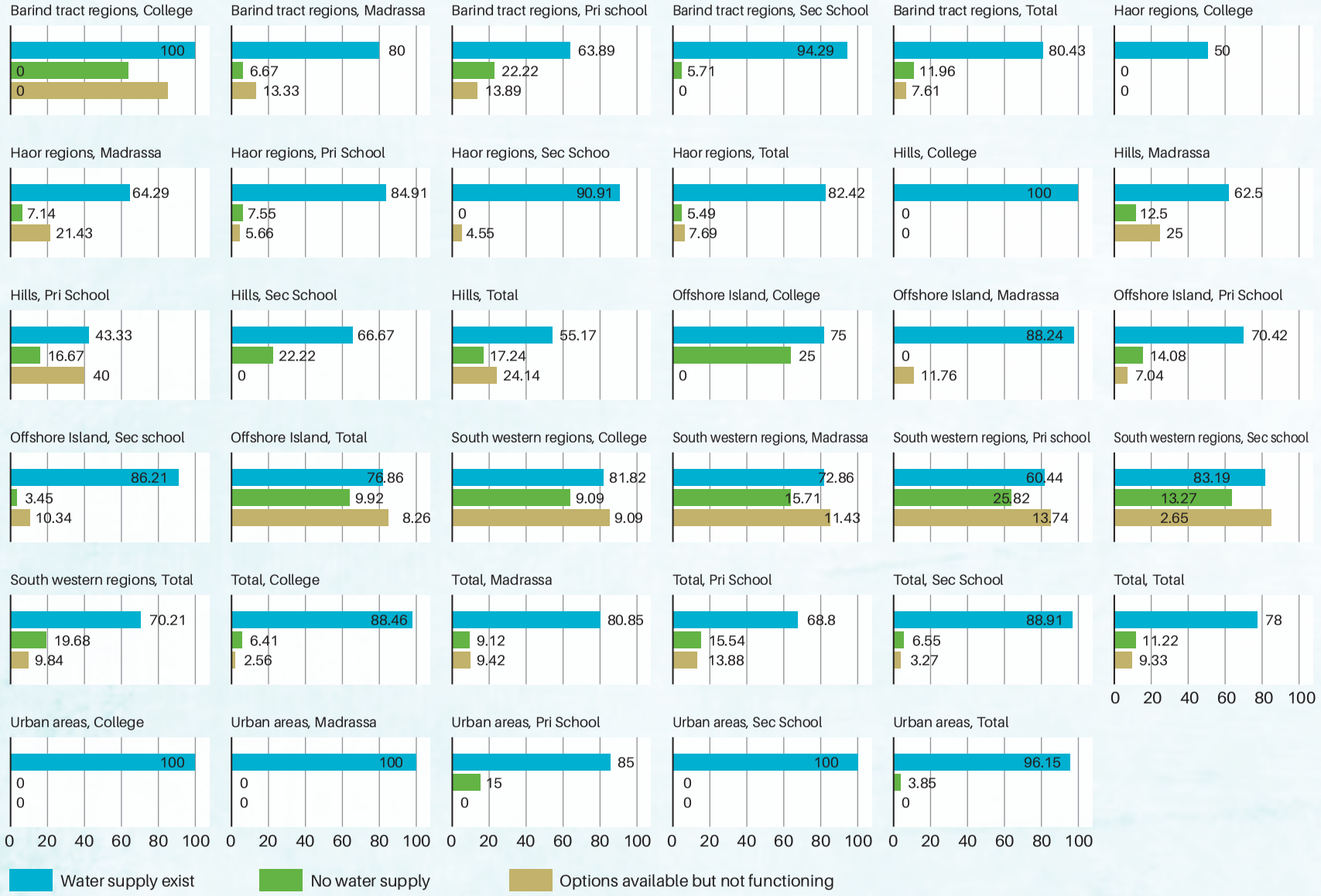
Type of institution	Number of institutions responded	State of water supply facilities		
		Exist	Absent	Exist but not working
Primary school	843	580 (68.8%)	131 (15%.)	117 (13.88%)
Junior/secondary school/school and college	550	489 (88.91%)	36 (6.55%)	18 (3.27%)
Madrassa	329	266 (80.85%)	30 (9.12%)	31 (9.42%)
College	78	69 (88.46%)	5 (6.41%)	2 (2.56%)
Total	1,800	1,404 (78%)	202 (11.22%)	168 (9.33%)

Table 3.6: Sources of safe water supply.

Type of institution	Number of institutions	Water supply sources					
		Shallow Tube well	Deep tube well	Pond	Pipe supply	Rain water	Other
Primary school	843	398 (47.21%)	230 (27.28%)	33 (3.91%)	34 (4.03%)	40 (4.74%)	20 (2.37%)
Junior/secondary school/ school and college	550	290 (52.73%)	176 (32%)	35 (6.36%)	72 (13.09%)	13 (2.36%)	6 (1.09%)
Madrassa	329	172 (52.28)	100 (30.40)	35 (10.64%)	13 (3.95%)	11 (3.34%)	6 (1.82%)
College	78	44 (56.41%)	26 (33.33%)	8 (10.265%)	10 (12.82%)	-	-
Total	1,800	1,056 (58.68%)	622 (34.54%)	132 (7.33%)	150 (8.34%)	74 (4.14%)	37 (2.07%)

Table 3.7: Toilet facilities of the educational institutions.

Type of institution	Number of institutions	Toilet facilities					
		No facilities	present but not working	Unhygienic	Exist but only for teachers	No separate toilet facilities for female students	Good toilet facilities for all
Primary school	843	75 (8.9%)	181 (21.47)	151 (17.91%)	127 (15.07%)	164 (19.45%)	361 (42.82%)
Junior/secondary school/school and college	550	12 (2.18%)	62 (11.27%)	74 (13.45%)	88 (16%)	96 (17.45%)	353 (64.18%)
Madrassa	329	13 (3.95%)	57 (17.33%)	46 (13.98%)	66 (20.06%)	69 (20.97%)	167 (50.76%)
College	78	2 (2.56%)	9 (11.54%)	6 (7.69%)	12 (15.38)	7 (8.97%)	59 (75.64%)
Total	1,800	102 (5.67%)	309 (17.17%)	277 (15.39%)	293 (16.28%)	336((18.67%)	940 (52.22%)



Graphs by Disaster Regions and Institutions

Figure 3.8: Status of water supply systems in educational institutions by disaster zones.

3.7 Availability of facilities and their roles in disaster preparedness

Facilities like playgrounds, library and common rooms for students' use, opportunities for volunteerism, physical equipment and devices for emergency response play important roles in enhancing capacity of the school to better respond to disaster emergencies and also to get prepared to face any upcoming events to reduce both tangible (physical damage) and intangible loss (e.g. competency loss). The CCESD pilot survey captured response regarding these facilities as to assess the resource capacity of educational institutions to cope with disaster induced uncertainties. About 40% institutions mentioned that they have playgrounds that are currently not in usable conditions for different reasons (e.g. illegally occupied, unsafe, used for dumping of construction materials etc.), 10% said they don't have any playground and remaining 50% educational institutions got playgrounds for all the students both girls and boys. Among the institutions, colleges gave the highest response (74.36%) about having playgrounds in their premises and primary schools responded the least (40.21%). Disaster zone wise response pattern shows that a significant percentage of educational institutions located in Haor regions do not have any playgrounds; for instance 48.35% responded no playgrounds at all and another 35.16% mentioned that they have playgrounds but not in usable condition in this region (Figure 3.9a, 3.9b). Response pattern shows that the conditions in the coastal areas, offshore islands and river islands areas also bad in terms of having playgrounds in the premises of educational institutions.

The questionnaire survey also inquired the educational institutions on having other facilities like giving mid-day meals (tiffin), opportunities for information and technology (e.g. electricity, computer lab, computers, multimedia, internet), opportunities for volunteerism etc. Only 9.19% educational institutions (primary schools show highest percentage, 31.55%, Table 3.8) responded that they provide tiffin to the students; among these. In addition, 60% educational institutions indicated that they have electricity connection in their institutions (29.30% as lowest in the primary schools), only 23.61% mentioned that they have computer laboratories, 46.80% mentioned they have computers, 37.20% mentioned having internet facilities.

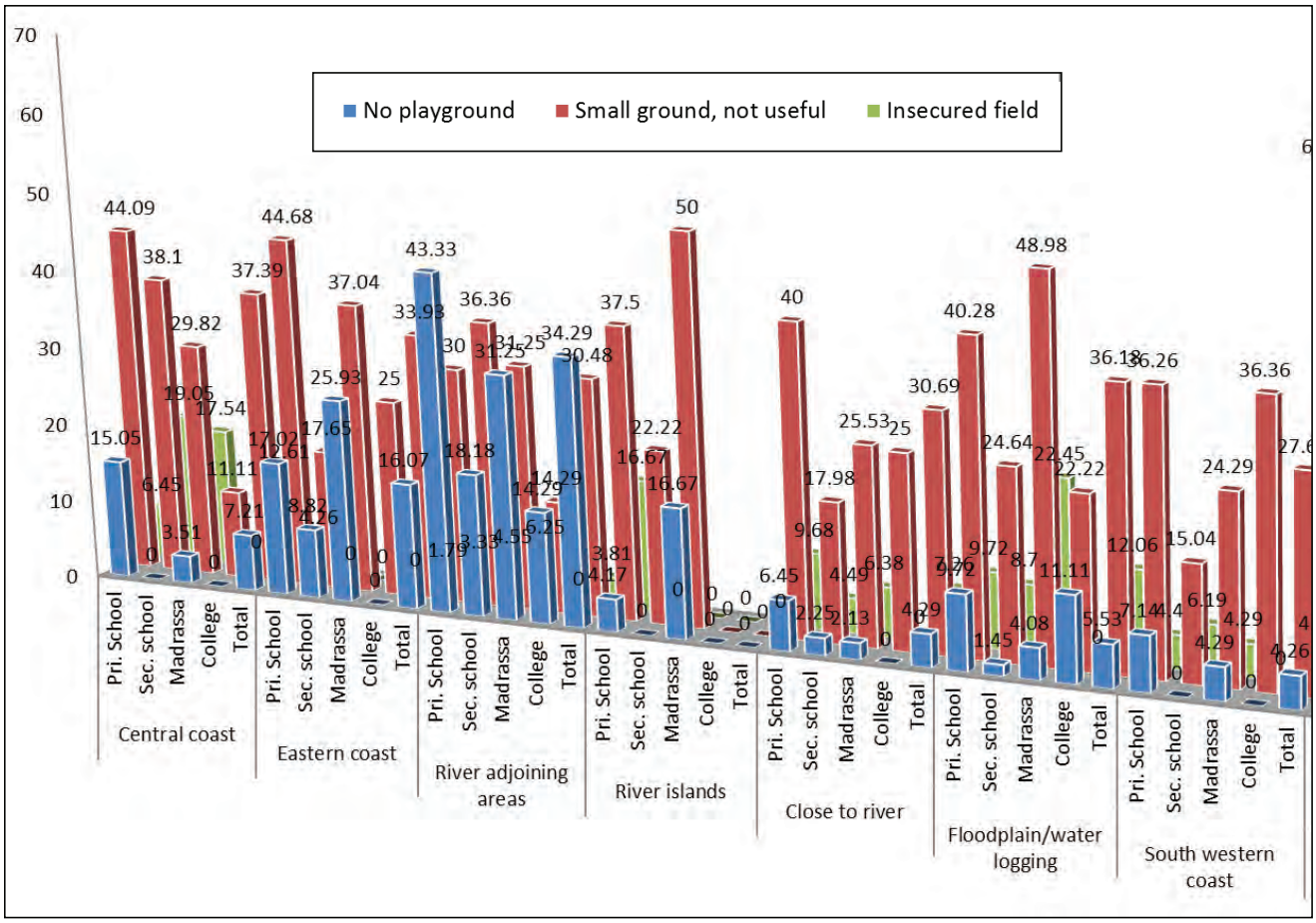


Figure 3.9a: Playgrounds in the premises of educational institutions.

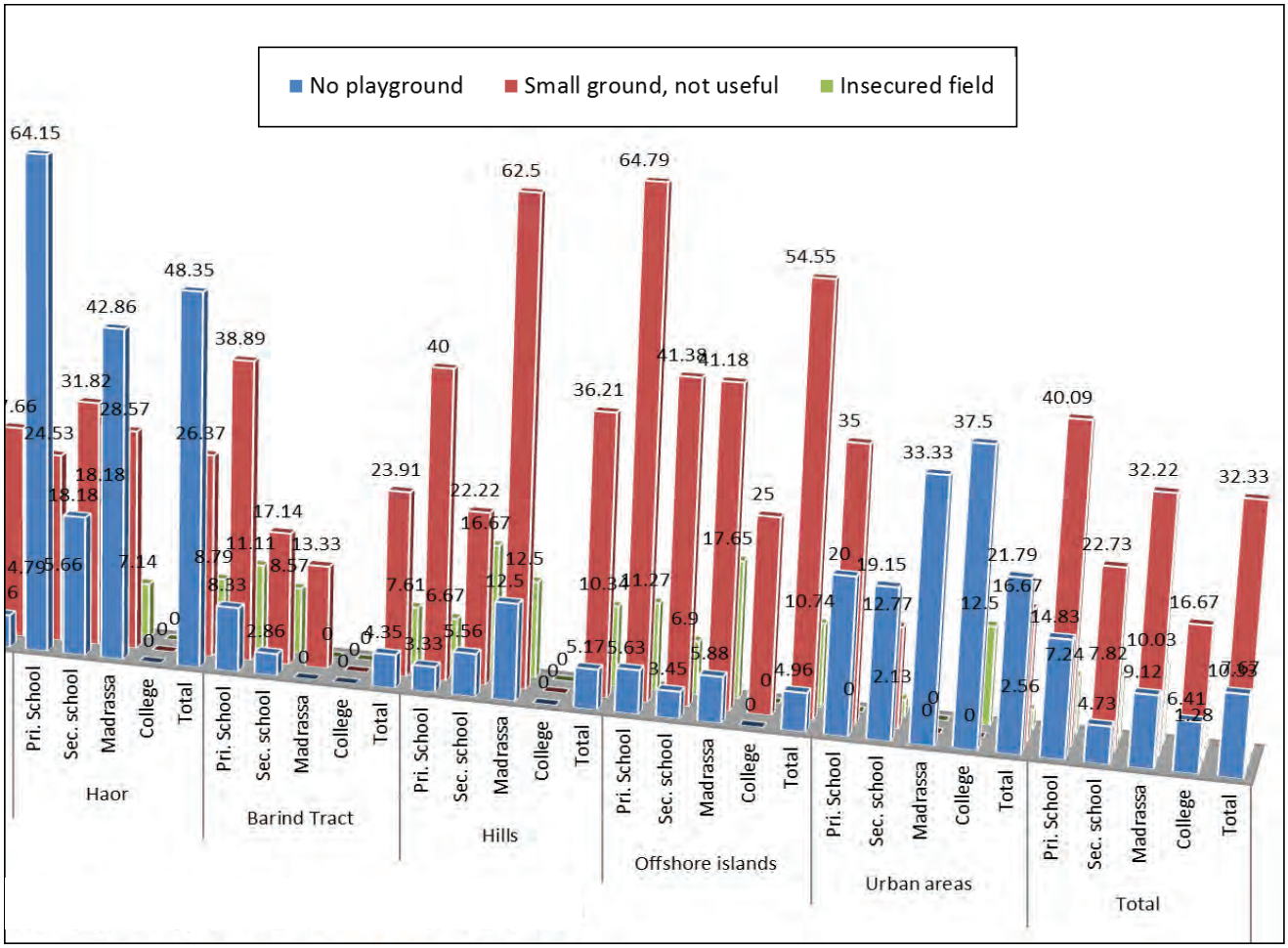


Figure 3.9b: Playgrounds in the premises of educational institutions.

Table 3.8: Support services at educational institutions, by types of institutions.

Facilities	Primary school		Junior/secondary school/school and college		Madrassa		College		Average	
	Total	%	Total	%	Total	%	Total	%	Total	%
Tiffin given	266	31.55	12	2.18	10	3.04	0	0	72	9.19
Electricity	247	29.3	373	67.82	200	60.79	64	82.05	221	59.99
Computer lab	5	0.59	137	24.91	37	11.25	45	57.69	56	23.61
Internet	11	1.3	277	50.36	96	29.18	53	67.95	109.25	37.20
Scouting	316	37.49	377	68.55	167	50.76	25	32.05	221.25	47.21
Rover	6	0.71	14	2.55	19	5.78	37	47.44	19	14.12
Bangladesh National Cadet Core (BNCC)	1	0.12	8	1.45	2	0.61	6	7.69	4.25	2.47
Girls' Guide	36	4.27	147	26.73	36	10.94	8	10.26	56.75	13.05
Red Crescent	14	1.66	49	8.91	19	5.78	9	11.54	22.75	6.97

Facilities	Primary school		Junior/secondary school/school and college		Madrassa		College		Average	
	Total	%	Total	%	Total	%	Total	%	Total	%
Fire extinguisher	4	0.47	40	7.27	5	1.52	5	6.41	13.5	3.92
No scope for volunteerism	30	3.56	18	3.27	8	2.43	2	2.56	14.5	2.96
Multimedia	22	2.61	233	42.36	81	24.62	46	58.97	95.5	32.14
Cyclone Preparedness Program (CPP) volunteers	4	0.47	7	1.27	4	1.22	4	5.13	4.75	2.02
Computers (no lab)	30	3.56	337	61.27	158	48.02	58	74.36	145.75	46.80
Others	35	4.15	6	1.09	4	1.22	0	0	11.25	1.62

Table 3.9: Educational institutions having playgrounds or not.

Type of institution	Number of institutions	Playground and scopes to use it				
		Playground exist	Playground does not exist	Small playground	Unsafe playground	Other
Primary school	843	339	125	338	61	5
	%	40.21	14.83	40.09	7.24	0.59
Junior/secondary school/ school and college	550	370	26	125	43	5
	%	67.27	4.73	22.73	7.82	0.91
Madrassa	329	180	30	106	33	0
	%	54.71	9.12	32.22	10.03	0.00
College	78	58	5	13	1	0
	%	74.36	6.41	16.67	1.28	0.00
Total	1,800	947	186	582	138	10
	%	52.61	10.33	32.33	7.67	0.56

Table 3.10: Conditions of playgrounds.

Type of institution	Number of institutions	Playground							
		Good	%	Moderate condition	%	No	%	No response	%
Primary school	843	121	14.35	560	66.43	137	16.25	25	2.97
Junior/secondary school/ school and college	550	173	31.45	344	62.55	25	4.55	8	1.45
Madrassa	329	86	26.14	232	70.52	11	3.34	0	0.00
College	78	31	39.74	42	53.85	2	2.56	3	3.85
Total	1,800	411	22.83	1,178	65.44	175	9.72	36	2.00

Table 3.11: Library facilities

Type of institution	Number of institutions	Library facilities (with books)							
		Facilities exist for all	%	Only for teachers	%	No library exist	%	No response	%
Primary school	843	127	15.07	115	13.64	570	67.62	31	3.68
Junior/secondary school/ school and college	550	339	61.64	113	20.55	97	17.64	1	0.18
Madrassa	329	158	48.02	105	31.91	62	18.84	4	1.22
College	78	62	79.49	8	10.26	7	8.97	1	1.28
Total	1,800	686	38.11	0	0.00	736	40.89	37	2.06

Table 3.12: Common room facilities in the educational institutions.

Type of institution	Number of institutions	Common room facilities							
		Exist separately gor boys and girls	%	Only for girls	%	Does not exist	%	No response	%
Primary school	843	3	0.36	29	3.44	761	90.27	50	5.93
Junior/secondary school/ school and college	550	21	3.82	271	49.27	232	42.18	26	4.73
Madrassa	329	20	6.08	172	52.28	114	34.65	23	6.99
College	78	20	25.64	44	56.41	13	16.67	1	1.28
Total	1,800	64	3.56	516	28.67	1,120	62.22	100	5.56

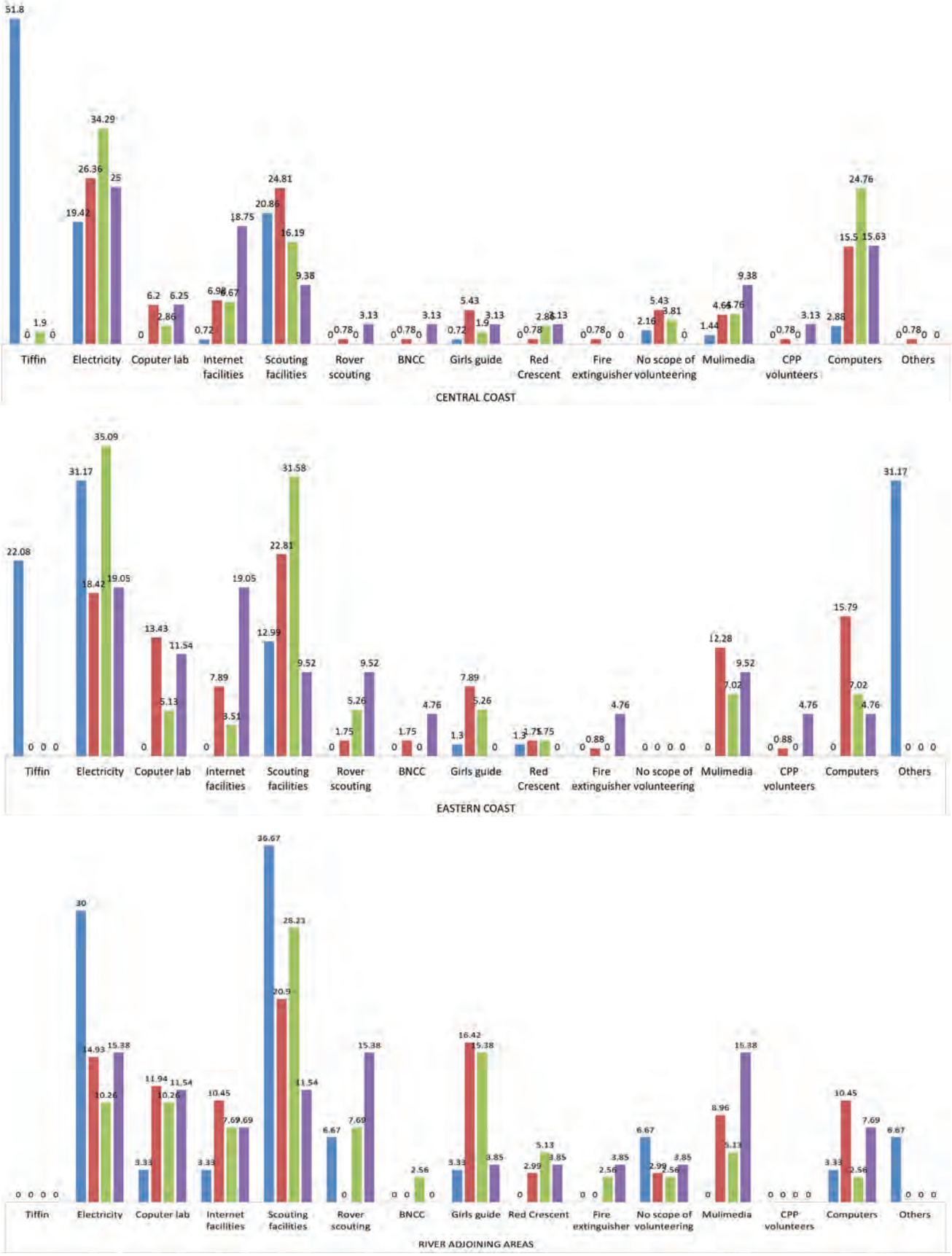


Figure 3.10a: Facilities in educational institutions by disaster affected zones.

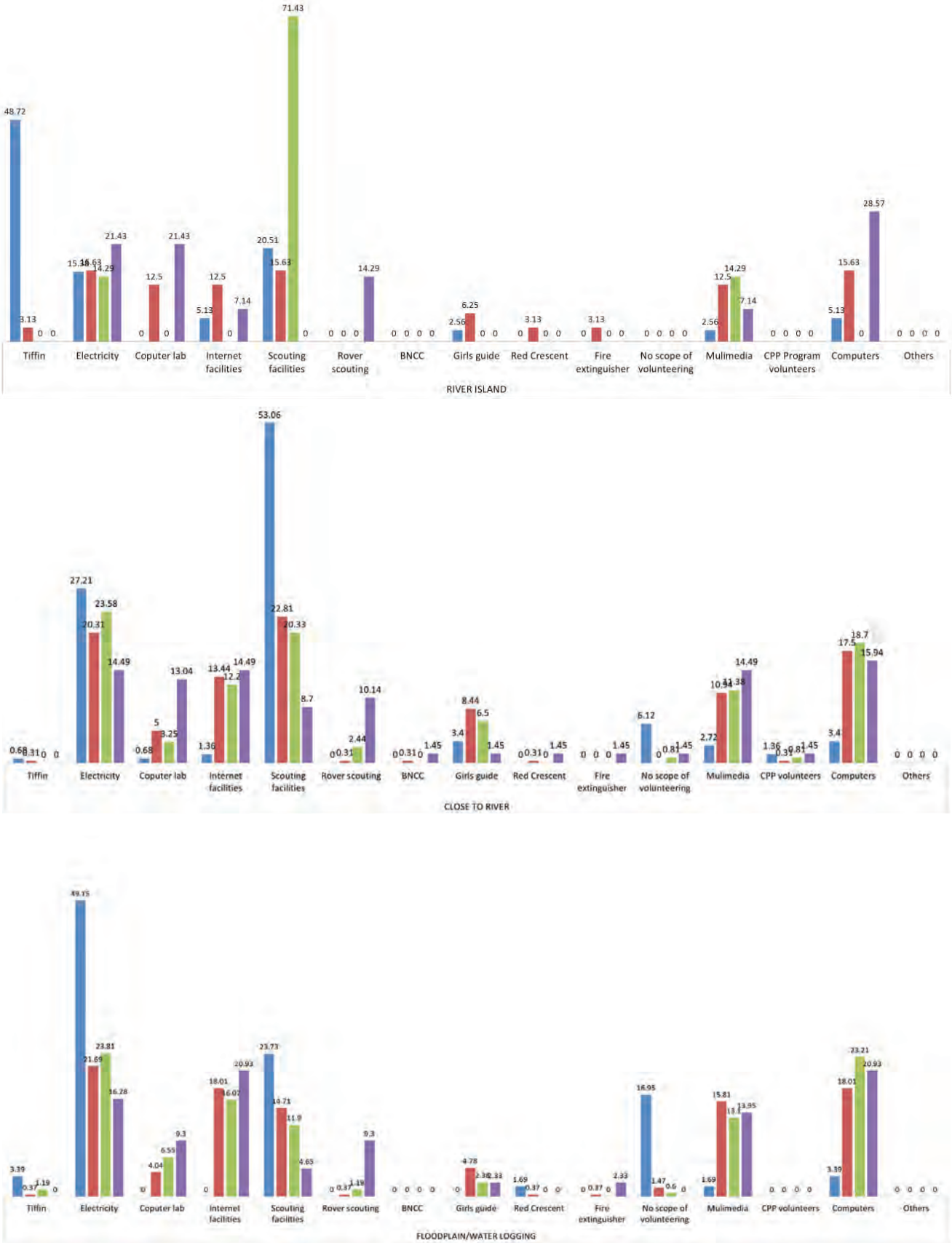


Figure 3.10b: Facilities in educational institutions by disaster affected zones.

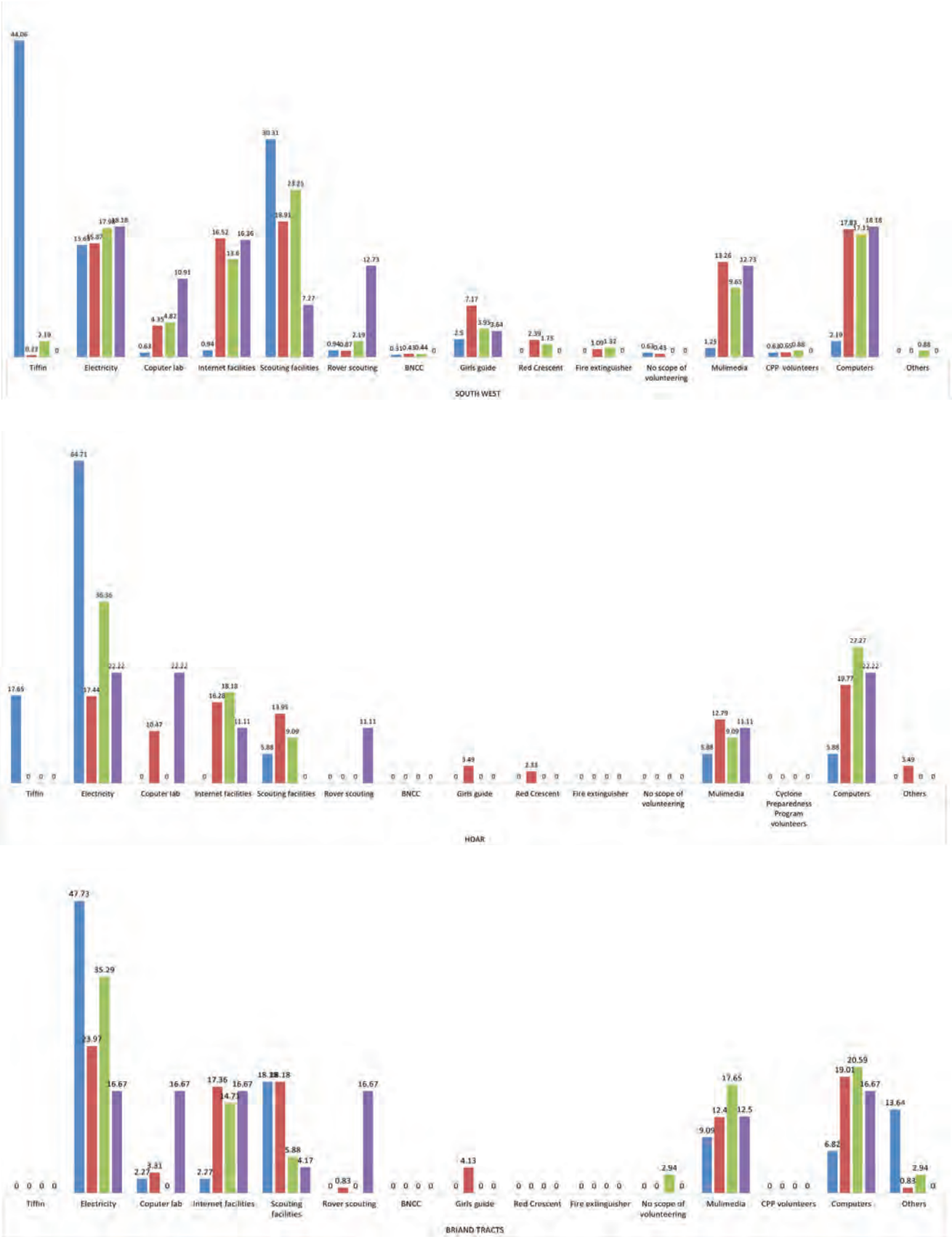


Figure 3.10c: Facilities in educational institutions by disaster affected zones.

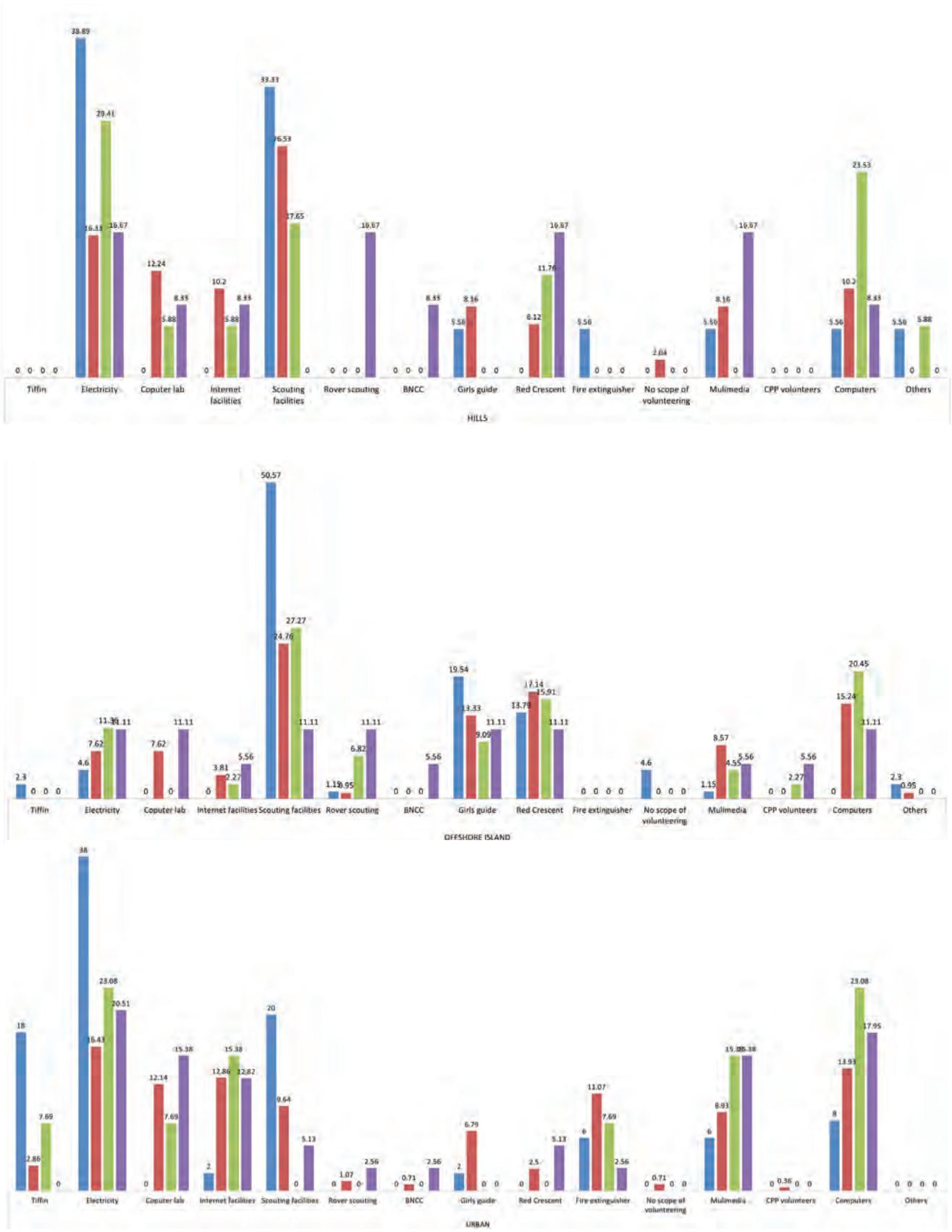


Figure 3.10d: Facilities in educational institutions by disaster affected zones.

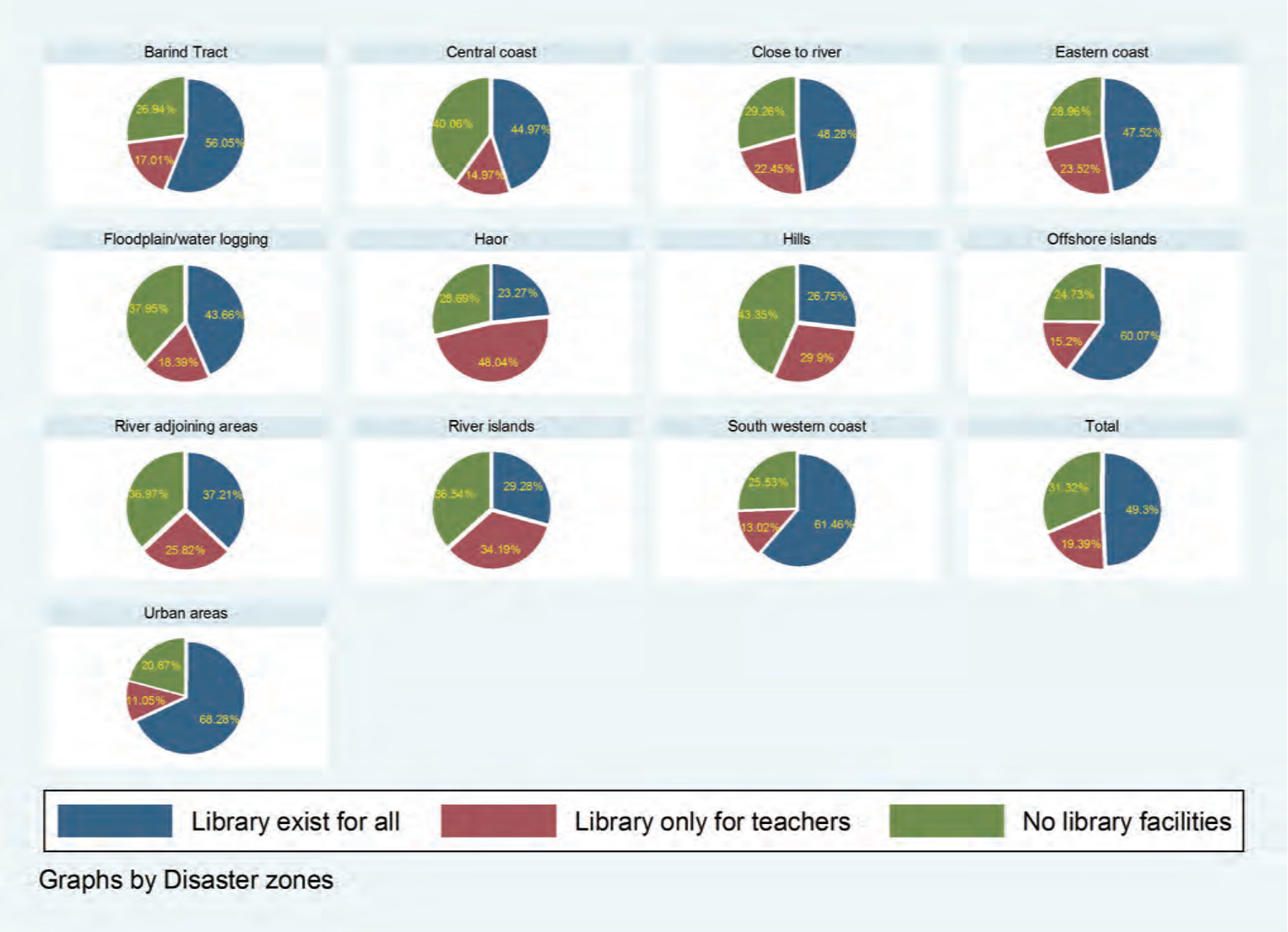


Figure 3.11: Library facilities in educational institutions by disaster affected zones.

Figure 3.12: Common room facilities in educational institutions by disaster affected zones.

2.8 Health Facilities

Educational institutions generally seek services from the nearest health care centers if any health related emergency arises. In that consideration, distance of the health care center from the institution is an important factor to receive required timely services. About 58.49% educational institutions indicated that nearest health care center is situated within 2 kilometers from the institution, 23.25% (419 institutions out of 1800 covering 158 thousand students) cases health centers are located in between 2 to 5 kilometers and 15.18% (273 institutions covering 103 thousand students) cases health care centers are located beyond 5 kilometers of the institutions. The remotest institutions from health care centers are mainly located in hills regions, Haor, river islands and river adjoining areas. About 80% of the urban area educational institutions mentioned that they are located with two kilometers of healthcare facilities. During disaster times, the educational institutions that are located beyond two kilometers of health care centers (about 38%, 684 institutions out of 1800 surveyed, covering about 260 thousand students) may remain in anxiety that it will be very hard for them to receive health services if necessary when communication becomes a huge issue for the local area. .

Even if the staffs of the schools needs to respond to any health related emergencies, they are less ready for that because of the absence of First Aid Box in the institution or mal-functioning conditions of it; about 52.19% primary schools (939 institutions out of 1800 surveyed) responded that they are not in a position to get support from First Aid Box because they simple do not have it (32.62%) or it is not functioning (19.57%). Most poor conditions are demonstrated by institutions located in the Haor regions, hills, river islands, river adjoining areas and deep floodplain regions. But disaster affected areas like south-western coastal regions affected by cyclone Sidr (2007) and cyclone Aila (2009) indicated that they have working First Aid Box in their institutions. Respondents in the FGD mentioned that First Aid Box are very important to have (along with regular change of outdated materials and other replenishments) because minor injuries from received falling off high places, snake bites, drowning are common challenges they need to tackle during school opening hours. In this regard, primary schools those got First Aid Box mentioned that they do not know about the use of it or these have not been changed since they got it. About 71.17% (1281 institutions out of 1800) institutions responded that they never receive any training on the use of First Aid Box equipment.

Table 3.13: Status of owning First Aid Box.

Type of institution	Number of institutions	First Aid Box in the school (figures represent number of institutions followed by percentage)				
		More than one (active)	Have one but not functioning	Have but not working	We do not have any	No response
Primary school	843	58	318	275	165	27
		6.88	37.72	32.62	19.57	3.20
Junior/secondary school/ school and college	550	23	59	36	387	45
		4.18	10.73	6.55	70.36	8.18
Madrassa	329	1	8	11	279	30
		0.30	2.43	3.34	84.80	9.12
College	78	6	5	6	52	9
		8				
Total	1,800	88	390	328	883	111
		4.89	21.67	18.22	49.06	6.17

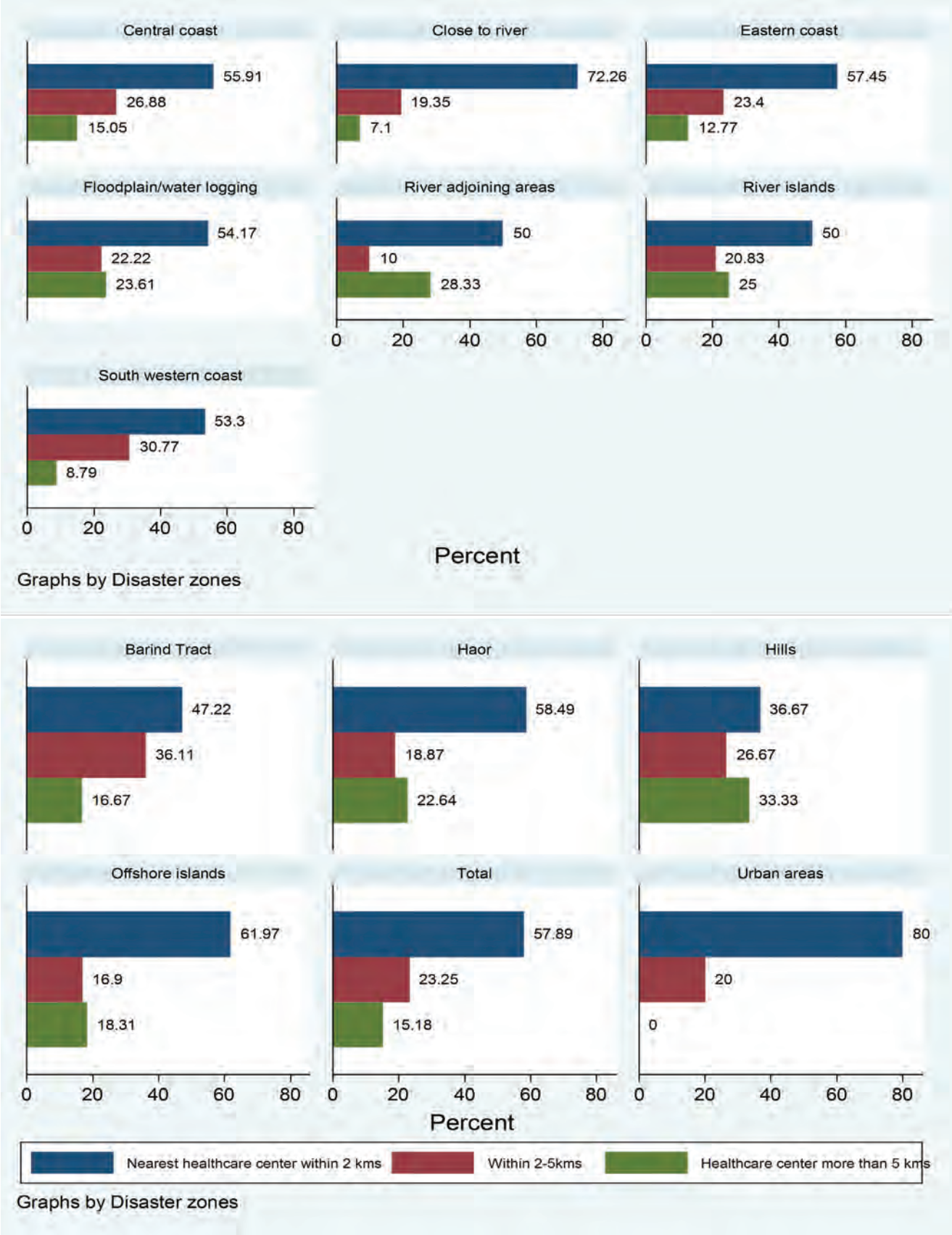


Figure 3.13: Distance of health care centers from educational institutions.

Table 3.14: Replenishment of First Aid Box.

Type of institution	Number of institutions	When last replenished the First Aid box (figures represent number of institutions followed by percentage)				
		Never replenished	Don't know what to do	Not time expired	Replenished in time	No response
Primary school	843	316 37.49	157 18.62	105 12.46	115 13.64	150 17.79
Junior/secondary school/ school and college	550	45 8.18	139 25.27	26 4.73	39 7.09	301 54.73
Madrassa	329	15 4.56	100 30.40	4 1.22	5 1.52	205 62.31
College	78	8 10.26	16 20.51	2 2.56	7 8.97	45 57.69
Total	1,800	384 21.33	412 22.89	137 7.61	166 9.22	701 38.94

Table 3.15: Status of First Aid Training.

Type of institution	Number of institutions	Status of First Aid training (figures represent number of institutions followed by percentage)			
		No one received training	Teachers received training	Staff/officers' received training	No response
Primary school	843	628 74.50	142 16.84	16 1.90	57 6.76
Junior/secondary school/ school and college	550	363 66.00	52 9.45	3 0.55	132 24.00
Madrassa	329	230 69.91	14 4.26	2 0.61	83 25.23
College	78	60 76.92	5 6.41	1 1.28	12 15.38
Total	1,800	1,281 71.17	213 11.83	22 1.22	284 15.78

Table 3.16: Distance of educational institutions from the educational institutions.

Type of institution	Number of institutions	Distance from nearest health care center (figures represent number of institutions followed by percentage)			
		0-2 kms	>2 to < 5 kms	>5 kms	No response
Primary school	843	488	196	128	31
		57.89	23.25	15.18	3.68
Junior/secondary school/ school and college	550	372	73	72	33
		67.64	13.27	13.09	6.00
Madrassa	329	208	53	57	11
		63.22	16.11	17.33	3.34
College	78	61	7	8	2
		78.21	8.97	10.26	2.56
Total	1,800	1,129	329	265	77
		62.72	18.28	14.72	4.28

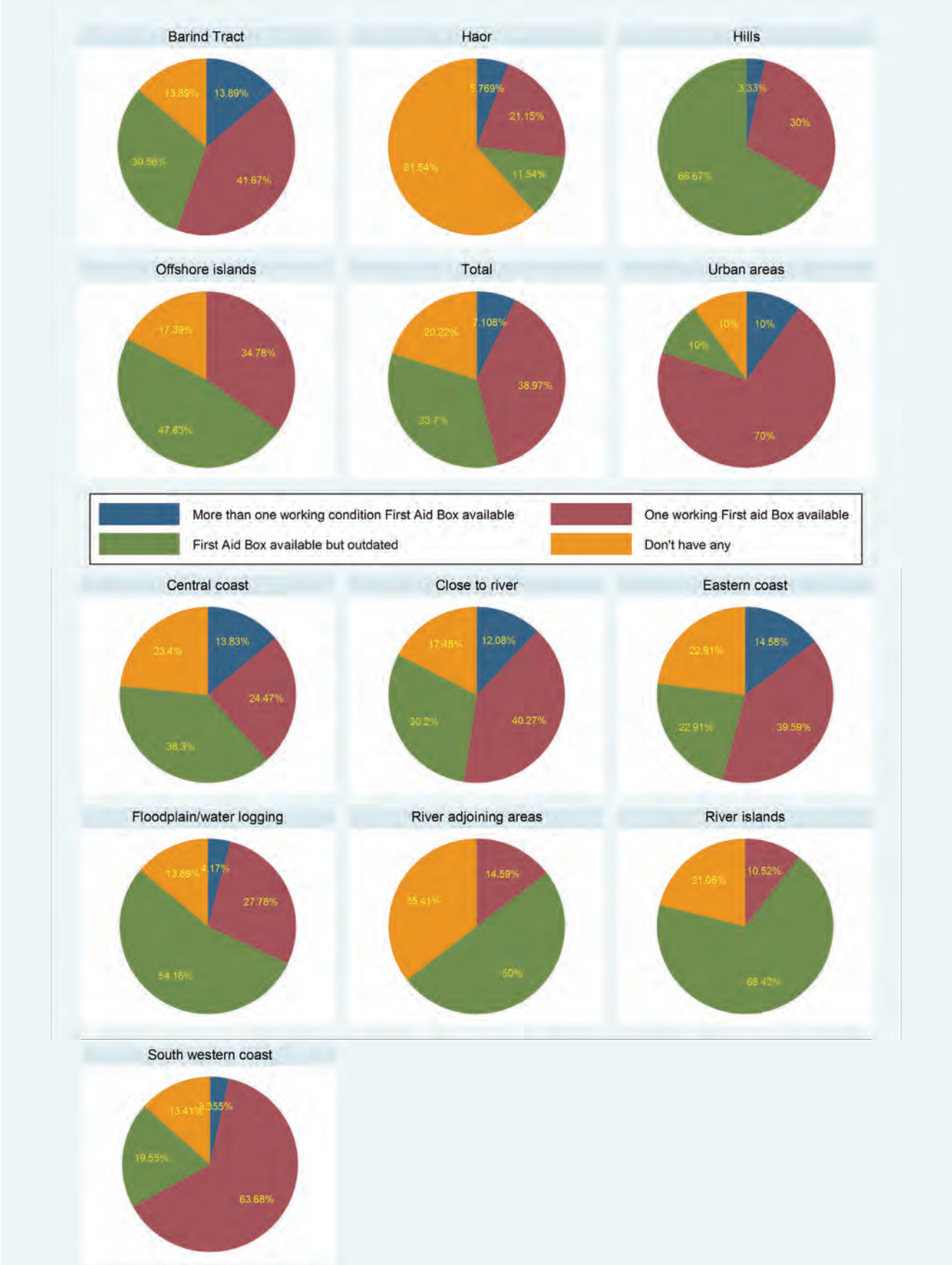


Figure 3.14: First Aid facilities in educational institutions by disaster affected zones.

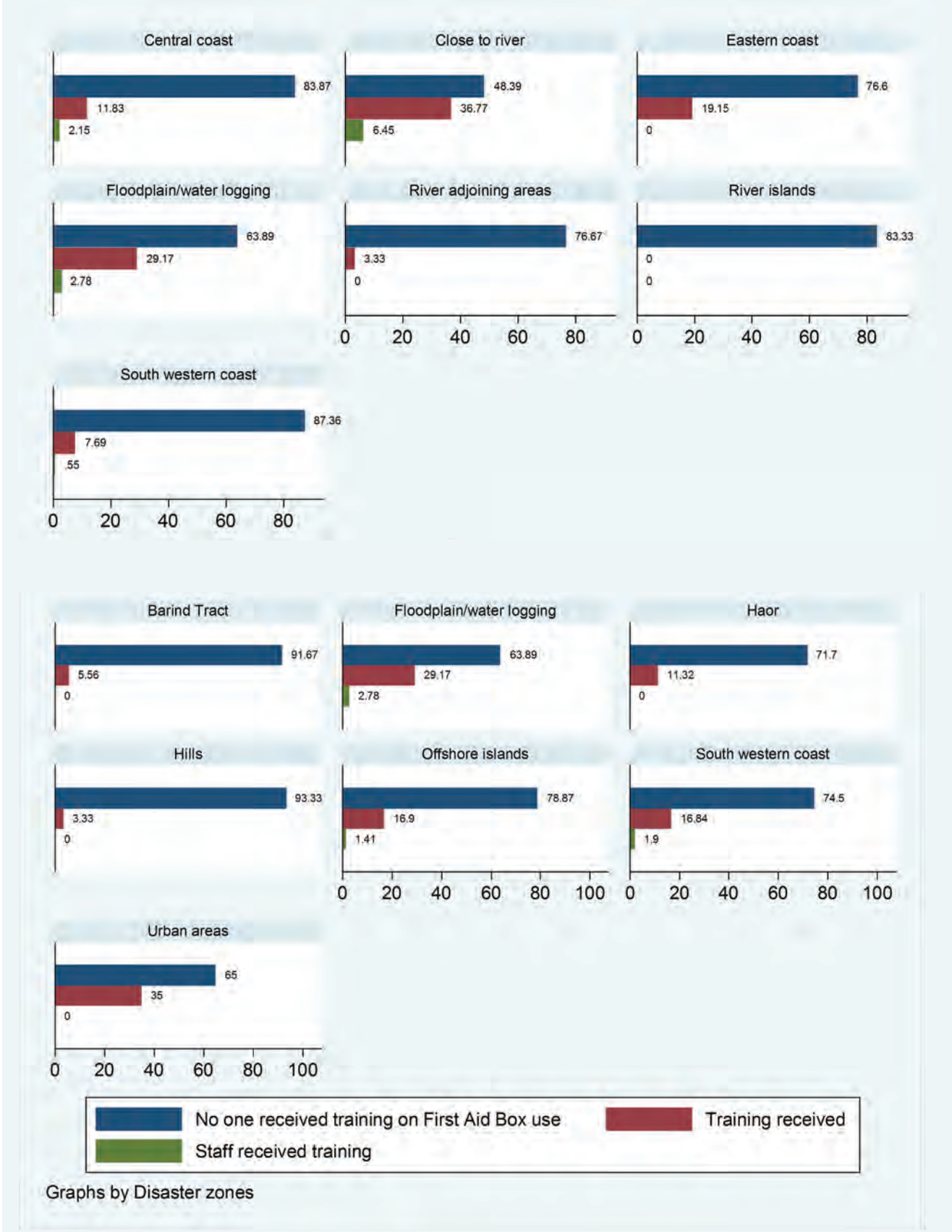


Figure 3.15: Status of training on First Aid in educational institutions by disaster affected zones.

3.9 Reasons for irregular attendance in the institution

Irregular attendance of students in the institution is one of the major impacts of disturbances caused by natural disasters. This cause analysis suggests that pre and post disaster conditions are equally important phenomena to consider like during disaster conditions if whole range of disaster impacts on students irregular attendance in the school is to be properly understood. In most of the disaster affected zones educational institutions identified transportation difficulty as a common challenge faced by the students. Helping parents, engaged in income generating activities, feeling unsafe while going to school, families moved to other places are identified as major causes of irregular attendance of students to the educational institutions. Haor regions mentioned that all the options/factors are true for them. It is interesting to note that the factor "families moving to other places" was chosen highest number of times by river islands, river adjoining areas. However, the causes in many instances are fused and negatively influence students' motivation to go to the school.

Irregular attendance of teachers in the educational institutions is always a concern in disaster affected regions. Alike students, during disaster times teachers also fell into different forms of sufferings which cause them irregular in attending schools and colleges. In many cases it was found that post disaster conditions also compel them not to appear in the schools. The pilot survey thus inquired about the disaster induced reasons for irregular attendance of the teachers. Educational institutions located in offshore island areas mentioned that sickness (own and family members) at home is the prime reason (69% mentioned own sickness and about 70% mentioned about sickness of family members) for irregular appearance in the institution. Second important factors identified (Figure 3.16a, 3.16b, 3.16c, 3.16d) by the institutions of non-appearance is 'engaged in disaster damage recovery activities at home'. In some disaster affected areas male teachers are more engaged (e.g. 45.5% male against 27.3% female in Haor areas, 52.2% male against 43.4% female in southwestern coastal regions). In contrast, central and southeastern coastal areas male teachers are more engaged in disaster damage recovery activities (84.1% male against 57.1% female in central coast). A significant percentage of educational institutions mentioned 'feeling unsafe' as the reason for irregular attendance in the school. The highest percentage appears from Haor regions, where about 40% teachers both male and female expressed their fear while commuting to the institution.

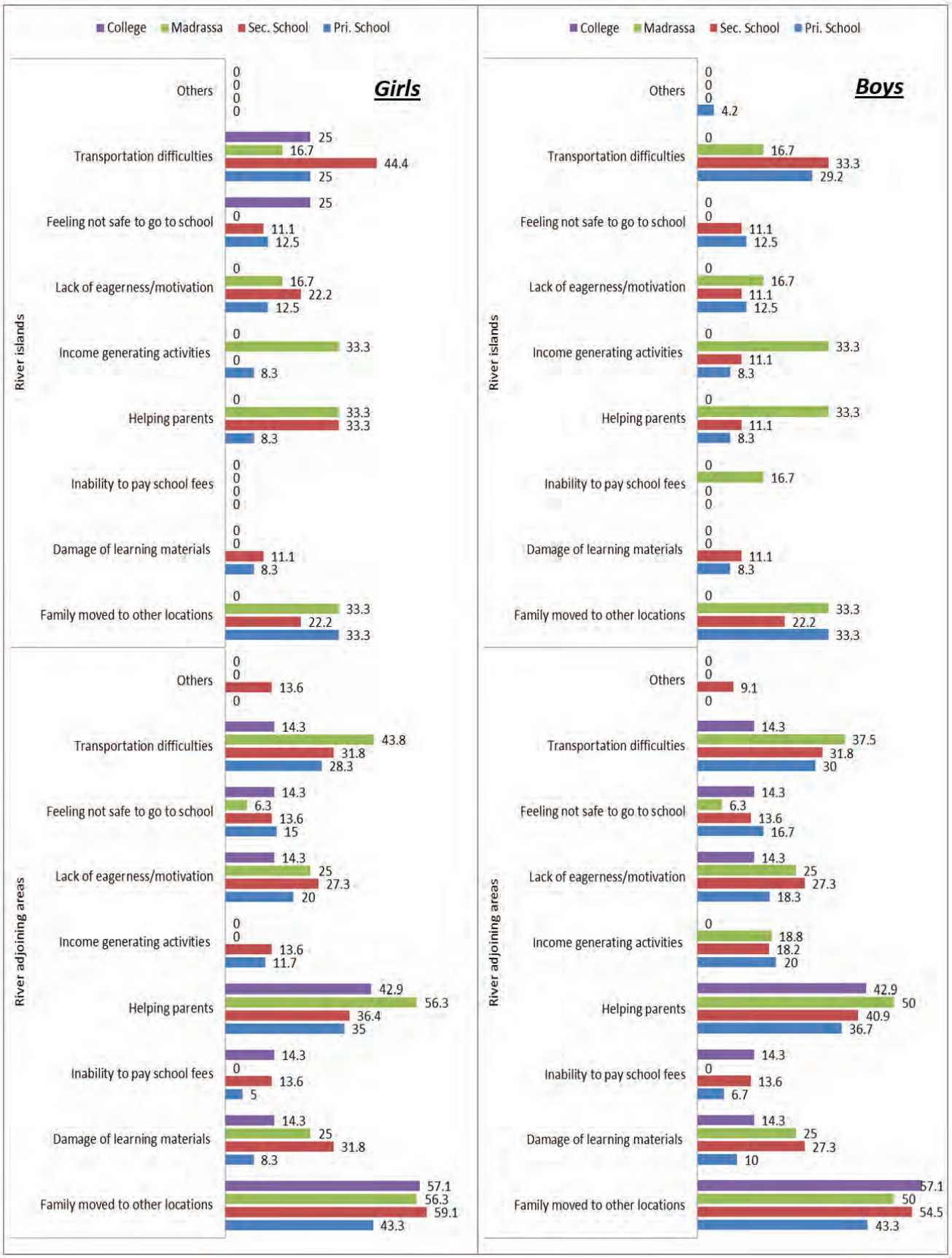


Figure 3.16a: Disaster induced challenges faced by students by disaster affected zones.

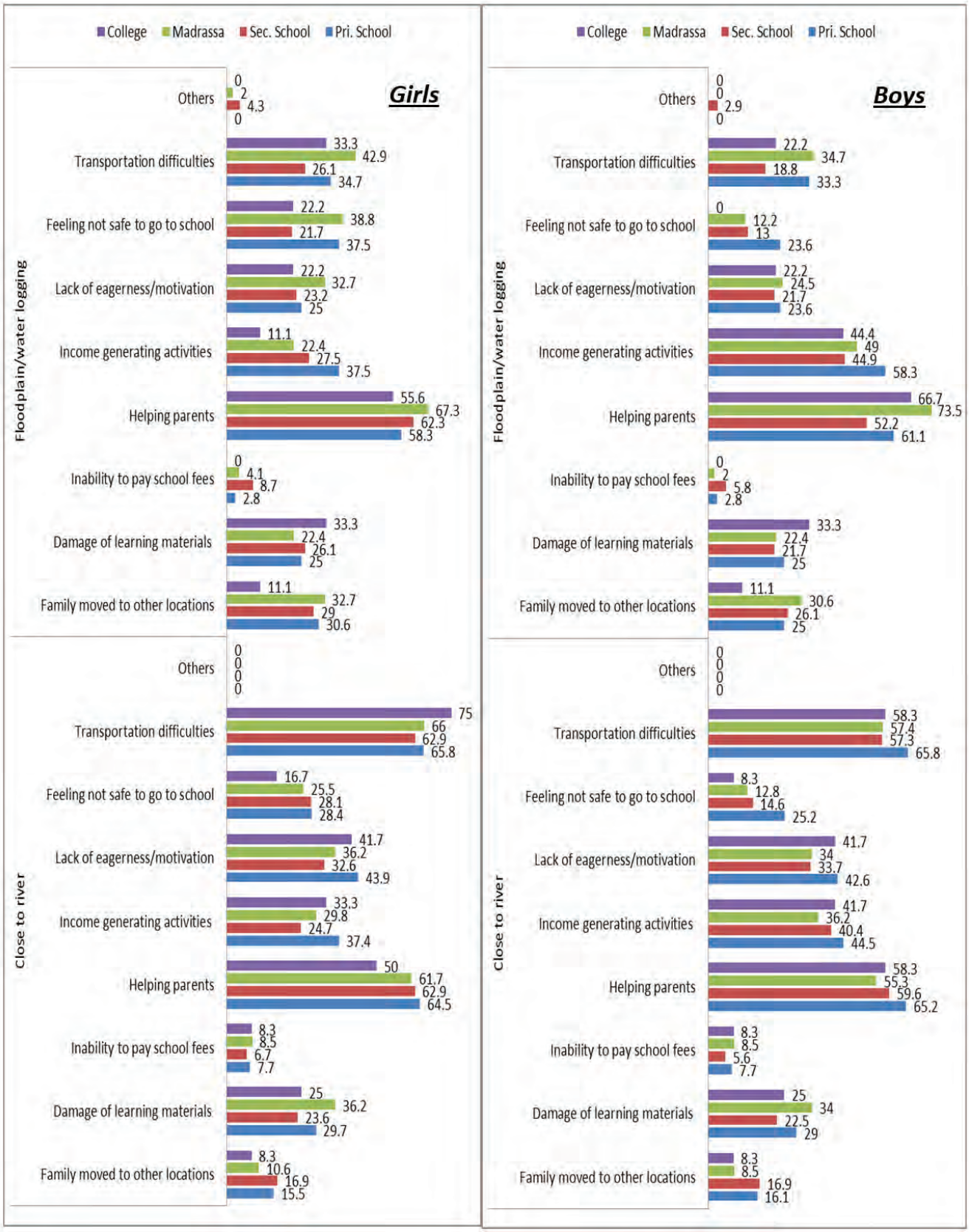


Figure 3.16b: Disaster induced challenges faced by students by disaster affected zones.

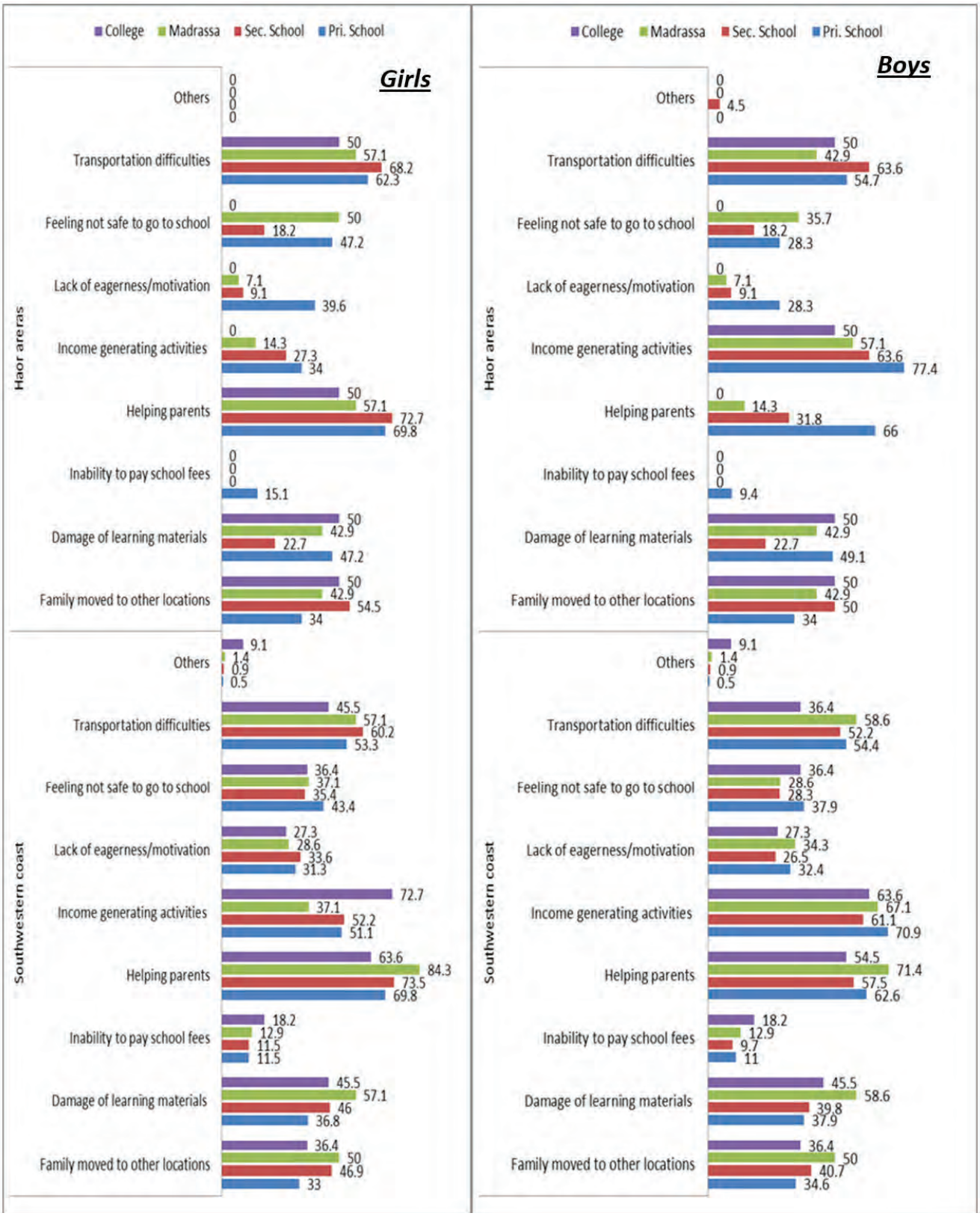


Figure 3.16c: Disaster induced challenges faced by students by disaster affected zones.

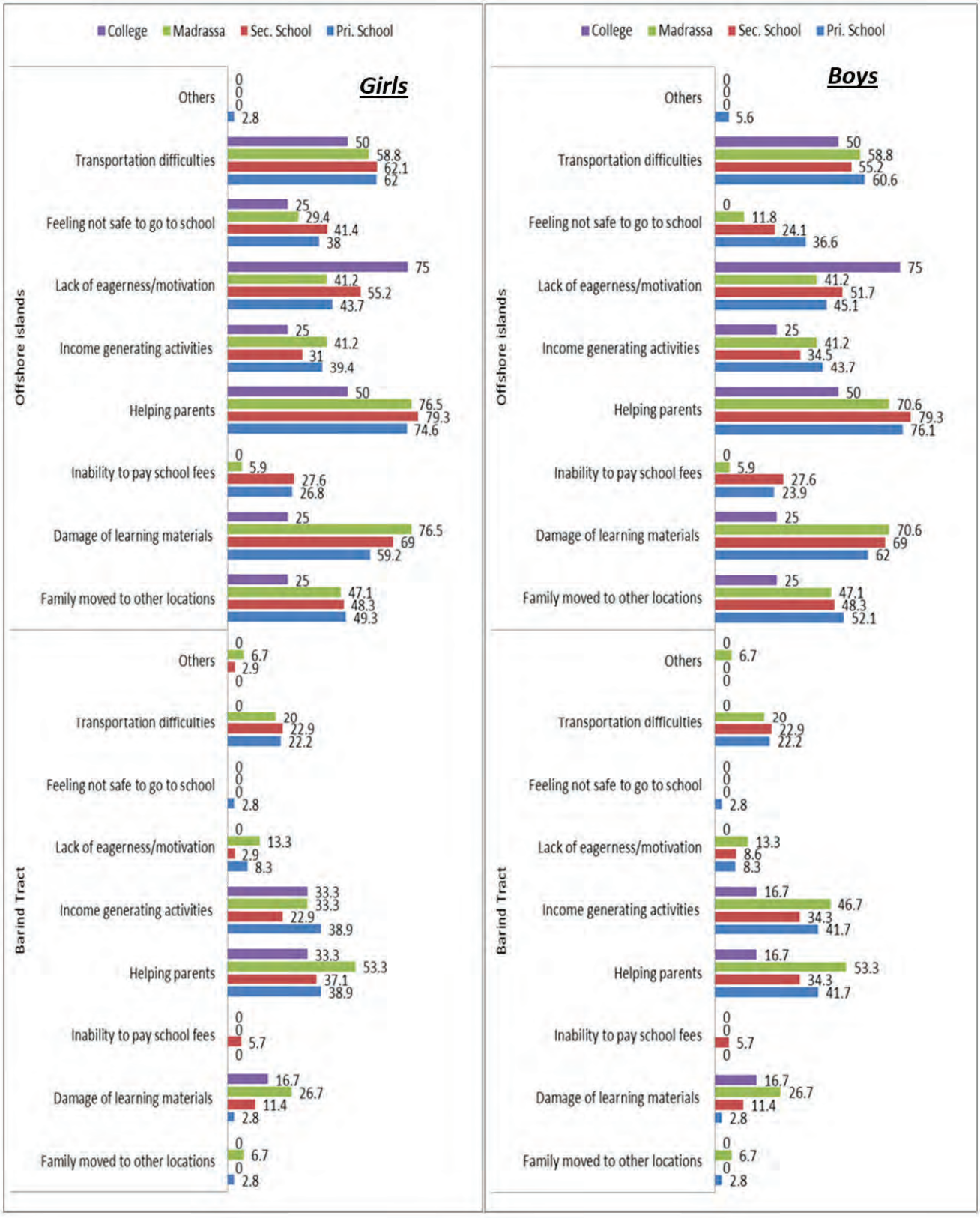


Figure 3.16d: Disaster induced challenges faced by students by disaster affected zones.

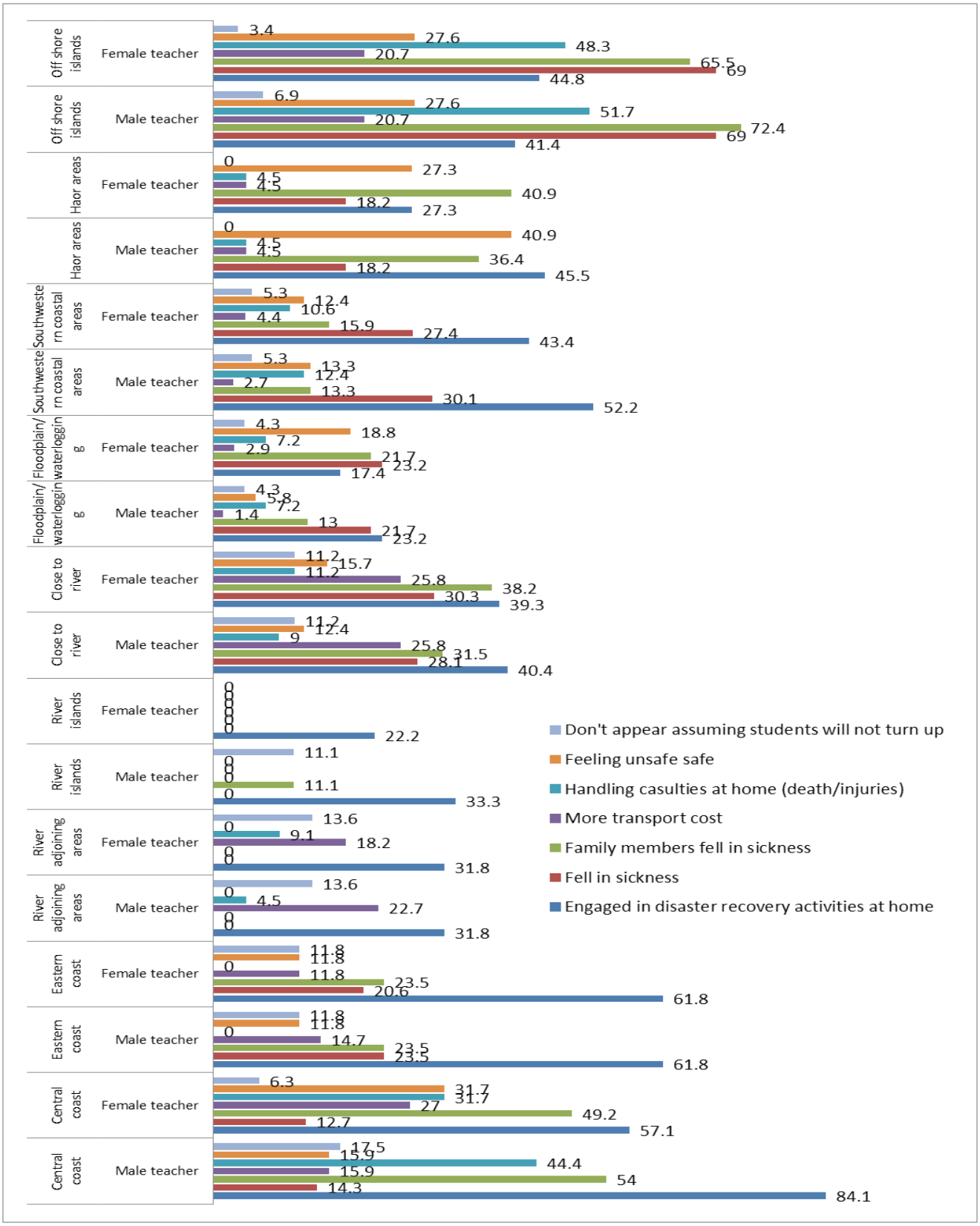


Figure 3.17: Reasons for irregular attendance of teachers at institutions by disaster affected zones.

3.10 Key findings of the chapter

The key findings of the chapter is categorized and given in the following sections. The results are summarized in such a fashion so that key messages can be read more easily and directly (given in blue colors) which may indicate need of actions (e.g. policy or interventions) for further improvements.

CCESD pilot survey carried out in 12 disaster hot spots of Bangladesh

- The pilot questionnaire survey was conducted in 1800 educational institutions (46.72% government and remaining 53.27% non-government) distributed in different disaster hot spots of Bangladesh.
- A total of 683737 male and female students (47.64% boys, 52.35% girls) were covered in the survey, while this figure stands at 19523 for teachers (72.55% male and 27.44% female).

Structures of institutions are fragile may become easy prey to upcoming hazards

- More than half of the surveyed schools (57%) are non-concrete or semi-concrete structures, while the remaining 43% are concrete made.
- Primary schools got highest percentage (71%) of concrete made school building structures where Madrassas showed highest percentage of semi-concrete structures.

Nearly half (47%) of the classrooms are not-usable

- 1800 surveyed schools got a total of 28383 classrooms among which 53% found to be mal-functioning (14923 numbers) and the rest 47% (13460 numbers) are currently in working condition. This suggests that a significant portion of classrooms remain unused by the educational institutions. Impacts of recent disasters, cumulative and residual impacts caused by disasters happened in previous years, poor quality construction, lack of maintenance is the factors responsible for damage of these classrooms.
- Schools located in coastal areas were found to be located in low lying areas (23% on an average in low lying areas, 13% on higher grounds 61% on adjoining area equal heights) from surrounding lands.

Seasons and locations determine the pattern of challenges to access to educational institutions; communication by local roads is the major means to access to school

- More than 80% of primary school students use non-asphalt local roads in dry seasons (in the winter) to go schools and this figure remains almost the same (i.e. 80%) in wet season.
- College students prefer (88% in both the seasons) road communications to come to their institutions.
- In wet season the average percentage stands at 16% who takes water ways which drops at 5% in dry season; students who take water ways to communicate to schools are also take risks during wet season when the rivers, canals or vast water terrains (in north-eastern Haor areas) remain full of water with strong water currents and waves.
- Boys and girls (especially in the primary school students) have to walk to access to school; these walkways might not be serviceable during wet or rainy season due to rainfall or flooding conditions. Even the use of walkways during dry seasons, especially in summer times, becomes difficult for those who live in riverine char lands where lands are exposed, sandy and lacks vegetation cover.

Coastal area institutions are more used as disaster shelters, thus more prone to damage of assets and loss of education by the shelter users

- Institutions located in the coastal areas where cyclonic disturbances are prominent were used more as shelter places compared to institutions located in other disaster affected zones. Thus the institutions situated in the central coast (Char Fashion upazila), southwestern coast (Shyamnagar and Tala upazilas), offshore island areas (Hatia upazila) show highest percentage of response in regards to the use of institution as disaster shelter.
- It is evidenced that primary and secondary schools used more than madrassa or colleges as shelter places.
- The significant percentage of primary and secondary schools mentioned (50% in Char Fashion and 35% in Shyamnagar) that the institutions was built as shelter therefore there remains a formal obligation to leave their space to disaster victims during emergencies and this is also reflected through the fact that the institutional premises were used as shelters (central coast 53%, offshore island 41%, southwestern coast 71% for primary schools).). The institutions located in south-eastern coastal areas like Moheskhali and Pekua also

mentioned that their structures were built and used as disaster shelters, but percentages in these area are low <20%) compared to central or south-western coastal areas.

One third of educational institutions still remained out of safe water supply systems

- Majority of the educational institutions got water supply facilities in their premises (78% said water facilities exist), but many institutions reported that existing water supply options are broken or mal-functioning. If the absent and mal-functioning water supply facilities are added then the figure stands at 28.88% for primary schools (i.e. 520 number of educational institutions out of 1800 institutions surveyed which got students about 190 thousands), 9.82% for secondary schools, 18.54% for madrassa and 8.87% for college.
- Shallow tube wells are the major water supply sources (58.68%) in the educational institutions and 34.54% institutions depend on deep tube wells for water supplies. This dependence on shallow tube wells for water supplies suggests that water supply options at school remains at unsteady states since dry seasons generally show drop in the ground water table in almost all the parts of the country.

About half of the educational institutions in disaster hotspots suffers from good sanitation facilities

- Sanitation options give more grim pictures, where only 52.22% educational institutions reported having good toilet facilities for all (47.78% reported mal-functioning sanitation systems). The primary schools show worst scenario in this regard where only 42.82% (57.18% reported negatively) schools mentioned that they have good toilet facilities for students, teachers and staffs.

Poor school facilities and support services provide weak education opportunities

- About 40% institutions mentioned that they have playgrounds that are currently not in usable conditions for different reasons (e.g. illegally occupied, unsafe, used for dumping construction materials etc.), 10% said they don't have any playground and remaining 50% educational institutions got playgrounds for by all the students both girls and boys.
- Among the institutions, colleges gave the highest response (74.36%) about having playgrounds in their premise and primary schools responded the least (40.21%). Disaster zone wise response pattern shows that a significant percentage of educational institutions located in Haor regions do not have any playgrounds; in Haor 48.35% responded no playgrounds at all and another 35.16% mentioned that they have playgrounds but not in usable condition. Response pattern shows that the conditions in the coastal areas, offshore islands and river islands areas also bad in terms of having playgrounds in the premises of educational institutions.
- When primary schools are concerned only 27.67% educational institutions responded that they provide tiffin to the students; among these 27.67% institutions, 18% comes from urban areas and other disaster affected regions showed more depressing conditions as only 2.3% in offshore islands, 0% in hills, Barind Tracts, close to river areas, river adjoining areas.
- 51.8% educational institutions in central coasts, 22.08% in southeastern coasts, 48.72% in river island areas, 44.06% in southwestern coasts, 17.65% in haor regions responded that they are they provide tiffin to students.
- Only 20.92% educational institutions indicated that they have electricity connection in their institutions (24.05% in the primary schools as the highest), only 5% mentioned that they have computer laboratories, 13.54% mentioned they have computers, 10.17% mentioned having internet facilities.

Forty percent institutions situate two kilometers beyond of nearest health care centers

- About 58.49% educational institutions indicated that nearest health care center is situated within 2 kilometers (suggests 41.51% located >2 kilometers) from the institution, 23.25% (419 institutions out of 1800 covering 158 thousand students) cases health centers are located in between 2 to 5 kilometers and 15.18% (273 institutions covering 103 thousand students) cases health care centers are located beyond 5 kilometers of the institutions.
- The remotest institutions from health care centers are mainly located in hills regions, Haor, river islands and river adjoining areas.
- About 80% of the urban area educational institutions mentioned that they are located with two kilometers of healthcare facilities.
- During disaster times, the educational institutions that are located beyond two kilometers of health care centers (about 41.51%, 747 institutions out of 1800

surveyed, covering about 283 thousand students) may face remain in anxiety that it will be very hard to receive health services if necessary when communication becomes a huge issue for the local area.

More than 50% institutions do not get benefits from First Aid Box; 70% do not have training on its use

- About 52.19% primary schools (939 institutions out of 1800 surveyed) responded that they are not in a position to get support from First Aid Box because they simple do not have it (32.62%) or it is not functioning (19.57%). Most poor conditions are demonstrated by institutions located in the Haor regions, hills, river islands, river adjoining areas and deep floodplain regions.
- FGD participants mentioned that First Aid Box are very important to have (along with regular change of outdated materials and other replenishments) because minor injuries from fall from high places, snake bites, drowning are common challenges they need to tackle during school opening hours.
- 56.11% primary schools those got First aid Box mentioned that they do not know about it or these have not been changed since got it. About 71.17% (1281 institutions out of 1800) institutions responded that they never receive any training on the use of First Aid Box equipment.

Access difficulty is the most significant challenge faced by students in disaster affected areas

- In most of the disaster zones educational institutions identified transportation difficulty as a common challenge faced by the students. Helping parents, engaged in income generating activities, feeling unsafe to go to school, families moved to other places are identified as major causes of irregular attendance of students to the educational institutions. Haor regions mentioned that all the options/ factors are true for them.

Displacement of families is the main reason of students dropouts in river dominated areas

- It is interesting to note that the factor "families moving to other places" was chosen highest number of times by river islands, river adjoining areas. However, the causes in many instances are fused and negatively influence students' motivation to go to the school.

Sickness of teachers and their family members is a prime reason of teacher's irregular attendance in educational institutions

- Educational institutions located in offshore island areas mentioned that sickness (own and family members) at home is the prime reason (69% mentioned own sickness and about 70% mentioned about sickness of family members) for irregular appearance in the institution. Second important factors identified by the institutions of non-appearance is 'engaged in disaster damage recovery activities at home'. In some disaster affected areas male teachers are more engaged (e.g. 45.5% male against 27.3% female in Haor areas, 52.2% male against 43.4% female in southwestern coastal regions). In contrast, central and southeastern coastal areas male teachers are more engaged in disaster damage recovery activities at home (84.1% male against 57.1% female in central coast). A significant percentage of educational institutions mentioned 'feeling unsafe' as the reason for irregular attendance in the school. The highest percentage appears from Haor regions, where about 40% teachers both male and female expressed their fear while commuting to the institution.

CHAPTER 4:

Experiencing Impacts of Disasters

Experiencing Impacts of Disasters

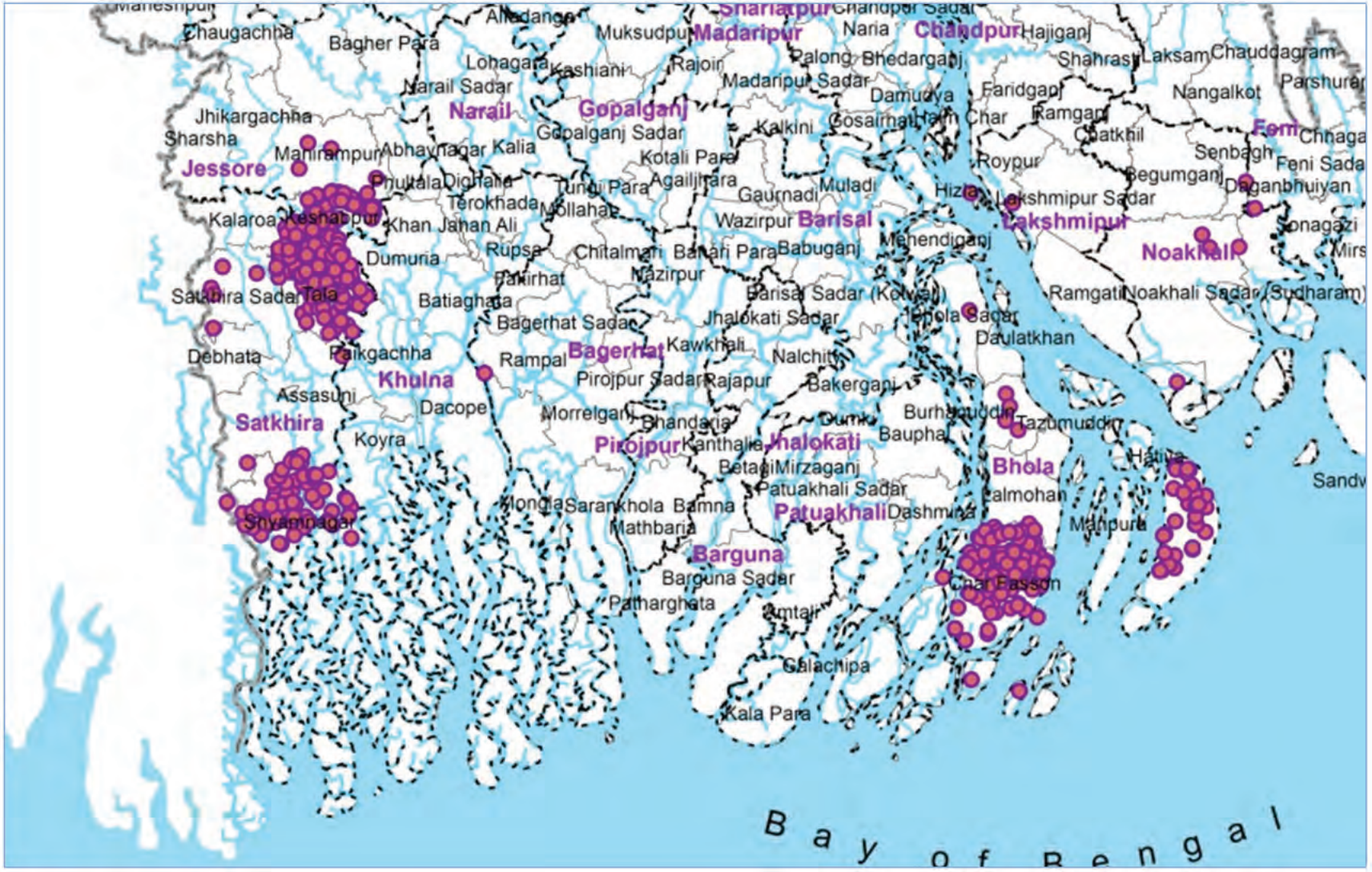
4.4 Introduction

This chapter elaborates the disaster impacts conditions that educational institutions located in different disaster zones face in terms of damage in the physical structures, resources and learning materials/facilities and learning competencies. At the beginning reflecting on the quantitative survey, the chapter provides a discussion about types of disasters that affect the educational institution, which may provide a general context about the consequences and on the state of disaster preparedness of the institutions.

4.5 Regional patterns of disaster impact conditions

4.2.1 Disaster impacts in coastal regions

Disaster narratives in Bangladesh are generally limited in analyzing and discussing mostly the tangible impacts of major cataclysmic events like floods, cyclone, earthquake. The discussions rarely focus on the attributes or internal dynamics of a particular hazard and therefore impacts situations are not properly understood, gaps remained unidentified and subsequently appropriate plans cannot be taken for necessary intervention design, budgeting processes and devising implementation strategy. For instance, the disaster impact conditions that has emerged from the CCESD pilot survey clearly indicates that limiting only understanding flood impacts and leaving the differential occurrence intensity over time restrain the experts and planners to pay necessary attention how to deal with it. Figure 4.1a, 4.1b show that the disaster impacts in coastal areas have both time and space dimension, where time dimension indicates that in every 2-5 years the educational institutions face impact conditions from flood and cyclone hazards. On the other hand, types of hazards show a difference with the difference of location. Educational institutions in south-western coastal areas mentioned that flooding is a concern for them, the institutions located in the central coastal regions mentioned about flood impacts, but 60% of them reported that they face flood impact every year and the institutions located in the south-eastern coastal areas did not indicate about flooding problem. Alike flood impacts, central coastal areas institutions also reported that they face cyclonic disturbances, irrespective of landfall happened or not, almost every year; they also identified river bank erosion as a hazard effecting every year. Educational institutions of south-western coastal regions mentioned that abnormally high tides and related inundations (73.53%) cause problems to them and this abnormal high tide conditions happen in every 2-3 years interval.



Map 4.1: Educational institutions surveyed in coastal regions of Bangladesh in CCESD pilot study.

Institutions in all three coastal regions expressed their concern over Tsunami risks. South-eastern coastal areas mentioned about flash floods/local floods and landslide hazards which other two coastal regions did not mention. Similarly, south-western coastal region reports slow onset disaster threats like salinity intrusion and water logging problems which the central and south-eastern coastal areas did not take any serious account. Comparative

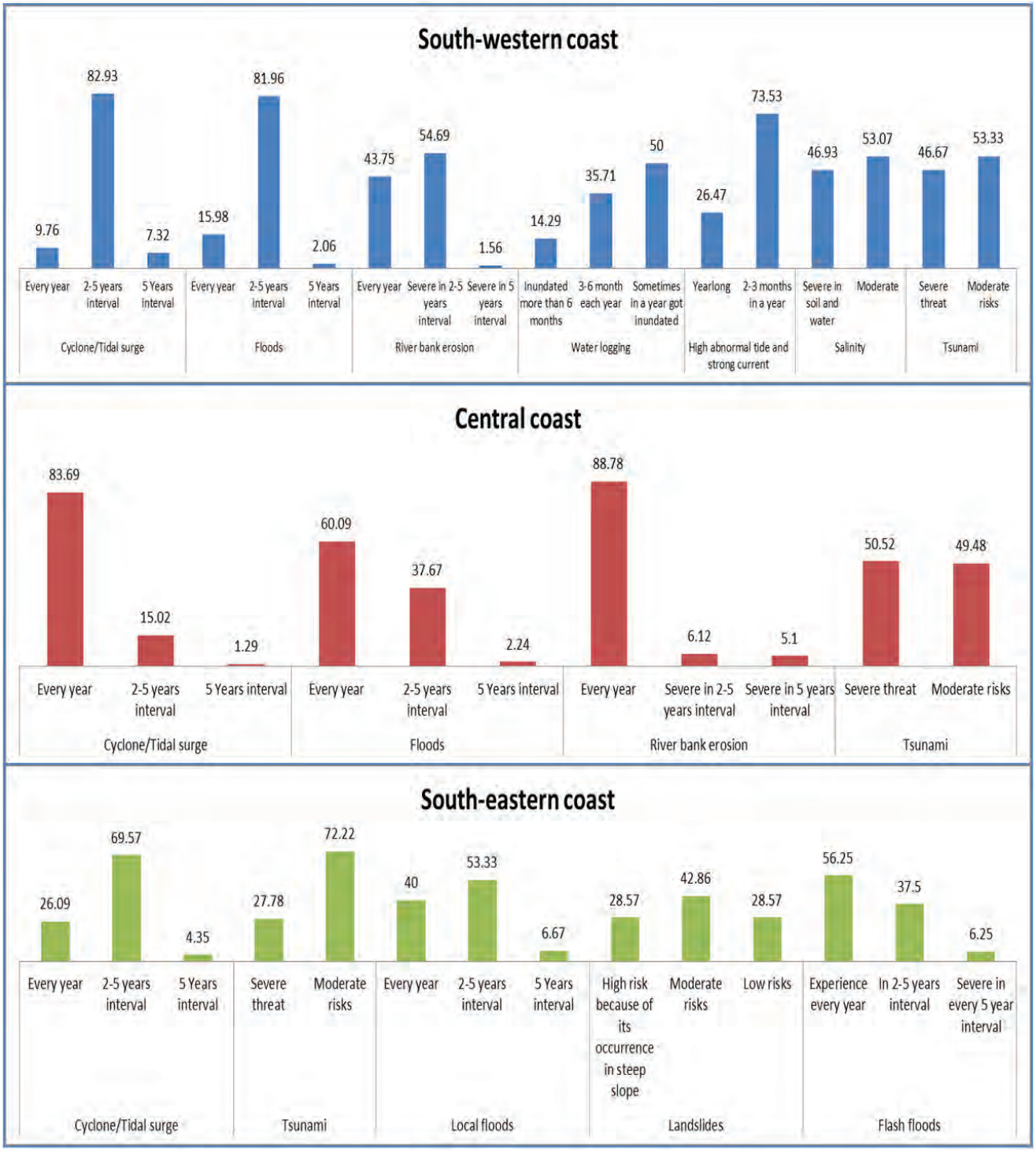


Figure 4.1a: Return periods of hazards by disaster zones.

assessment disaster impact conditions (Figure 4.1a, 4.1b, 4.1c, 4.1d and 4.2) suggests that coastal regions of Bangladesh experience multiple hazard conditions where other regions have generally characteristic pattern of hazard conditions.

4.2.2 Disaster impacts in river adjoining areas and floodplains

Flood impacts are identified as major threats by the institutions located in river adjoining areas (within 2 kilometers of the river), areas close to river (2-5 kilometers

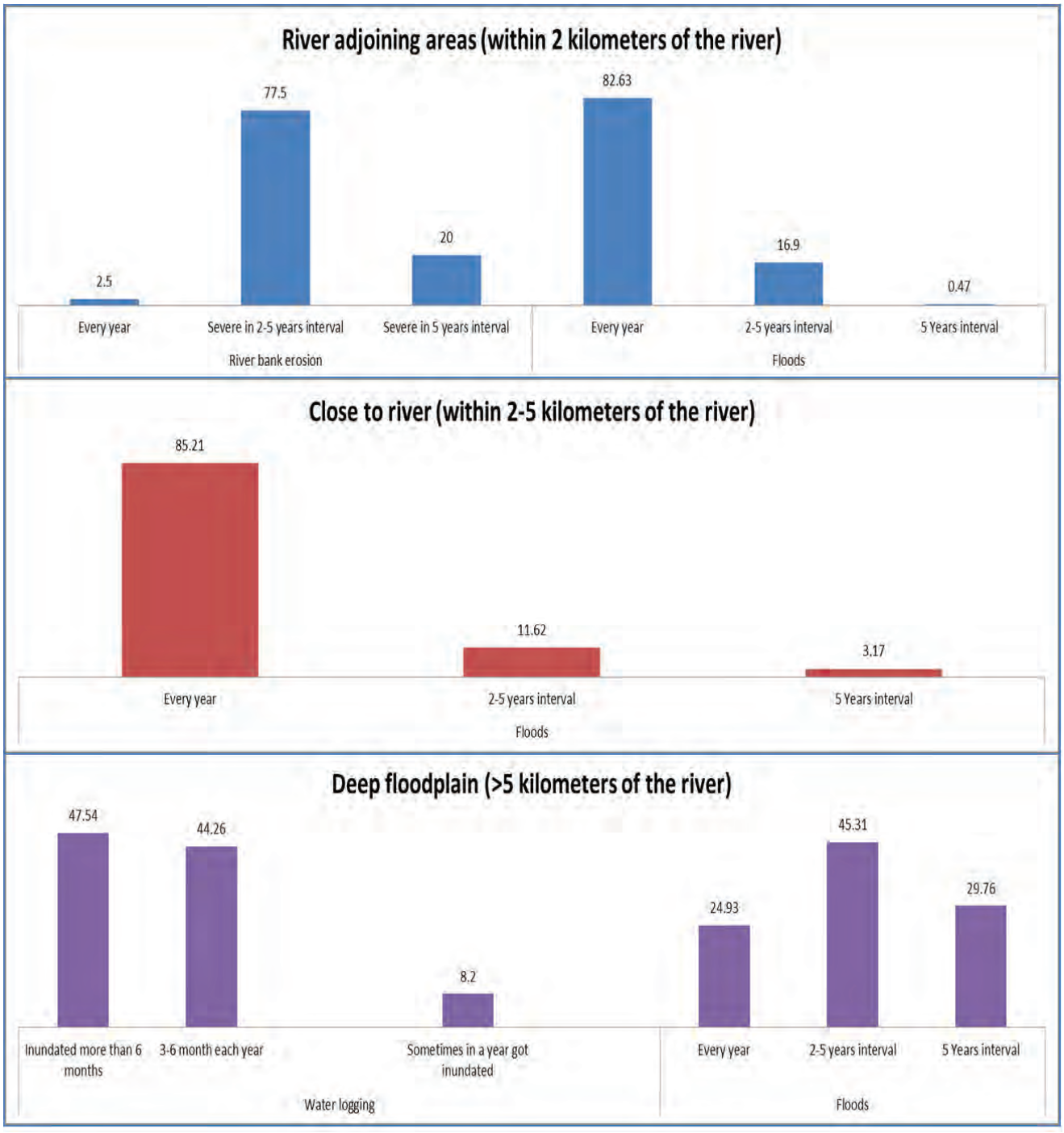


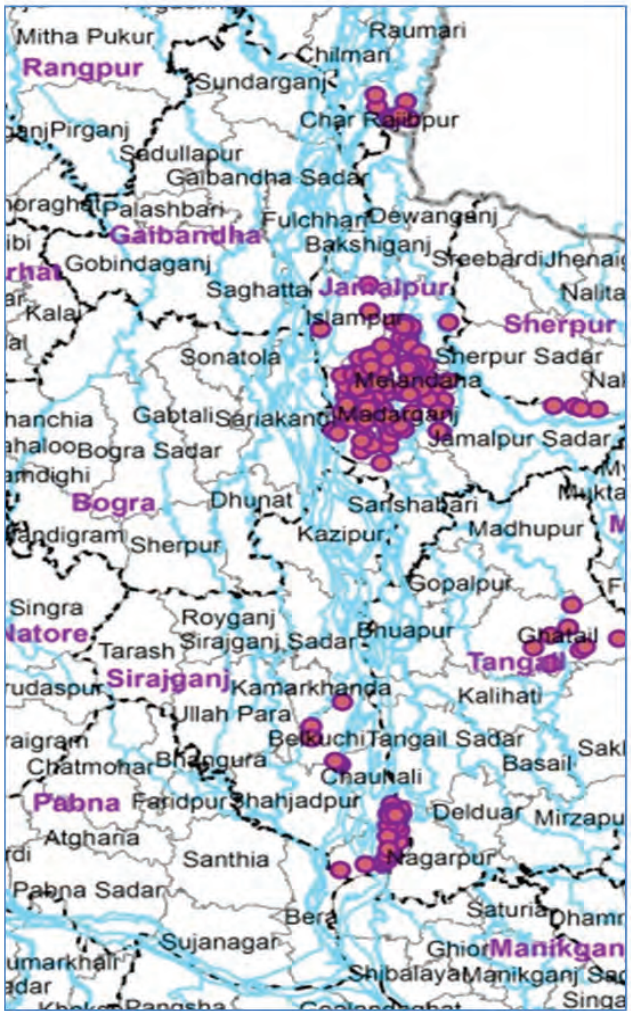
Figure 4.1b: Return periods of hazards by disaster zones.

of the river) and floodplain interiors (termed as deep floodplain located beyond 5 kilometers of the river). Institutions located in river adjacent areas (both river adjoin and close to river areas) mentioned that experiencing flood impacts is a every year phenomenon for them, on the other hand floodplain area educational institutions face major flood impacts in 2-5 years interval. Waterlogging problem turns out as a characteristic hazard phenomenon for floodplain areas, among 91.8% educational institutions who responded yes to waterlogging problem 47.54% mentioned that inundation of the area happens more than 6 months of a year and 44.26% indicated that it is a 3-6 month-prolonged phenomenon from waterlogging hazard.

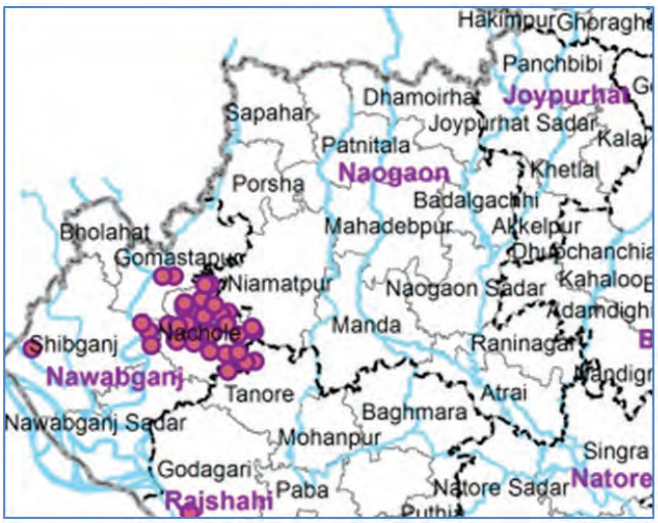
4.2.3 Haor regions Barind tracts and Hills

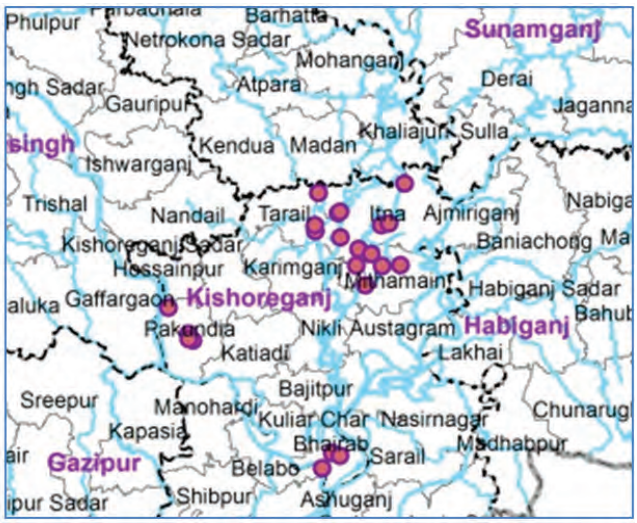
Haor regions represent the low lying piedmont areas located in the northern-eastern parts of the country, covering districts like Sunamgonj, Hobigonj, Netrokona, Moulvi Bazar and Sylhet. This region got two contrasting seasons (hot and humid rainy seasons from March to August and dry and cold winter season spreads from September to the month of February) and problems that the educational institutions of this regions face are also correspond the seasons. Flashfloods happening as a result of huge amount of water coming down from the adjoining Indian hills is a major threat in *Haor* region.

Inundation by flood waters, strong current, waves, gusty winds all collectively create serious conditions



Map 4.2 Educational institutions surveyed in floodplain and river adjoining areas.





Map 4.3 Educational institutions surveyed in Barind tract (left) and Haor regions (right) of Bangladesh in CCESD pilot study.

in the regions. The educational institutions are located in raised island-like earth made platforms which look like drifting islands. Taking a journey by country boats is the only means for the students to get to schools. It was reported during field visits that capsize of boats happen sometimes causing deaths and injuries. In dry and winter season boats cannot ply and poor road communication put students, teachers in different troubles to access to institutions, about 88.71% institutions mentioned that access difficulty is a major threat for them in dry season.

Map 4.4 Educational institutions surveyed in south-eastern coastal regions of Bangladesh.

The educational institutions located in Barind Tract areas (in the north-western parts) mentioned that drought conditions and associated other hazards like high temperatures cause problems in the areas. It was reported that dry conditions cause shortage of drinking water and also impacts radiate in sanitation and hygiene processes. Students mentioned that it is sometimes very difficult for them to stay at schools due to hot ambient conditions. While in the hills, respondents mentioned that heavy rainfall during summer and rainy seasons cause problems to them.

4.2.4 Disaster experiences in island areas

Flood is reported by the educational institutions as one of the common natural hazard in both river and offshore island areas. About 81.67% respondents from river island areas told that they face flood problems almost every year while 74.49% in the offshore island areas mentioned the similar problem. Similarly, educational institutions in both the areas mentioned that bank erosion from water currents and waves is a serious threat for them. Offshore islands indicated about sea erosion along with river erosion hazards.

4.2.5 Urban areas

Hazards faced by urban areas educational institutions are different from the hazard faced by institutions located in other areas. Earthquakes, urban floods generated mainly from water congestion and drainage problems and fire hazards are found to be the major hazards in urban contexts. Representatives from institutions mentioned that flooding problem is not a regular phenomenon, rather they face it in almost 5 years interval. It is interesting to note that fire hazards and earthquake hazards are identified by majority of the institutions (64.29% mentioned about earthquake and 79.27% mentioned about fire hazard), but they said it is not a serious problem for them and they are better prepared to address related threats.

4.2.6 Frequency in experiencing disaster by the educational institutions

The educational institutions were asked about their experience in facing and tackling the hazards. They were asked how many times in history they experience hazards, what was the degree of intensity, what time of the year they experienced that. The response pattern suggests

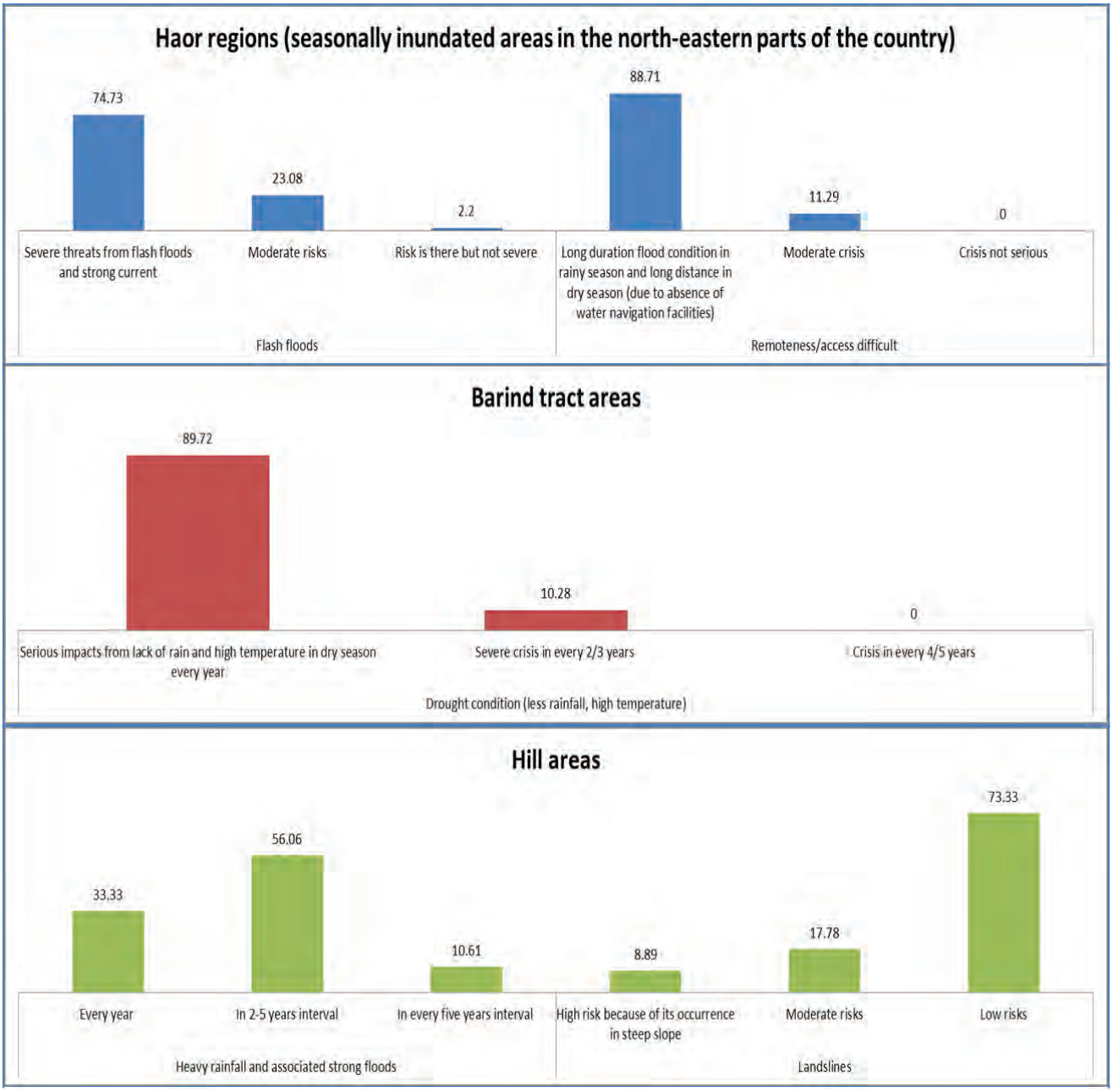


Figure 4.1c: Return periods of hazards by disaster zones.

that hydro-meteorological hazards (i.e. cyclone, floods, river bank erosion, flashfloods, water logging, severe rainfall, strong wind) returns in cyclic order and almost in the same time of the year. The highest response show that educational institutions had experienced hazards 1 to 6 times in disaster impact history (257 institutions in cyclone affected areas mentioned 1-6 time while 86 institutions mentioned more than 6 times impact experience; for

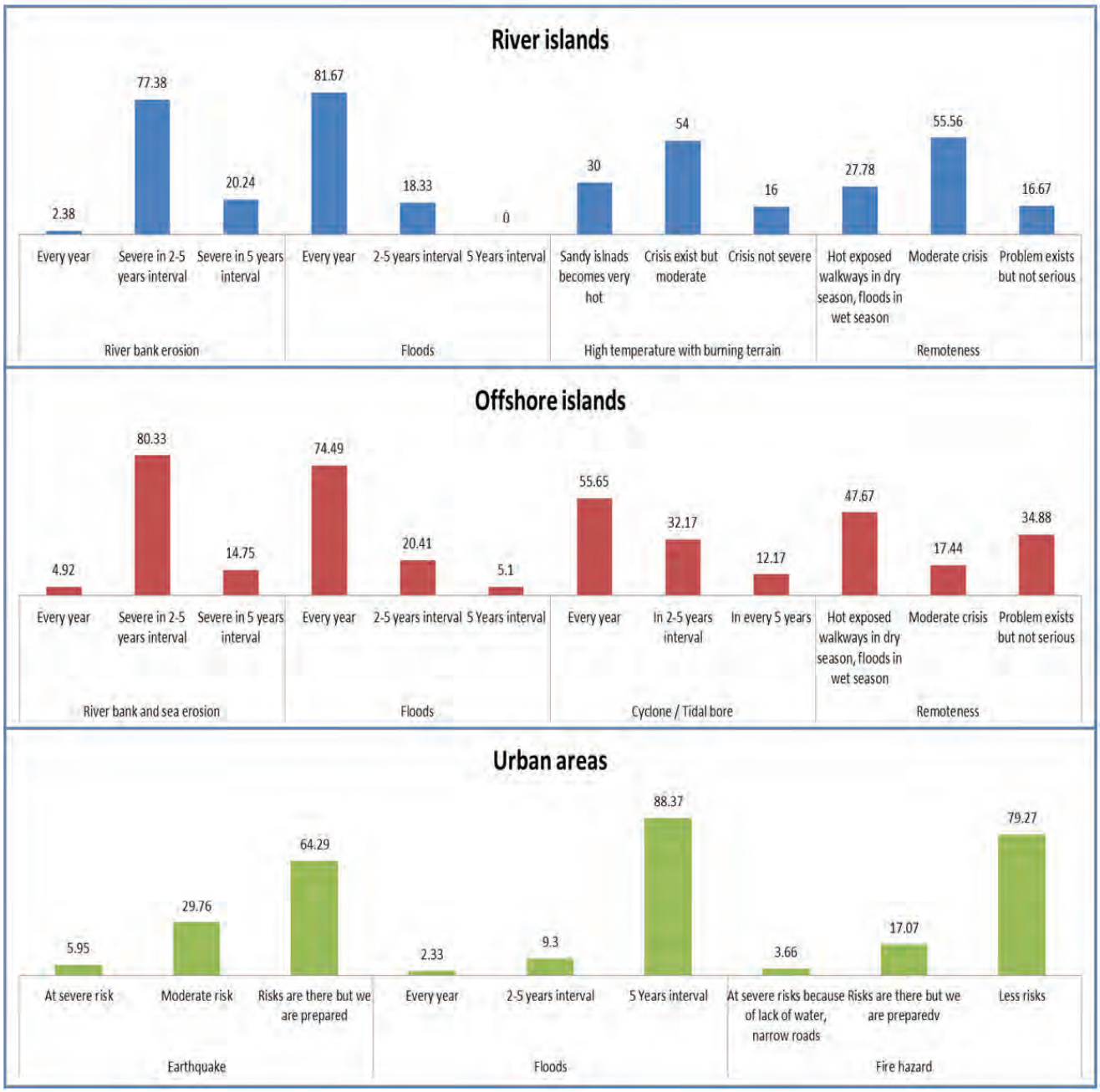
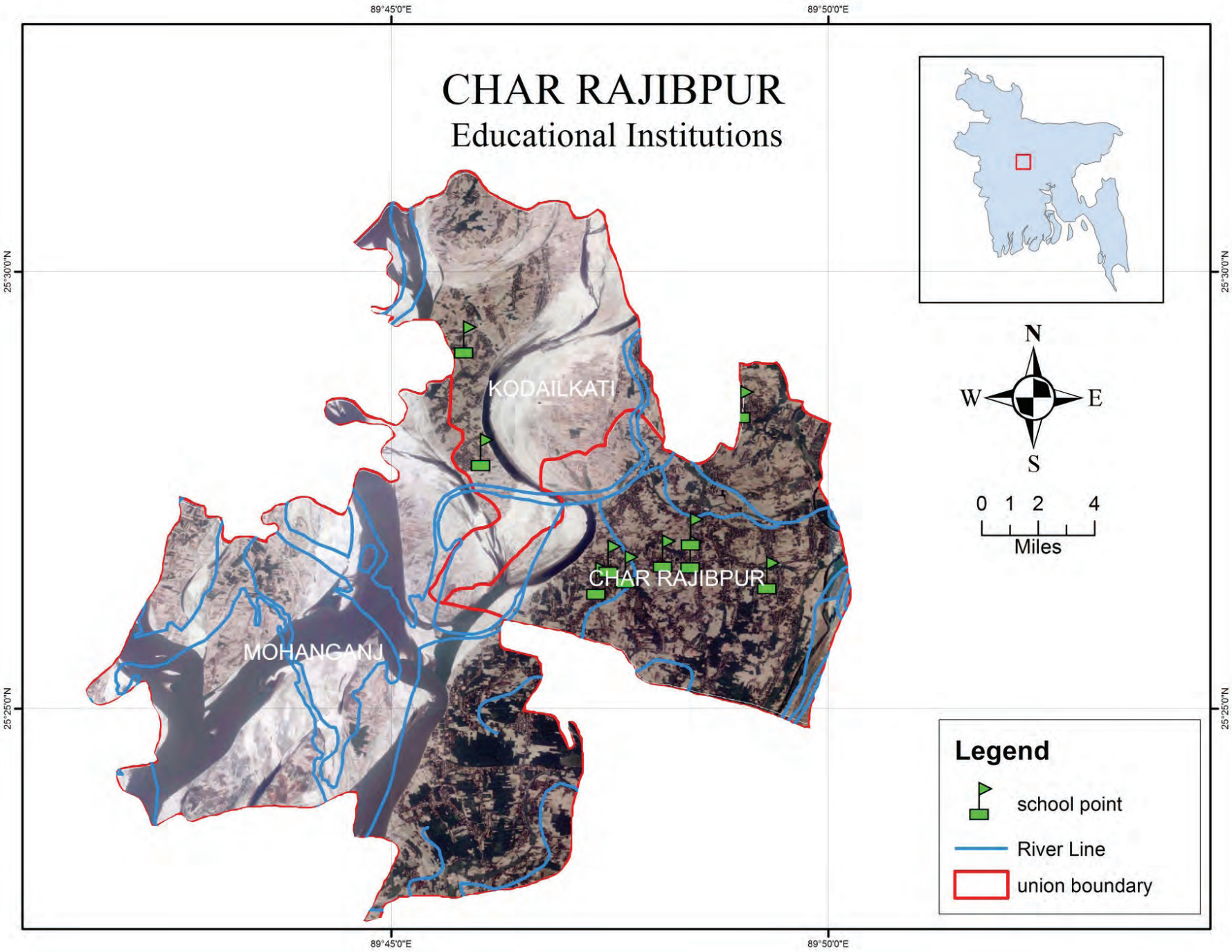
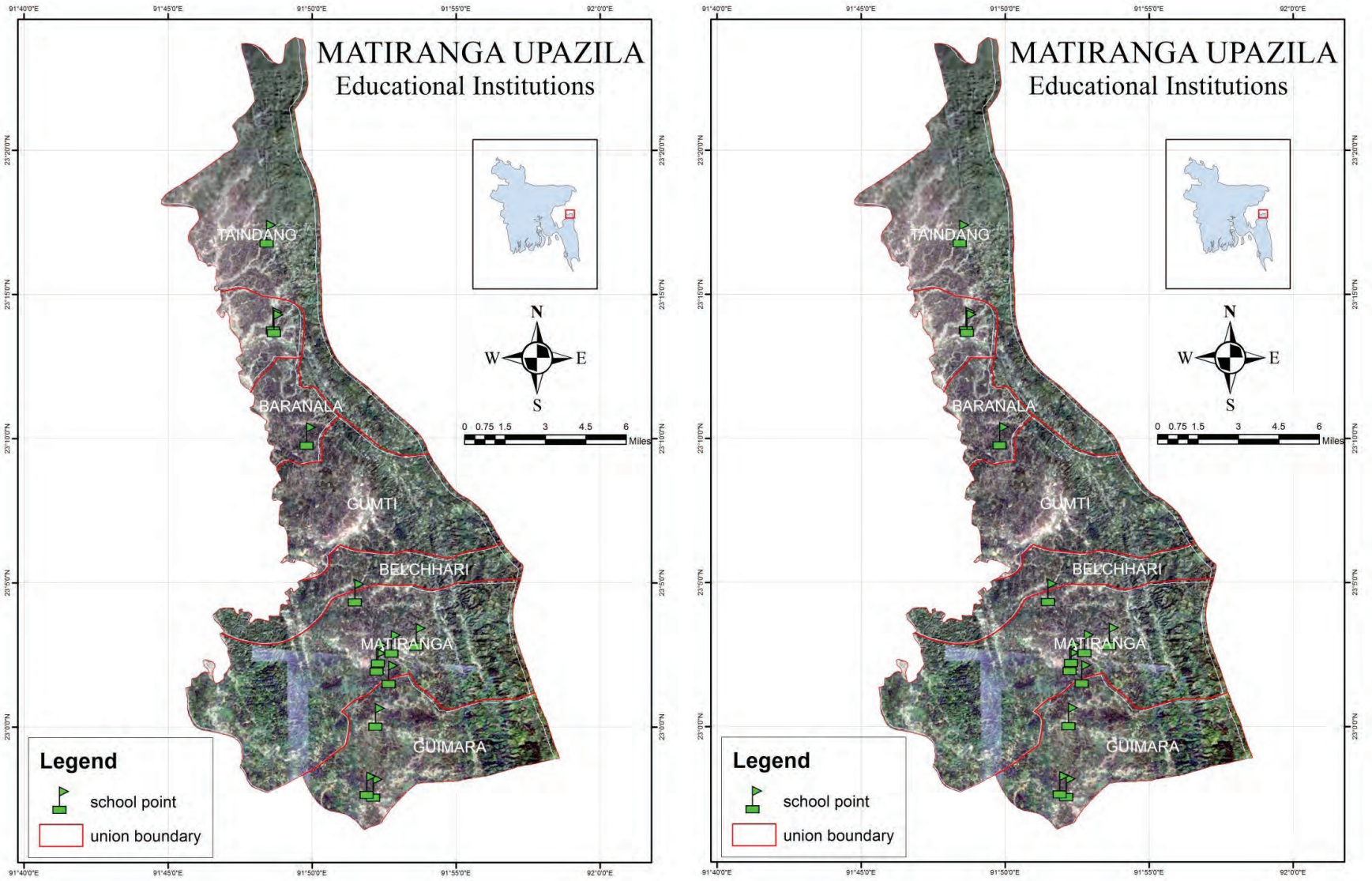


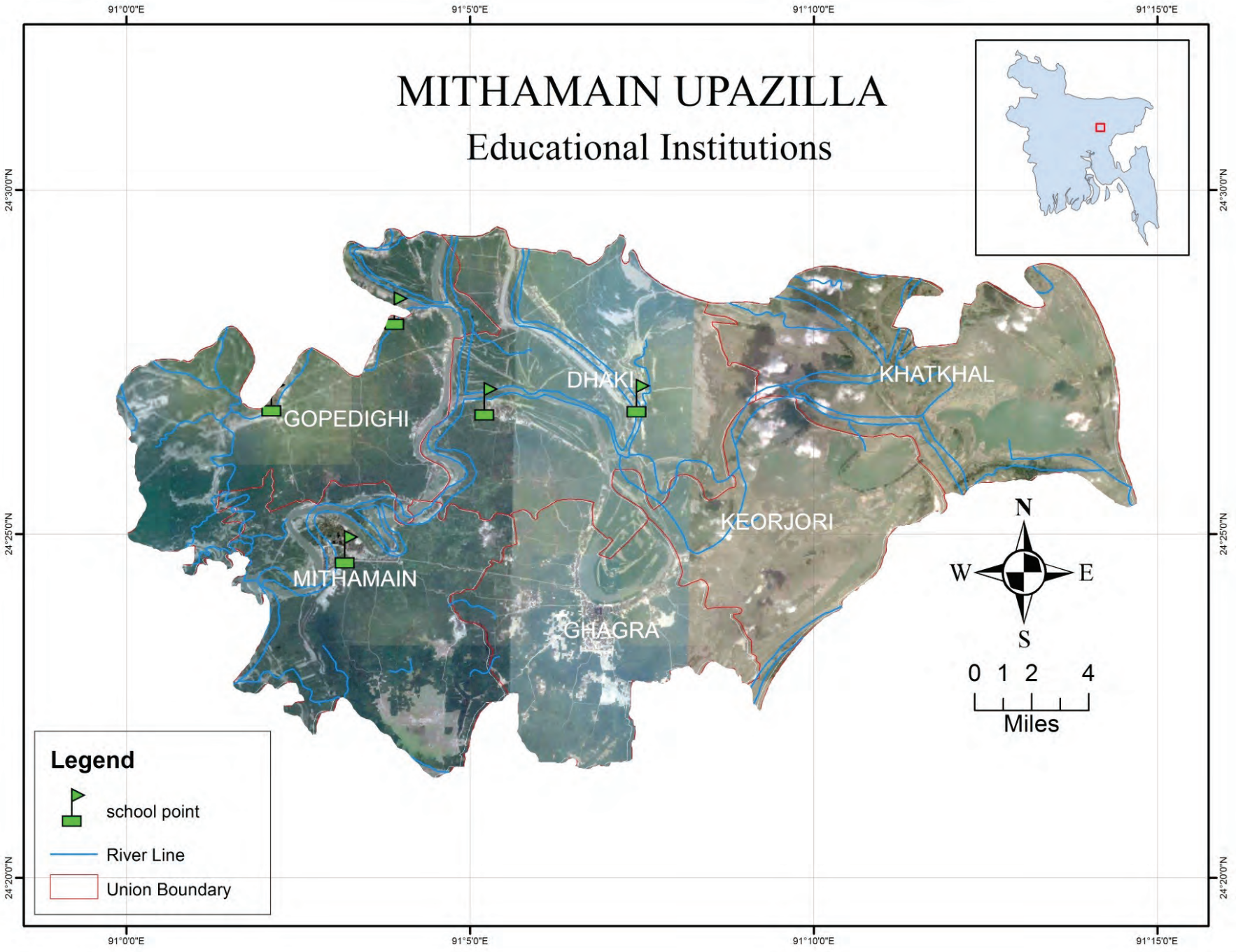
Figure 4.1d: Return periods of hazards by disaster zones.



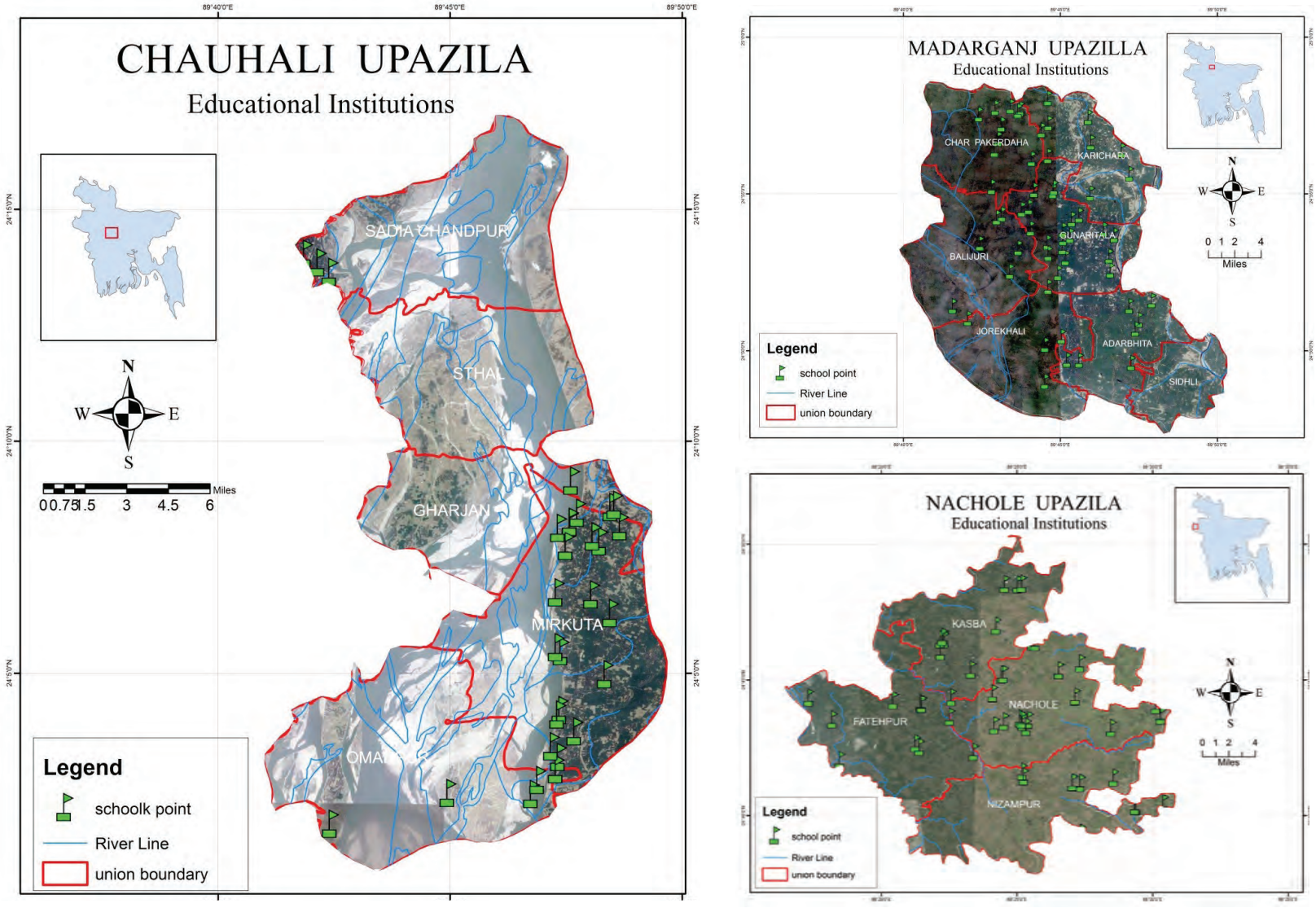
Map 4.5: Educational institutions in Char Rajibpur upazila, Kurigram district.



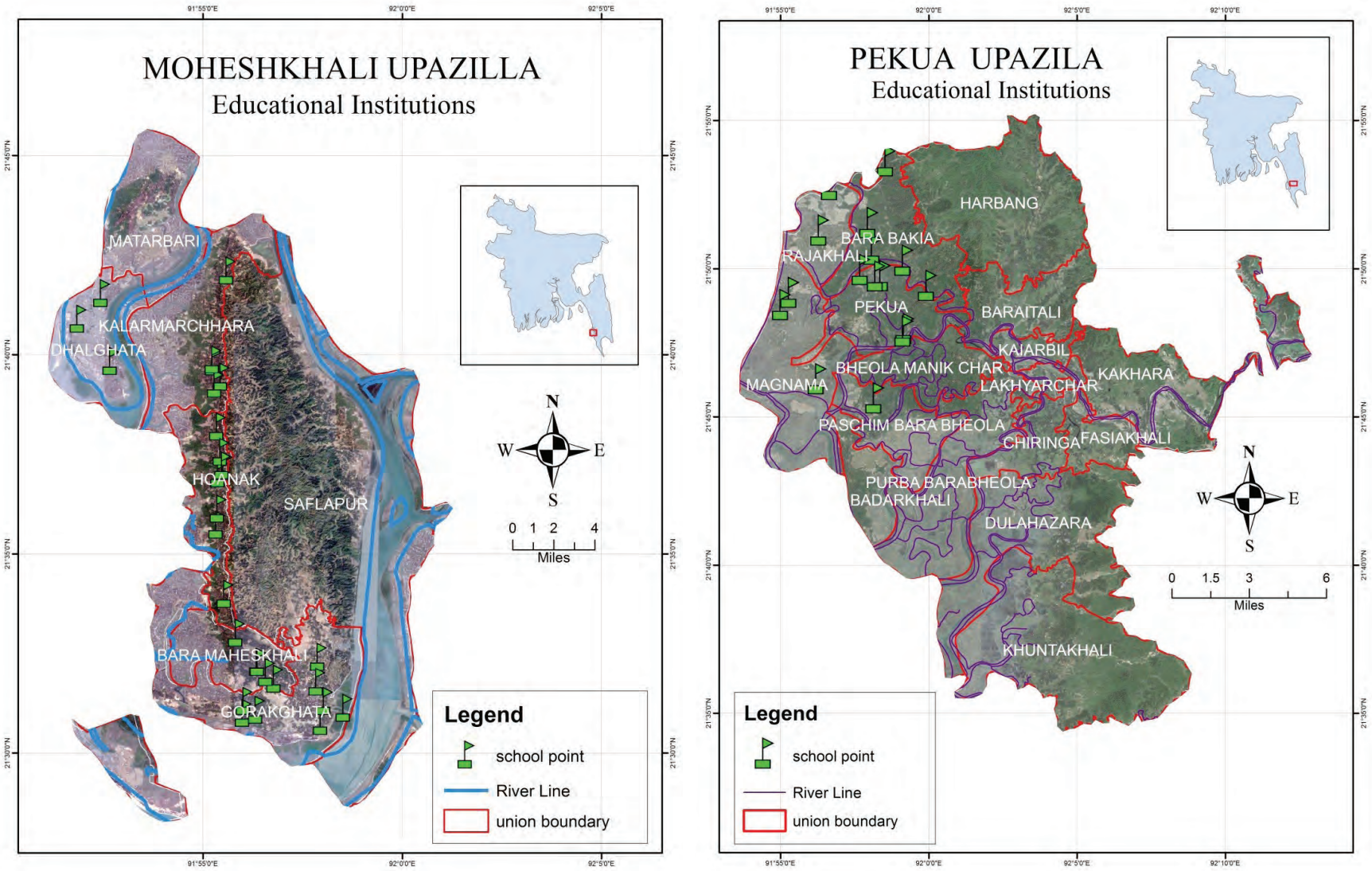
Map 4.6: Educational institutions in Matiranga upazila, (Khagrachari district) and Shyamnagar upazila (Satkhira district).



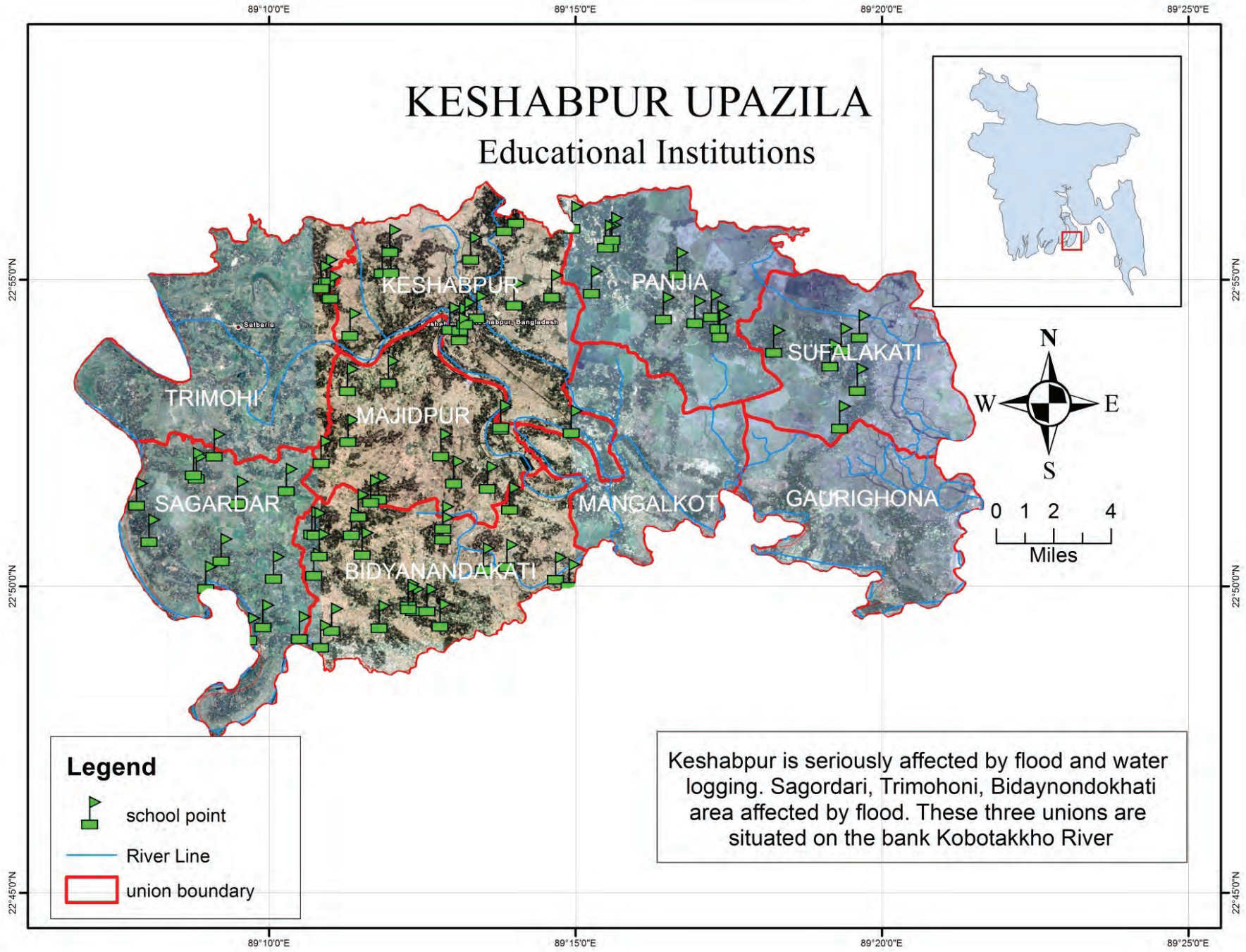
Map 4.7: Educational institutions in Mithamain upazila, Kishoregonj district.



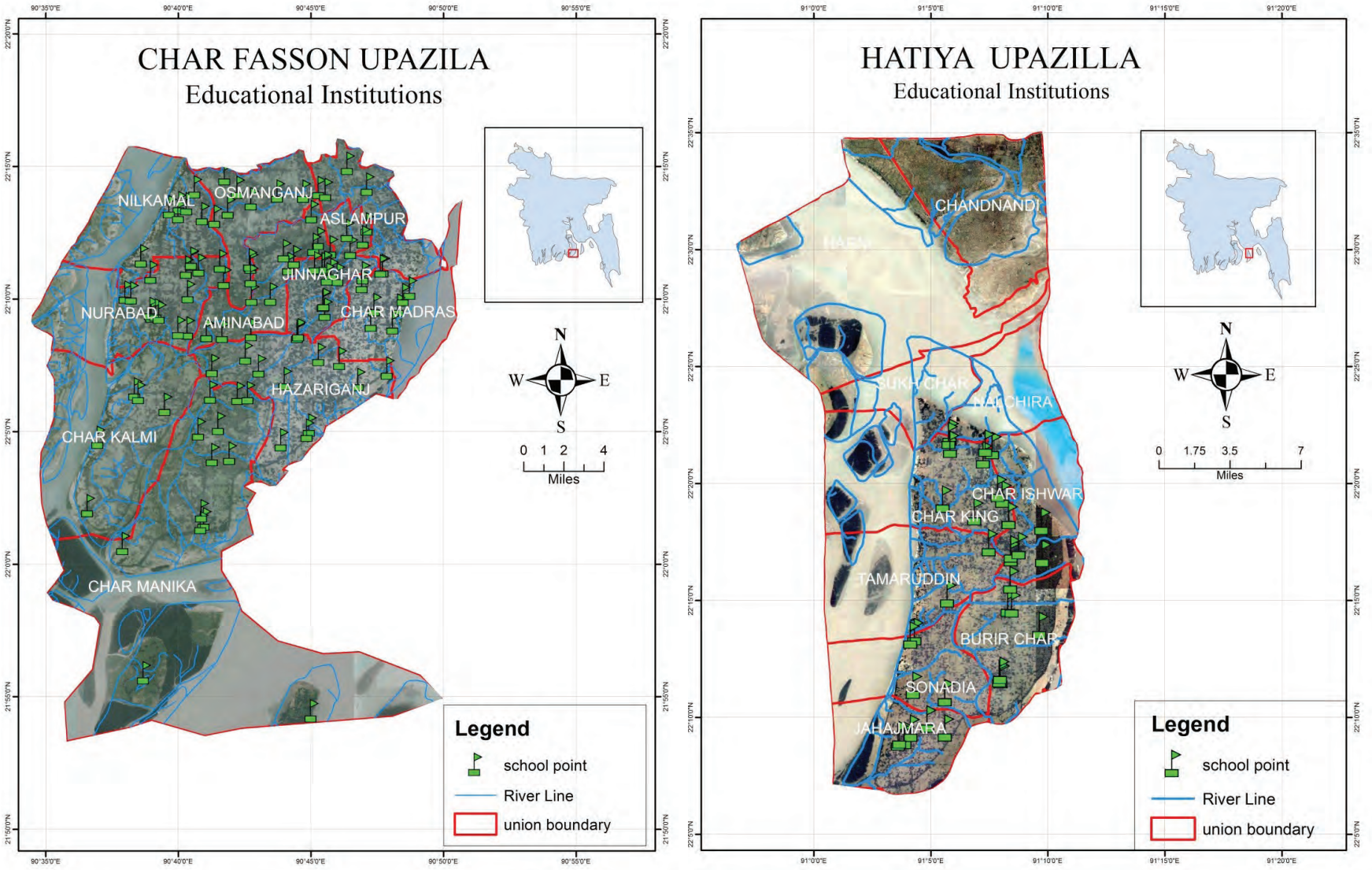
Map 4.8: Educational institutions in Chauhali upazila (Sirajgonj district), Madarganj upazila (Jamalpur district) and Nachole upazila (Nawabgonj district).



Map 4.9: Educational institutions in Moheshkhali upazila (Coxs Bazar district) and Pekua (Coxs Bazar district).



Map 4.10: Educational institutions in Keshabpur upazila, Jessore district.



Map 4.11: Educational institutions in Char Fasson upazila, (Bhola district) and Hatiya upazila (Noakhali district).

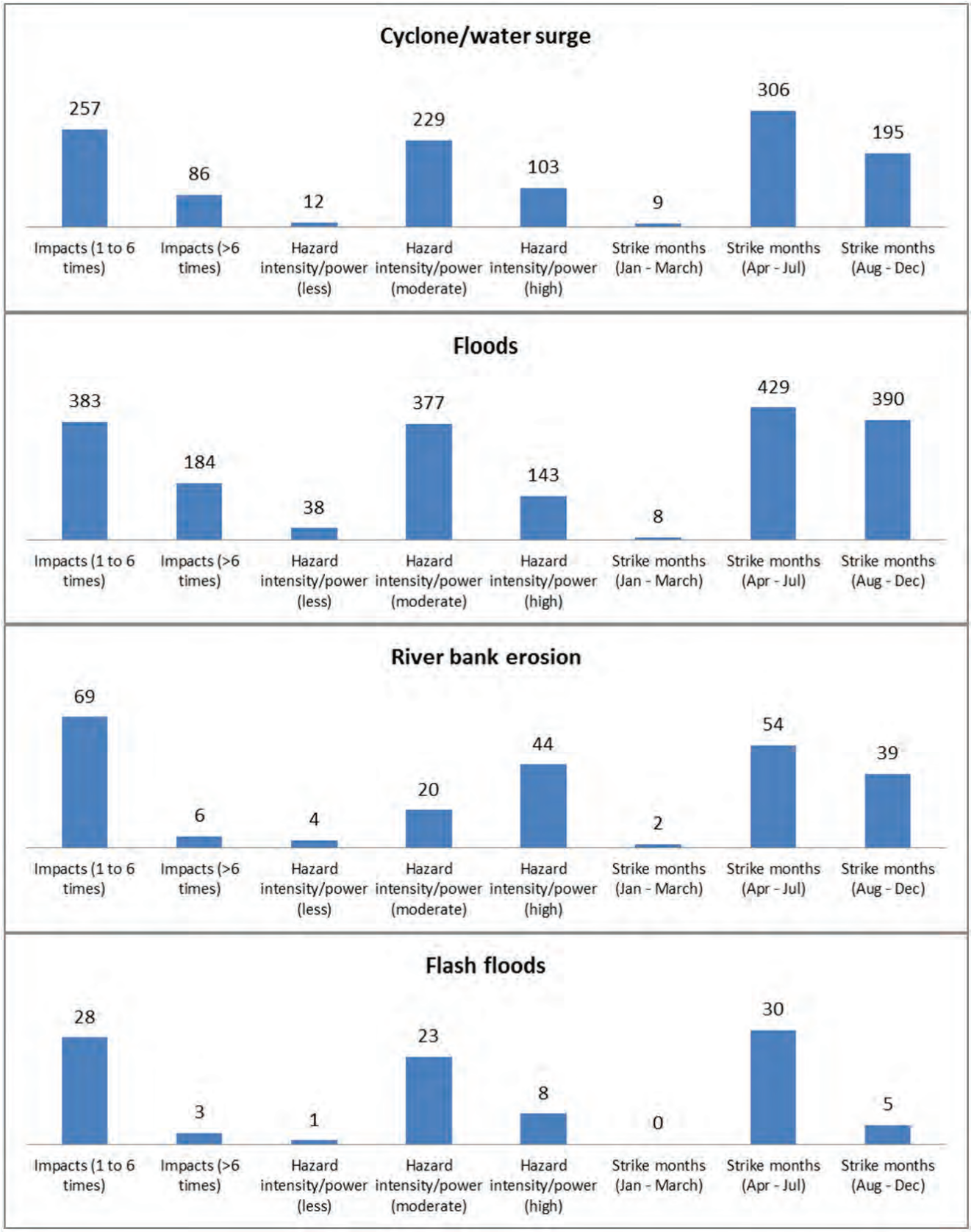


Figure 4.2a: Return periods, disaster intensity and month of occurrence of strong and rapid hazards by disaster zones.

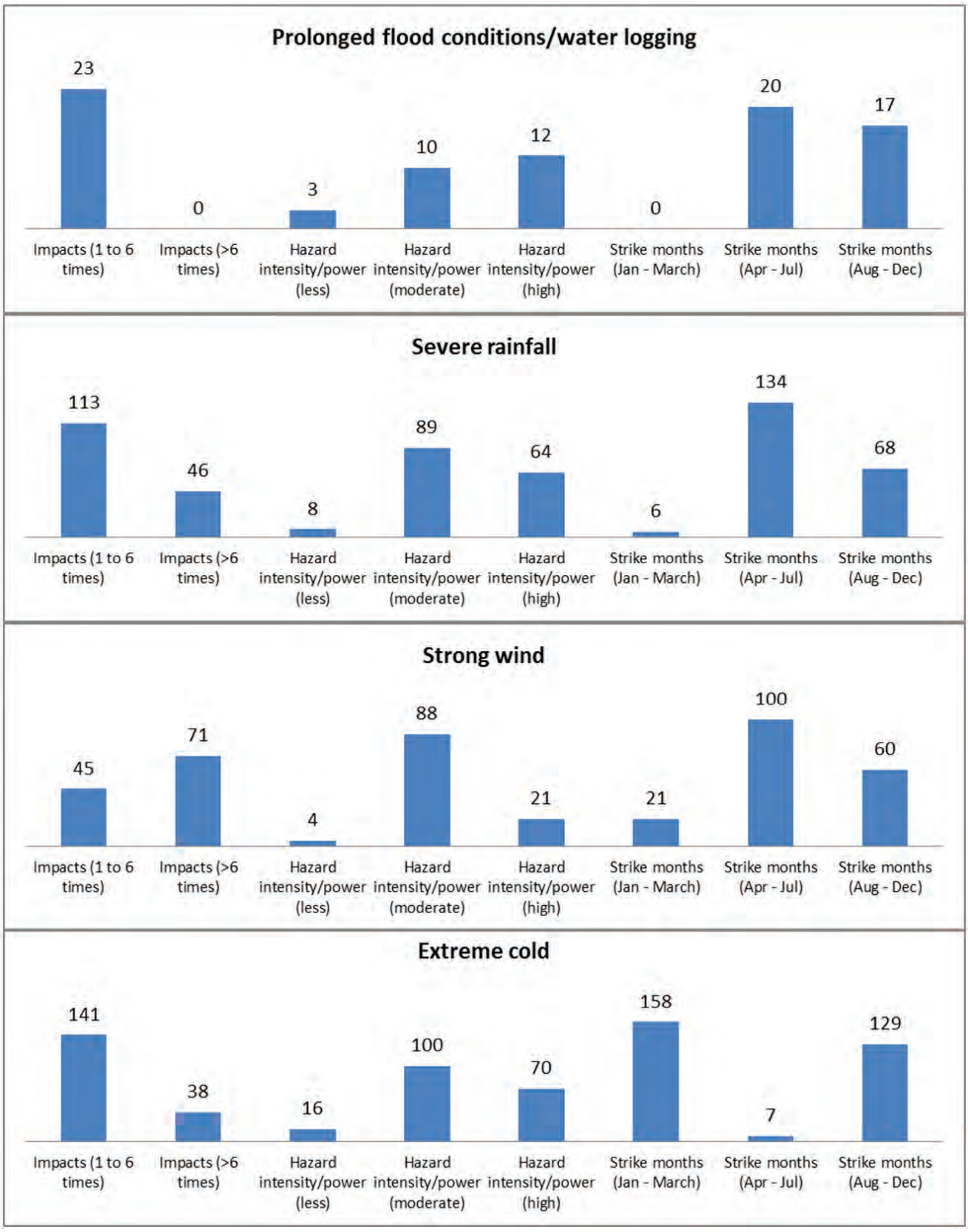


Figure 4.2b: Return periods, disaster intensity and month of occurrence of strong and rapid hazards by disaster zones.

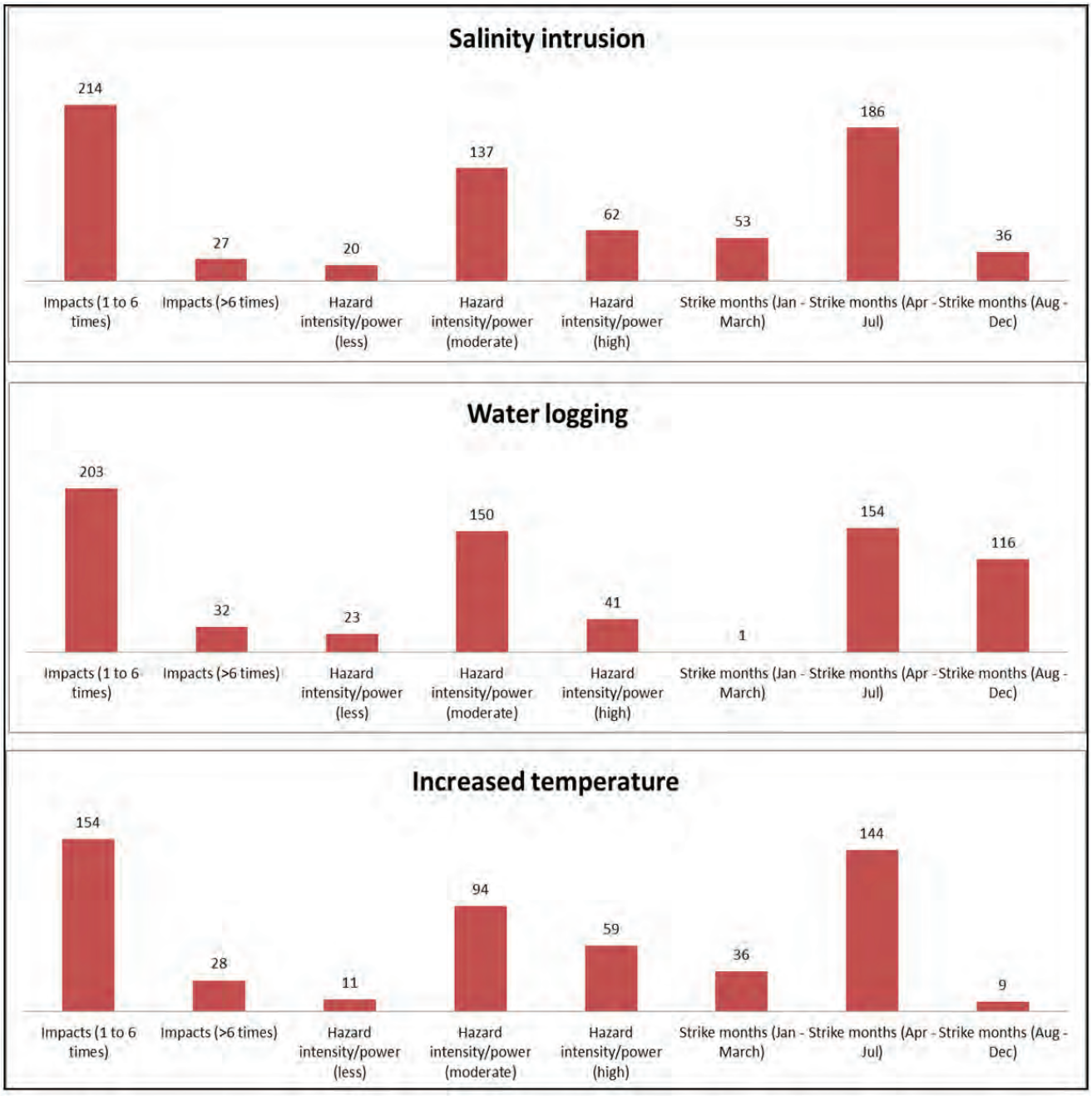


Figure 4.3a: Return periods, disaster intensity and month of occurrence of slow and progressive hazards by disaster zones.

floods this numbers are 383 and 184, for river bank erosion 69 and 6 respectively). In impact intensity scale[14], institutions mentioned moderate in majority cases, though some of the institutions indicated high impacts. The educational institutions expressed the April, May and June are the month of the year when most of these hydro-meteorological hazards generally occur, some of the institutions also mentioned that August to December as disaster impact times. The slow onset hazards like salinity intrusion, water logging, high temperature, unusual

[14] The options were high, moderate and low.

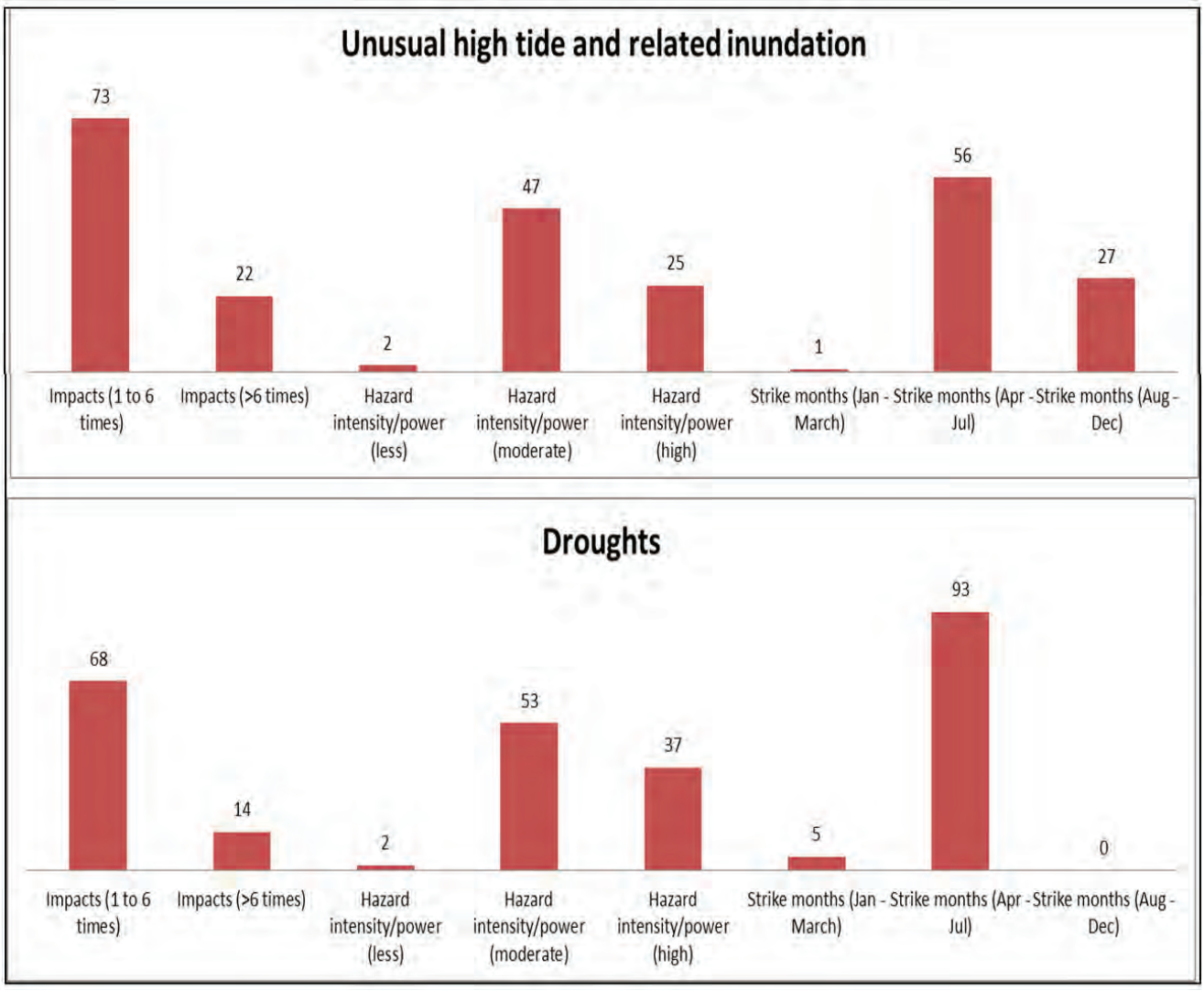


Figure 4.3b: Return periods, disaster intensity and month of occurrence of slow and progressive hazards by disaster zones.

high tide and related inundation, drought conditions are associated with hydrological and meteorological factors, therefore response pattern in this regard appeared like rapid and strong hazards indicated above.

Table 4.1: Vulnerability of educational institutions located in flood affected areas.

Types of vulnerability of educational institutions located in flood affected areas	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Severe flood impact every year	419 (50%)	232 (42%)	156 (47%)	31 (40%)	838 (47%)
Experiencing moderate level damage every year	488 (58%)	316 (57%)	217 (66%)	44 (56%)	1,065 (59%)
Dysfunction of water supply and sanitation facilities	438 (52%)	289 (53%)	169 (51%)	39 (50%)	935 (52%)

Types of vulnerability of educational institutions located in flood affected areas	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Prolonged flood conditions disrupt students coming to school	506 (60%)	332 (60%)	192 (58%)	45 (58%)	1,075 (60%)
Students can not use playgrounds during floods	525 (62%)	318 (58%)	200 (61%)	43 (55%)	1,086 (60%)

Table 4.2: Vulnerability of educational institutions located in cyclone affected areas.

Cyclonic impacts	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
The classrooms of this institution are generally used as cyclone shelter resulting to serious damage of furniture and building infrastructure	192 (23%)	82 (15%)	70 (21%)	14 (18%)	358 (20%)
Cyclonic gusts and water current cause damage to infrastructure, water supply systems and school sanitation processes	219 (26%)	134 (24%)	105 (32%)	17 (22%)	47 (26%)
Student's access to school becomes very dangerous during cyclone times	237 (28%)	138 (25%)	125 (38%)	19 (24%)	519 (29%)
Communication disruptions took place that cause poor school attendance of the students	230 (27%)	130 (24%)	119 (36%)	16 (21%)	495 (28%)
Students do not appear to school in this time	112 (13%)	76 (14%)	59 (18%)	8 (10%)	255 (4%)

Table 4.3: Water logging and impacts.

Types of vulnerability	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Difficult to come to school, time consuming, expensive and risky	146 (17%)	99 (18%)	65 (20%)	9 (12%)	319 (18%)
Dysfunction of WASH (water, sanitation and hygiene) facilities	164 (19%)	108 (20%)	71 (22%)	12 (15%)	355 (20%)
Students can not use playgrounds	182 (22%)	140 (25%)	91 (28%)	15 (19%)	428 (24%)
Many students can not appear to school because of breakdown of communication systems	178(21%)	123 (22%)	84 (26%)	11 (14%)	396 (22%)
Institution remain open but no class remain suspended	110 (13%)	81 (15%)	46 (14%)	8 (10%)	245 (14%)

Table 4.4: Impacts of salinity on educational institutions.

Types of vulnerability	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Infrastructure (wall, fllor and other parts) of the institute becomes fragile	167(20%)	95 (17%)	61 (19%)	11 (14%)	334 (19%)
Breakdown of WaSH facilities	160 (19%)	90 (16%)	62 (19%)	11 (14%)	323 (18%)
Tree damage/uprooted/died	154 (18%)	82 (15%)	60 (18%)	8 (10%)	304 (17%)
Cause students' sickness and related irregular attendance	103 (12%)	50 (9%)	40 (12%)	5 (6%)	198 (1%)

Table 4.5: Disaster experiences by schools located in river adjoining areas

Types of vulnerability	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Relocation of the institution becomes necessary	58 (7%)	17 (3%)	20 (6%)	5 (6%)	100 (6%)
Close presence of river put us in constant fear of being gulp down by the river anytime	89 (11%)	44 (8%)	36 (11%)	8 (10%)	177 (10%)
The teachers who use water ways to come to school face serious risks	84 (10%)	45 (8%)	32 (10%)	9 (12%)	170 (9%)
Displacement of parents/households cause students to leave the institution	94 (11%)	54 (10)	37 (11%)	10 (13%)	195 (1%)

Table 4.6: Vulnerability in haor regions

Types of vulnerability	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Disrupted communication systems	50 (6%)	19 (3%)	13 (4%)	2 (3%)	84 (5%)
Surrounding areas of the institution remain inundated	53 (6%)	22 (4%)	12 (4%)	2 (3%)	89 (5%)
The children are at drowning risks	52 (6%)	20 (4%)	12 (4%)	1 (1%)	85 (5%)
Boats are sometimes capsized in rainy season	50 (6%)	20 (4%)	13 (4%)	2 (3%)	85 (5%)
Sometimes institution lost it ground due to erosion of hati (the raised platforms on which the schools are placed)	49 (6%)	19 (3%)	11 (3%)	1 (1%)	80 (4%)
Occurrence of early floods and flash floods cause threats to school infrastructure	31 (4%)	18 (3%)	10 (3%)	0 (0%)	59 (3%)
In absence of water navigation facilities communication disruption happens during dry season	44 (5%)	18 (3%)	9 (3%)	1 (1%)	72 (4%)

Table 4.7: Hilly regions and disaster vulnerability of educational institutions.

Types of vulnerability	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Living in fear of rocks falls from hills	6 (1%)	3 (1%)	3 (1%)	0 (0%)	12 (0.67%)
It's risky to go to school/college during rains	22 (3%)	14 (3%)	3 (1%)	2 (3%)	41 (2.28%)
Water supply ceased due to dry up of hill fountain/ streams in dry season	5 (1%)	6 (1%)	1 (0%)	0 (0%)	12 (0.67%)
Sometimes boats are capsized during rainy season	12 (1%)	7 (1%)	4 (1%)	1 (1%)	24 (1.33%)
High temperature, high humidity conditions in atmosphere influence spread of malaria	6 (1%)	3 (1%)	3 (1%)	0 (0%)	12 (0.67%)

Table 4.8: Disaster impacts in Barind Tract regions.

Types of vulnerability	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
High temperature put students, teachers and staffs in difficulty in coming to schools during summar times	36 (4%)	33 (6%)	16 (5%)	6 (8%)	91 (5%)
Disrupted WASH facilities	28 (3%)	18 (3%)	9 (3%)	6 (8%)	61 (3%)
Toilets become unusable from bad smell and dirty conditions due to shortage of water supply in toilets for flashing works	23 (3%)	11 (2%)	7 (2%)	4 (5%)	45 (3%)
Occurrence of tornado resulting from high temperature combined with low atmospheric pressure cause serious threats	26 (3%)	25 (5%)	15 (5%)	4 (5%)	70 (4%)
Students suffer from temperature related sickness (caught by cold/fever, dehydration and diarrhoea, sometimes skin disease)	30 (4%)	25 (5%)	10 (3%)	5 (6%)	70 (4%)
Power cut off during summers season put students in suffereings from burnings and sweating in the classroom. This conditions compel students to go to home early.	34 (4%)	33 (6%)	16 (5%)	7 (9%)	90 (5%)
Extreme could cause troubles to students to come to school	35 (4%)	30 (5%)	15 (5%)	6 (8%)	86 (5%)

Table 4.9: Disaster impacts in urban areas.

Types of vulnerability	Types of educational institutions				
	Primary school	Junior/secondary school/school and college	Madrassa	College	Total
Getting support from rescue and service delivery agencies in case of emergencies is difficult because of the location of the institution in densely populated areas	7 (1%)	12 (2%)	0 (0%)	0 (0%)	19 (1%)
Absence of water bodies near by areas put the institution at risk to get water supply in case of emergencies like fire hazard	16 (2%)	32 (6%)	2 (1%)	6 (8%)	56 (3%)
High risk from earthquake hazard because of fragile state of the building structure	9 (1%)	13 (2)			
Water logging is a common problem because of poor drainage conditions in the area	14 (2%)	17 (3%)			
Presence of many high rise buildings around the institution amplify the risk intensity in case of earthquake occurrence	10 (1%)	23 (4%)			
Absence of playgrounds or meeting place in the premise of institution increase risks from earthquake hazard	5 (1%)	11 (2%)			
Location of industries in near by areas cause sound and air pollution and put students and staffs at risk	8 (1%)	15 (3%)			

4.3 Loss and damage assessment of disasters on education systems

4.3.1 Impacts on education support materials

One of the major costs of disasters on education happened through the damage of education materials such as education support elements like maps, flip charts, models, damage of games and recreational items, damage of furniture and books. Schools located in areas where influence of rivers are prominent (like close to rivers, river islands), coastal areas (central and southwestern coastal areas), floodplain areas where water logging crisis is acute had chosen most of the response options (Figure 4.4a, 4.4b). Barind Tract and urban area educational institutions reported comparatively less loss in educational materials, though Barind Tract mentioned about furniture damage.

4.3.2 Impacts on learning competencies

The educational institutions identified three subjects, i.e. English, Mathematics and Social Sciences, that they cannot recover the loss of lessons and related competencies as a result of disaster impacts. They mentioned that it is very difficult for them to recover and consequently students trapped into permanent loss in those subjects (Table 4.10). In normal conditions, educational institutions suffer from lack of qualified and trained teachers in these subjects, disaster impacts make the situation further worse. Figure 4.5a, 4.5b, 4.5c show the disaster zone wise differences of gaps happened as a result of different disaster impacts. The educational institutions were asked what they did to recover the loss in learning competencies. The response showed a mixed pattern where some of the institutions mentioned that they did nothing to recover loss (e.g. unban area institutions; 80% primary schools, 74.47% secondary schools, 66.67% madrassa and 73.08% colleges). A number of institutions in the eastern coastal areas also mentioned that they did not able to do anything to recover loss (31.91% primary). In contrast, educational institutions located in the offshore island areas mentioned that they were successful in taking extra class to make up the loss, although some of them mentioned that extra classes were taken but those were not enough to recover the loss.

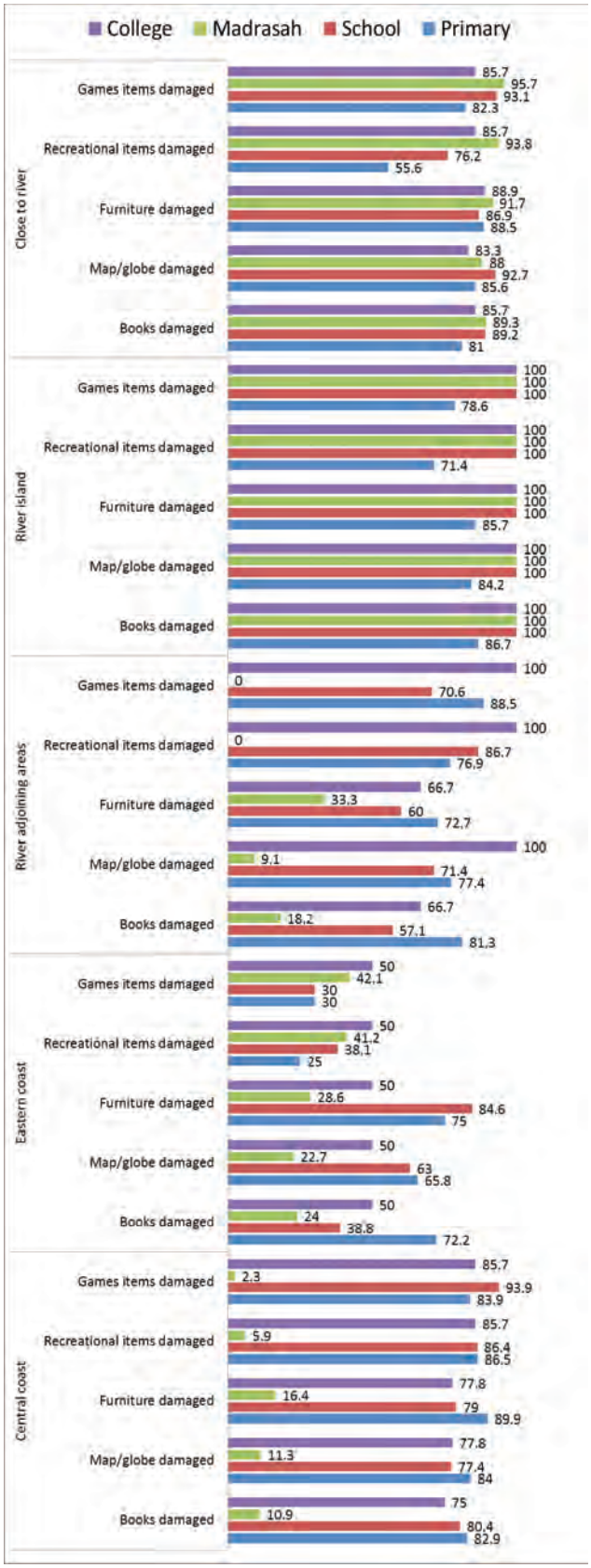


Figure 4.4a: Damage of education materials by disaster zones.

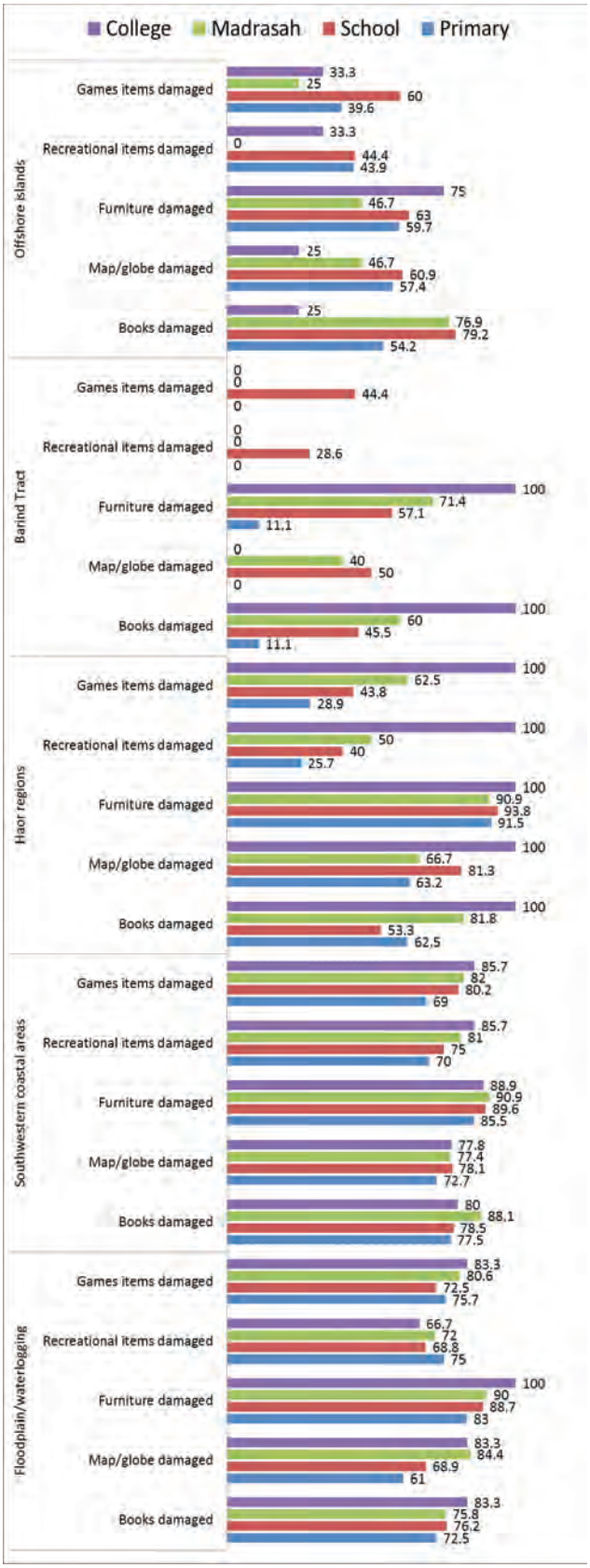


Figure 4.4b: Damage of education materials by disaster zones.

Table 4.10: Subjects that are subject to competency loss due to disaster impacts.

Affected subject	Can makeup at home	Become difficult if absent in the school	Permanent lose when fall behind	Can makeup at home	Become difficult if absent in the school	Permanent lose when fall behind
	(figures represent number of institutions followed by percentage)					
	Primary			*School*		
Bangla	339	47	65	247	13	23
	40.2	5.6	7.7	44.9	2.4	4.2
English	18	508	324	11	316	207
	2.1	60.3	38.4	2.0	57.5	37.6
Math	18	491	314	11	312	217
	2.1	58.2	37.2	2.0	56.7	39.5
Social Science	83	306	151	56	221	100
	9.8	36.3	17.9	10.2	40.2	18.2
Science	297	52	35	196	35	24
	35.2	6.2	4.2	35.6	6.4	4.4
Religious Study	321	19	21	227	10	13
	38.1	2.3	2.5	41.3	1.8	2.4
Other	158	9	19	112	8	6
	18.7	1.1	2.3	20.4	1.5	1.1
	Madrasah			*College*		
Bangla	139	17	23	26	1	4
	42.2	5.2	7.0	33.3	1.3	5.1
English	4	212	118	1	33	22
	1.2	64.4	35.9	1.3	42.3	28.2
Math	4	208	120	0	30	22
	1.2	63.2	36.5	0.0	38.5	28.2
Social Science	26	136	47	5	23	10
	7.9	41.3	14.3	6.4	29.5	12.8
Science	106	30	13	17	4	1
	32.2	9.1	4.0	21.8	5.1	1.3
Religious Study	133	13	8	25	0	1
	40.4	4.0	2.4	32.1	0.0	1.3
Other	65	10	3	15	0	1
	19.8	3.0	0.9	19.2	0.0	1.3

Figure 4.5a: Learning competency loss by subjects and state of recovery by disaster zones.

Figure 4.5b: Learning competency loss by subjects and state of recovery by disaster zones.

Figure 4.5c: Learning competency loss by subjects and state of recovery by disaster zones.

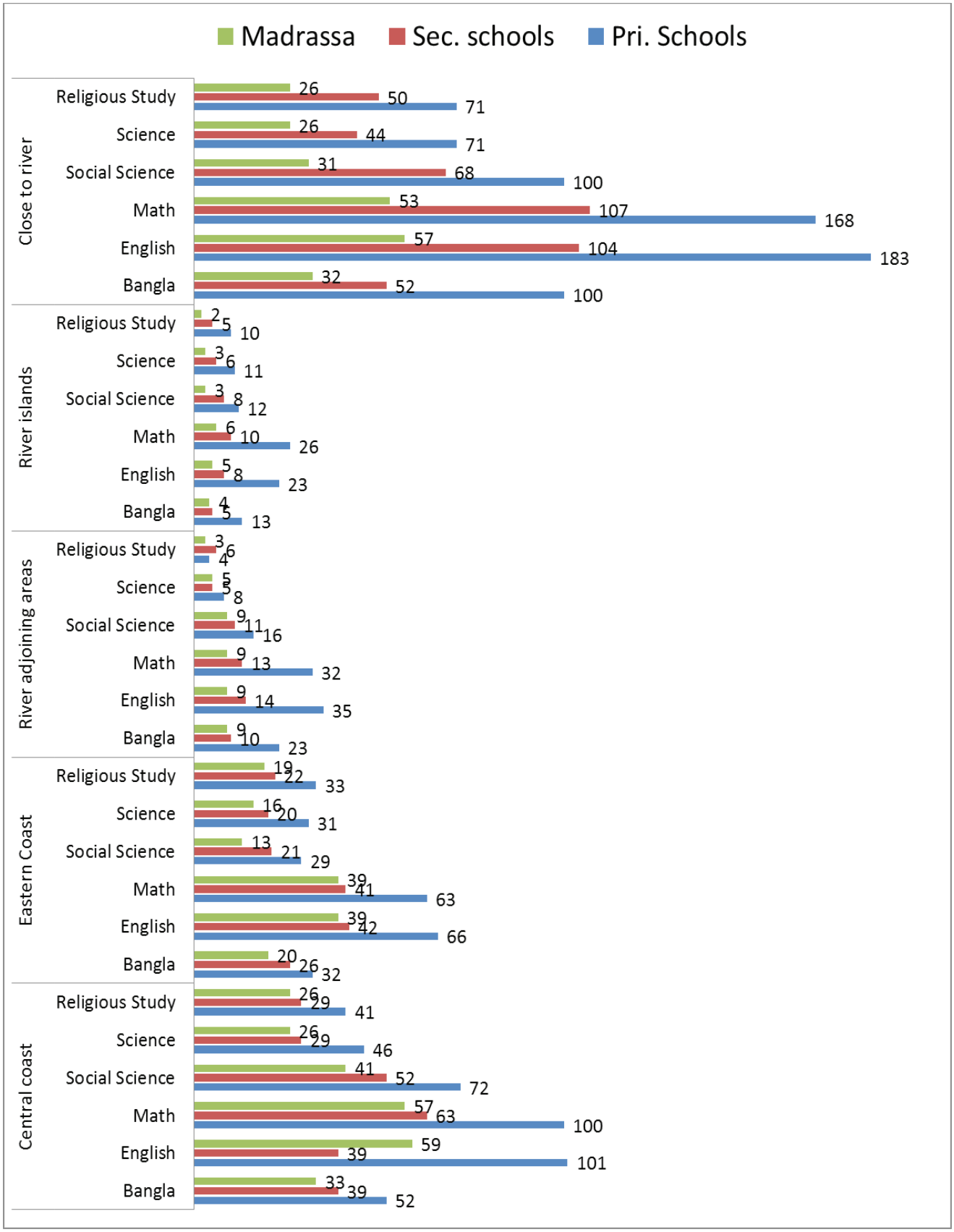


Figure 4.6a: Number of institutions responded on learning competency loss by subjects and state of recovery by disaster zones.

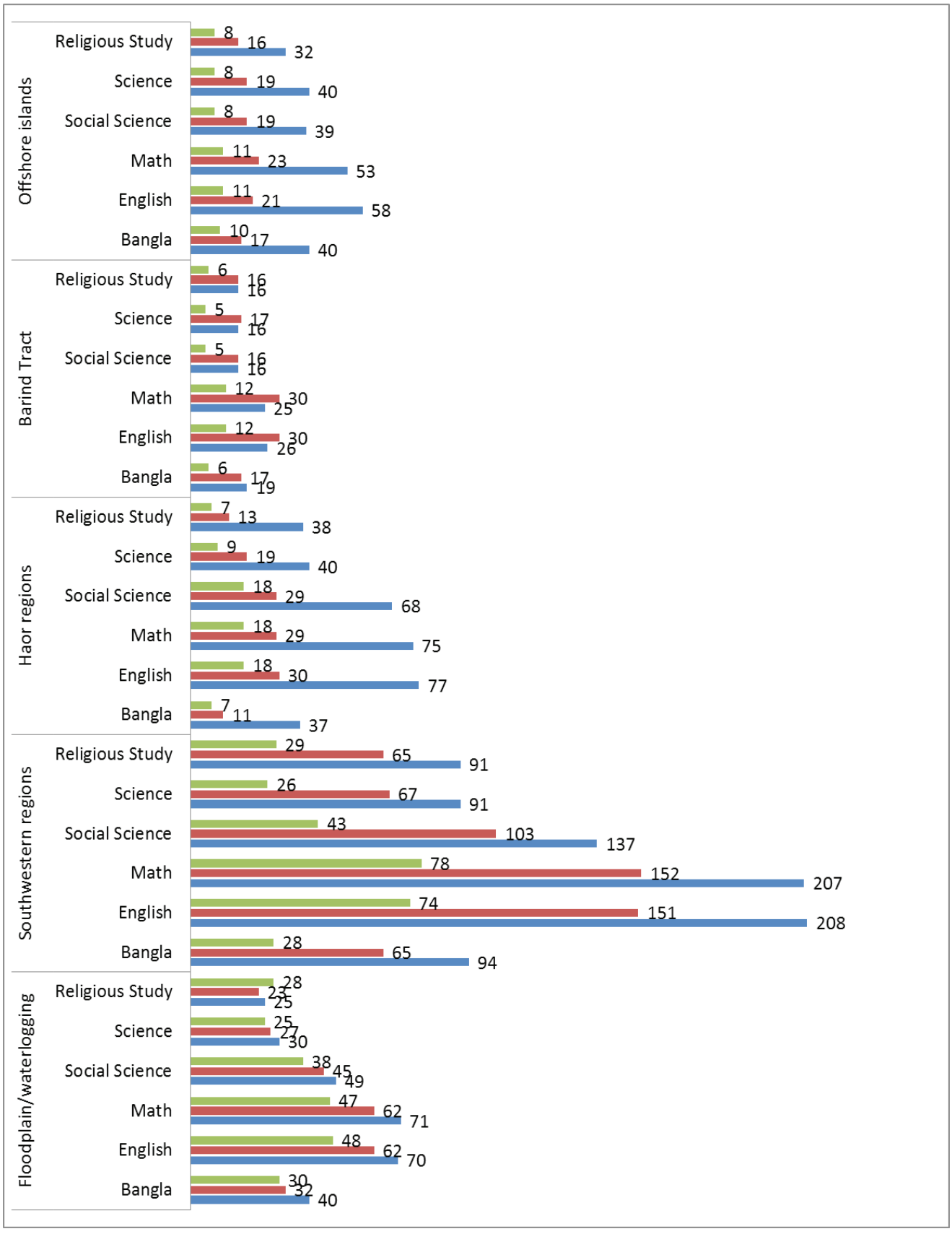


Figure 4.6b: Number of institutions responded on learning competency loss by subjects and state of recovery by disaster zones.

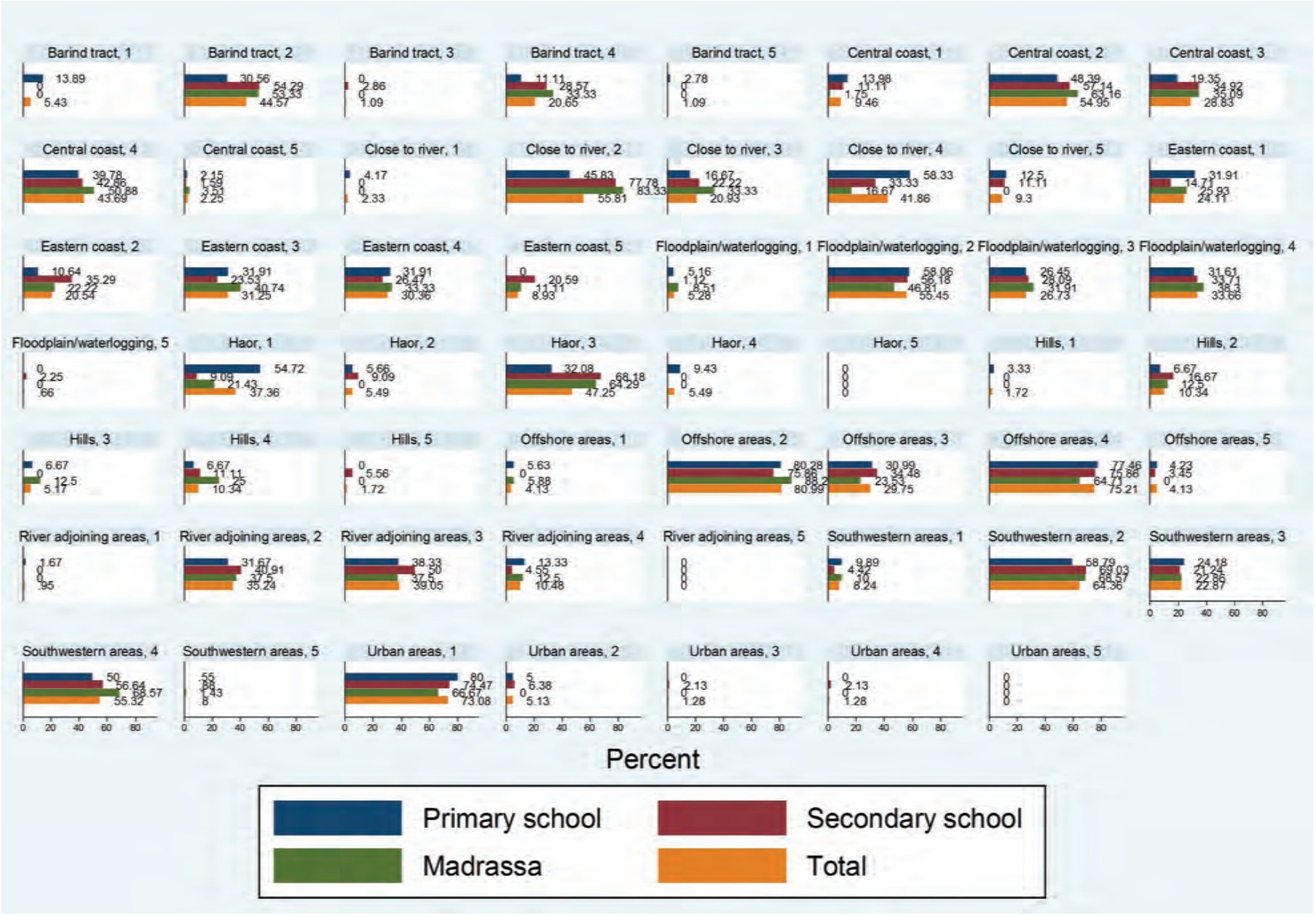


Figure 4.7: What did the institutions do to recover learning competency loss by disaster zones.

4.4 Key findings of the chapter

The key findings are given in the following sections.

Flood and cyclonic disasters return in 2-5 years interval

- Disaster impacts in coastal areas have both time and space dimension, where time dimension indicates that in every 2-5 years the educational institutions face remarkable impact conditions from hydro-meteorological hazards like flood and cyclone hazards. On the other hand, types of hazards show a difference with the difference of location. Educational institutions in south-western areas mentioned that flooding is a concern for them, the institutions located in the central coastal regions mentioned about flood impacts, but 60% of them reported that they face flood impact every year and the institutions located in the south-eastern coastal areas did not indicate about flooding problem.

Sea erosion floods cyclones and Tsunami are important risk factors in central coastal areas

- Alike flood impacts, central coastal areas institutions also reported that they face cyclonic disturbances, irrespective of landfall happened or not, almost every year; they also identified river bank erosion as a hazard effecting every year.

- Institutions in all three coastal regions expressed their concern over Tsunami risks.

Abnormal high tides create serious threats to education in southwestern coastal regions

- Educational institutions of south-western coastal regions mentioned that abnormally high tides and related inundations (73.53%) cause problems to them and this abnormal high tide conditions happen in every 2-3 years interval.

Coupling hazards are phenomenal characteristic in southeastern (flashfloods-landslides) and southwestern coastal regions (salinity-waterlogging)

- South-eastern coastal areas mentioned about flash floods/ local floods and landslide hazards which other two coastal regions did not mention. Similarly, south-western coastal region reports slow onset disaster threats like salinity intrusion and water logging problems which the central and south-eastern coastal areas did not mention. Comparative assessment disaster impact conditions

Flood frequency intensity and impact duration are location specific; floods and related hazards (river bank erosion and water logging) are common in river influenced regions

- Flood impacts are identified as major threats by the institutions located in river adjoining areas (within 2 kilometers of the river), areas close to river (2-5 kilometers of the river) and floodplain interiors (termed as deep floodplain located beyond 5 kilometers of the river)

- Institutions located in river adjacent areas (both river adjoin and close to river areas) mentioned that experiencing flood impacts is a every year phenomenon for them, on the other hand floodplain area educational institutions face major flood impacts in 2-5 years interval.

- Waterlogging problem turns out as a characteristic hazard phenomenon for floodplain areas, among 91.8% educational institutions who responded yes to waterlogging problem 47.54% mentioned that inundation of the area happens more than 6 months of a year and 44.26% indicated that it is a 3-6 month-prolonged phenomenon from waterlogging hazard.

Seasons (wet and dry) determine the nature of challenges in Haor regions

- This region got two contrasting seasons (hot and humid rainy seasons from March to august and dry and cold winter season spreads from September to the month of February) and problems that the educational institutions of this regions face are also correspond the seasons. Flashfloods happening as a result of huge amount of water coming down from the adjoining Indian hills is a major threat in haor region. Inundation by flood waters, strong current, waves, gusty winds all collectively create serious conditions in the regions.

- Taking a journey by country boats is the only means for the students to get to schools. It was reported during field visits that capsize of boats happen sometimes causing deaths and injuries. In dry and winter season boats cannot ply and poor road communication put students, teachers in different troubles to access to institutions, about 88.71% institutions mentioned that access difficulty is a major threat for them in dry season.

High temperature, tornados (in summer) and biting cold (in winter) trigger many secondary hazards in Baring Tract areas

- The educational institutions located in Barind Tract areas mentioned that drought conditions and associated other hazards like high temperatures cause problems in the areas. It was reported that dry conditions cause shortage of drinking water and also impacts radiate in sanitation and hygiene processes. Students mentioned that it is sometimes very difficult for them to stay at schools due to hot ambient conditions. Sometimes tornados associated with thunderstorms (happening in the afternoons and evenings in summer times) smash assets and necessary service systems in the institutions in Barind Tract regions While in the hills, respondents mentioned that heavy rainfall during summer and rainy seasons cause problems to them.

Bank erosion caused by river and sea and inundation due to floods are major challenges in river and offshore island areas

- Flood is reported by the educational institutions as one of the common natural hazard in both river and offshore island areas. About 81.67% respondents from river island areas told that they face flood problems almost every year while 74.49% in the offshore island areas mentioned the similar problem. Similarly, educational institutions in both the areas mentioned that bank erosion from water currents and waves is a serious threat for them. Offshore islands indicated about sea erosion along with river erosion hazards.

Earthquakes fire hazards and water congestion (urban flooding) are major threats in urban areas

- Hazards faced by urban areas educational institutions are different from the hazard faced by institutions located in other areas. Earthquakes, urban floods generated mainly from water congestion and drainage problems and fire hazards are found to be the major hazards in urban contexts.

- It is interesting to note that fire hazards and earthquake hazards are identified by majority of the institutions (64.29% mentioned about earthquake and 79.27% mentioned about fire hazard), but they said it is not a serious problem for them and they are better prepared to address related threats.

Institutions those situate in Hydro-meteorological hazard regions devastated maximum 6 times in their disaster memoire; in majority cases impact intensities were moderate

- The response pattern suggests that hydro-meteorological hazards (i.e. cyclone, floods, river bank erosion, flashfloods, water logging, severe rainfall, strong wind) returns in cyclic order and almost in the same time of the year. The highest response show that educational institutions had experienced hazards 1 to 6 times in disaster impact history (257 institutions in cyclone affected areas mentioned 1-6 time while 86 institutions mentioned more than 6 times impact experience; for floods this numbers are 383 and 184, for river bank erosion 69 and 6 respectively).

- In impact intensity scale (the options were high, moderate and low), institutions mentioned moderate in majority cases, though some of the institutions indicated high impacts.

- The slow onset hazards like salinity intrusion, water logging, high temperature, unusual high tide and related inundation, drought conditions are associated with hydrological and meteorological factors.

April to June is the most challenging time of the year

- The educational institutions expressed the April, May and June are the month of the year when most of these hydro-meteorological hazards generally occur, some of the institutions also mentioned that August to December as disaster impact times.

English Mathematics and Social Sciences are major subjects where learning competencies fall as a result of disaster impacts

- The educational institutions identified three subjects, i.e. English, Mathematics and Social Sciences, that they cannot recover the loss of lessons and related competencies as a result of disaster impacts.

- The institutions mentioned that they did nothing to recover loss (e.g. unban area institutions; 80% primary schools, 74.47% secondary schools, 66.67% madrassa and 73.08% colleges)

- Educational institutions located in the offshore island areas mentioned that they were successful in taking extra class to make up the loss, although some of them mentioned that extra classes were taken but those were not enough to recover the loss.

CHAPTER 5:

State of Disaster Preparedness

Experiencing Impacts of Disasters

5.1 Introduction

The chapter highlights the existing resources and the capacity of educational institutions to cope with disasters. The discussions also show the state of their preparedness and training gaps of the teachers in areas of school focused disaster management aspects. The key findings may help to identify areas where program interventions could be designed/developed for assisting educational institutions to make them more disaster and climate resilient.

5.2 External support provisions in disaster impact reduction

The parents, guardians of the students and community as a whole are found to be concerned about the educational opportunities of the area. 'Impacts on education systems' always appears as the top agenda while discussing about disasters with the community people. Discussion with them indicated that they always extend their helping hands to support educational institutions so that they can cope with uncertainties and could recover certain damages incurred from disaster impacts. They also mentioned that their capacities are also limited since they themselves have to suffer from disaster impacts to secure their assets and livelihoods. Thus they said even though they cannot provide material support to the institutions but they always visited the school, inquired about the wellbeing of the institution (56% mentioned about that), discuss about it and try to come up with some solutions. Some of them mentioned (35.83%) that they offered help with physical labor to fix up some damages.

Table 5.1: Community help to recover disaster damage in educational institutions.

Affected subject	Primary	School	Madrasah	College	Total
	(figures represent number of institutions followed by percentage)				
Did not do any thing	237 28.11	163 29.64	72 21.88	20 25.64	492 27.33
Provided financial help	49 5.81	54 9.82	59 17.93	5 6.41	167 9.28
Extended helping hands/physical labor	291 34.52	184 33.45	151 45.90	19 24.36	645 35.83
Provided recover/repair instruments	123 14.59	104 18.91	103 31.31	8 10.26	338 18.78
Provided land	27 3.20	11 2.00	15 4.56	3 3.85	56 3.11
People come to school and showed solidarity	466 55.28	298 54.18	217 65.96	36 46.15	1,017 56.50

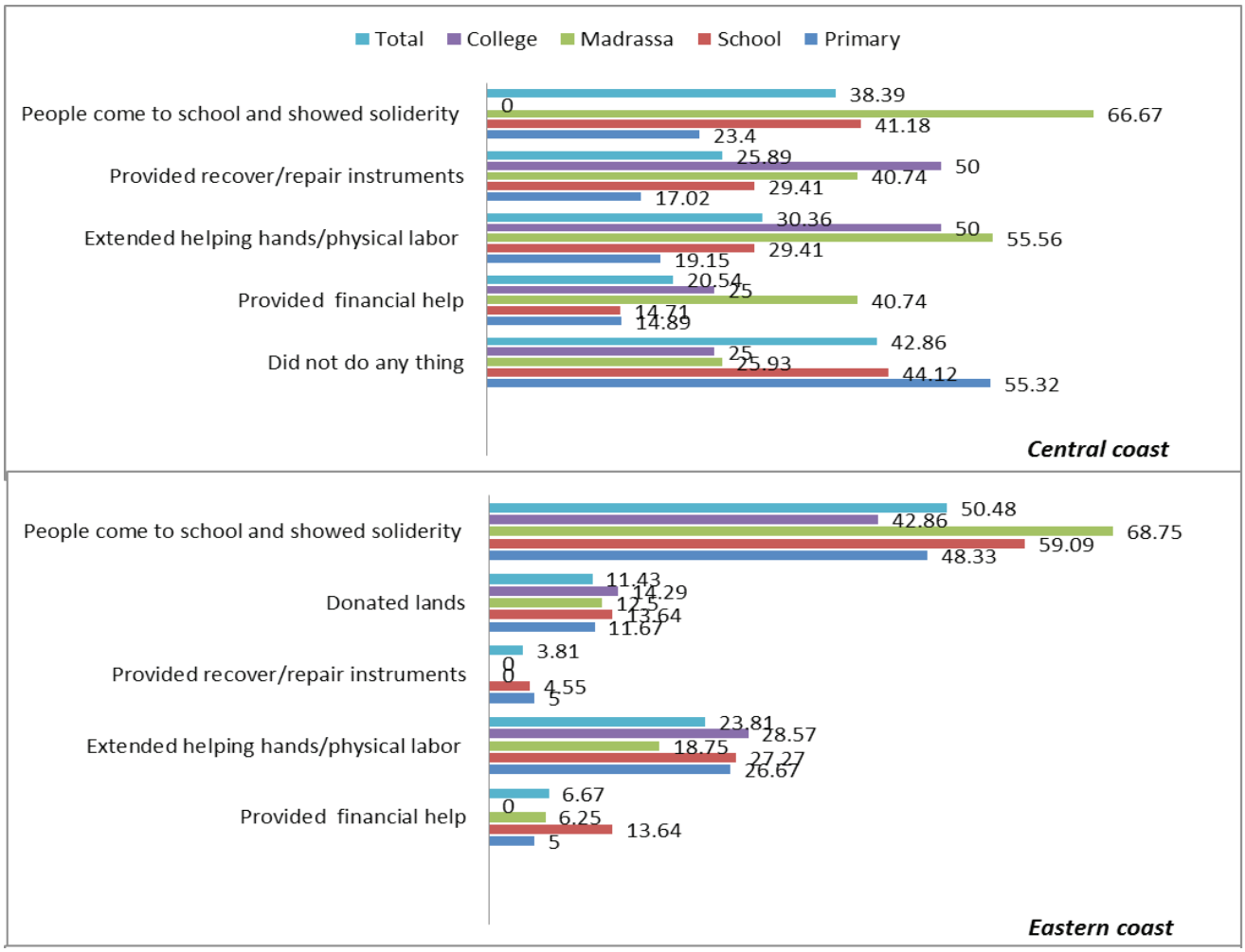


Figure 5.1a: How community helped to recover disaster damage by disaster zones.

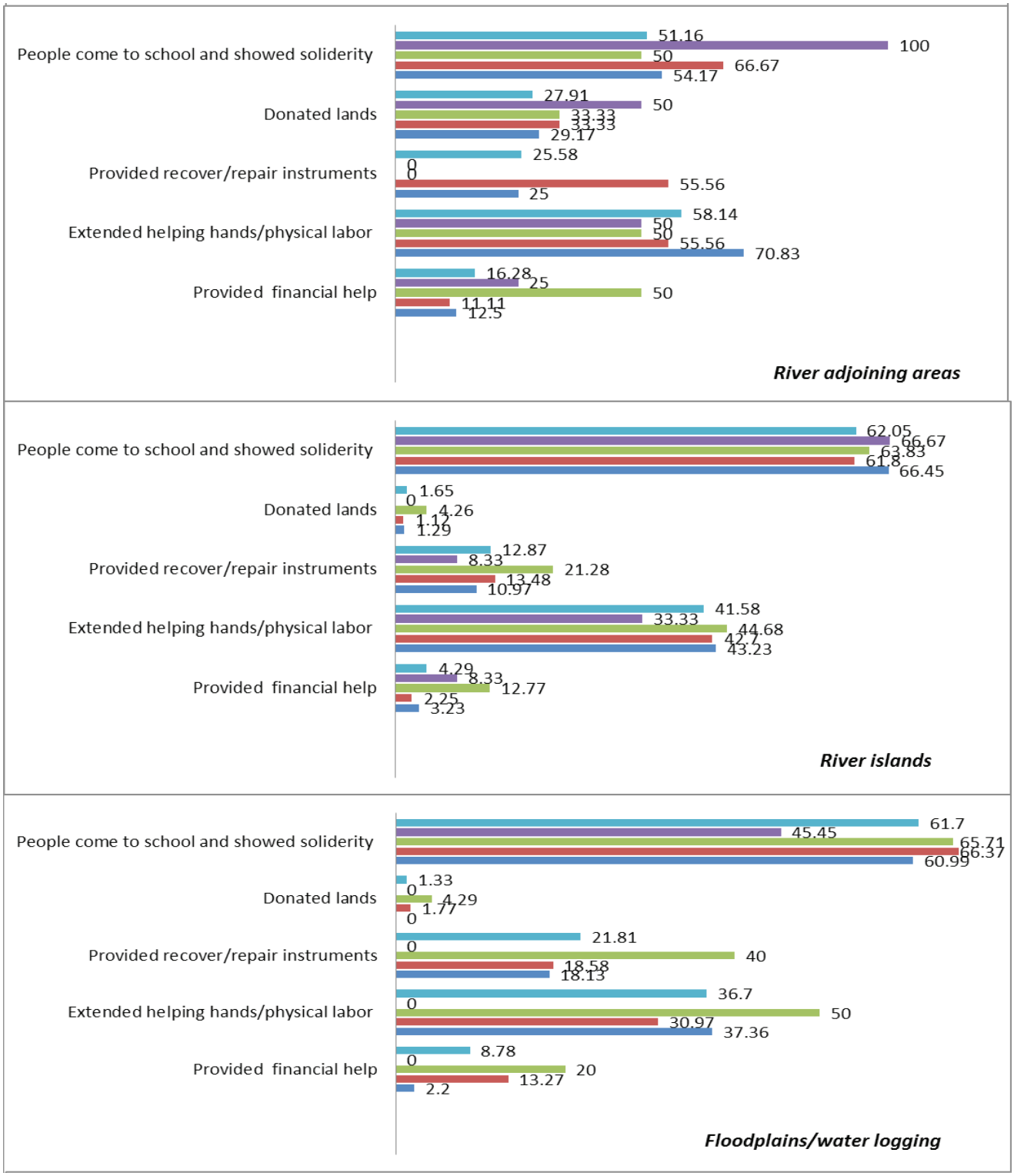


Figure 5.1b: How community helped to recover disaster damage by disaster zones.

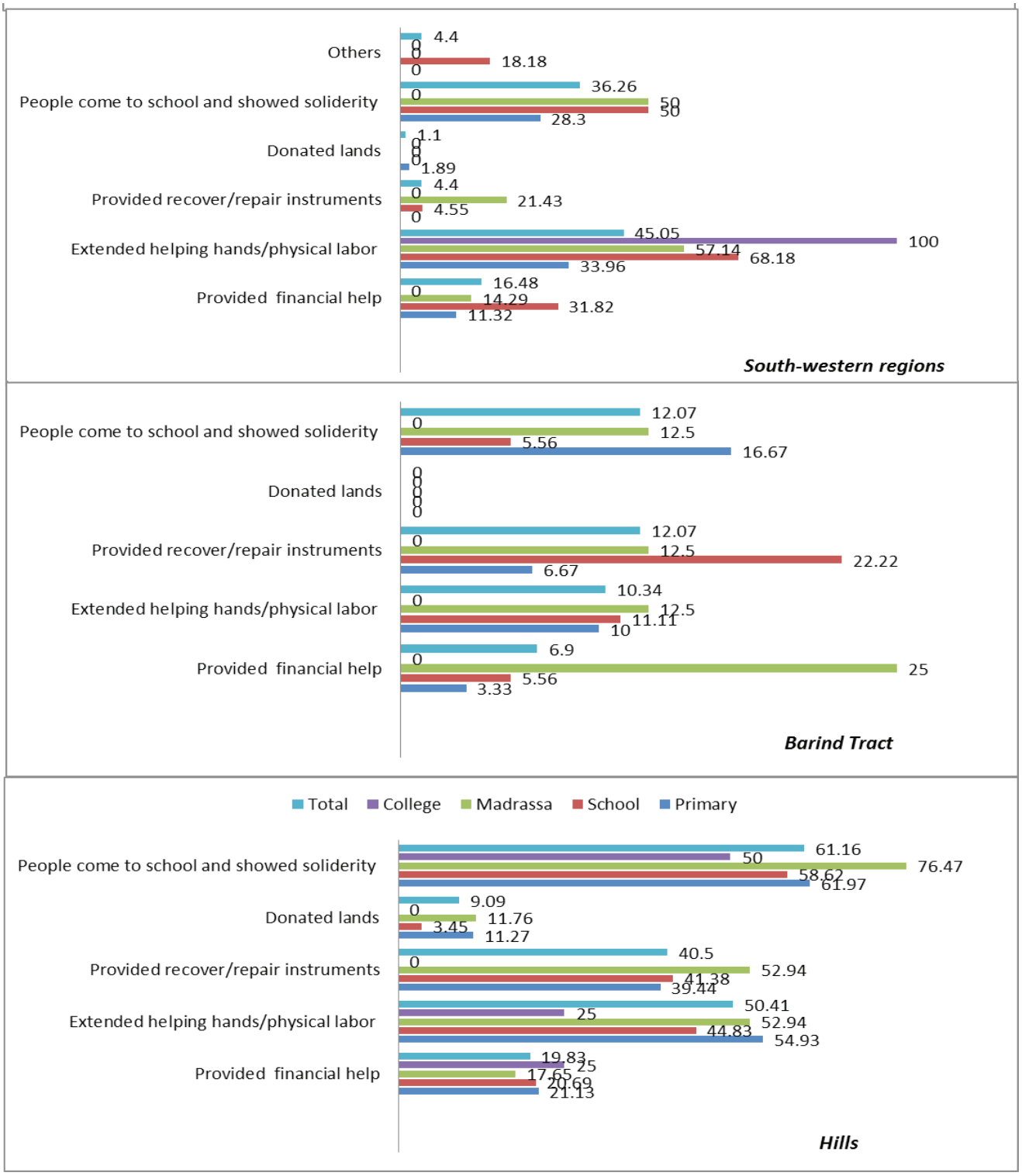


Figure 5.1c: How community helped to recover disaster damage by disaster zones.

5.3 State of learning environment after reopening the school

The educational institutions responded that at reopening the educational institutions immediate after disasters most of the systems remain dysfunctional and thus resuming and continuing education is always a challenge. The educational institutions reported that they had to hire external labors to fix the broken facilities and sometimes students extend their helping hands in bringing the situation back into order. About 55.22% (Table 5.2) of the educational institutions reported unusual and unsafe conditions in the institutions immediate after disaster occurrence and about 60% institutions mentioned that school surrounding environment does not appear to be good due to presence of dead animals, broken and uprooted trees around and disrupted communication systems. Educational institutions located in different disaster affected zones also indicated that unsafe conditions in the school premises and also mentioned about unusual and poor environmental conditions in the surrounding areas. These reasons cause at least one week loss of education of the students in educational institutions located in disaster affected areas (Table 5.3).

Table 5.2: Sate of learning environment immediate after disaster.

Sate of learning environment immediate after disaster (Q51)	Primary school	Secondary school	Madrasah	College	Total
	(figures represent number of institutions followed by percentage)				
Like normal	158 18.74	119 21.64	56 17.02	23 29.49	356 19.78
Unusual many things was out of order	454 53.86	306 55.64	204 62.01	30 38.46	994 55.22
School volunteers help	32 3.80	29 5.27	16 4.86	1 1.28	78 4.33
Surrounding environment not good	251 29.77	162 29.45	109 33.13	16 20.51	538 29.89
WaSH facilities were unusable	120 14.23	69 12.55	43 13.07	7 8.97	239 13.28

Table 5.3: Time required to resume education.

Q: 45 After Disaster	Boys	Girls	Male Teacher	Female Teacher	Employee	Boys	Girls	Male Teacher	Female Teacher	Employee
	(figures represent number of institutions followed by percentage)									
	Primary					School				
Not Late	127 15.07	120 14.23	207 24.56	207 24.56	128 15.18	127 15.07	120 14.23	207 24.56	207 24.56	128 15.18
One Week	315 37.37	300 35.59	193 22.89	197 23.37	84 9.96	315 37.37	300 35.59	193 22.89	197 23.37	84 9.96
Two Week	103 12.22	120 14.23	51 6.05	50 5.93	20 2.37	103 12.22	120 14.23	51 6.05	50 5.93	20 2.37
Three Week	23 2.73	22 2.61	15 1.78	13 1.54	6 0.71	23 2.73	22 2.61	15 1.78	13 1.54	6 0.71
Three Week +	64 7.59	62 7.35	48 5.69	42 4.98	21 2.49	64 7.59	62 7.35	48 5.69	42 4.98	21 2.49

Q: 45 After Disaster	Boys	Girls	Male Teacher	Female Teacher	Employee	Boys	Girls	Male Teacher	Female Teacher	Employee
	(figures represent number of institutions followed by percentage)									
	Madrassa					**College**				
Not Late	40 12.16	38 11.55	75 22.80	71 21.58	66 20.06	11 14.10	11 14.10	17 21.79	17 21.79	16 20.51
One Week	103 31.31	112 34.04	95 28.88	79 24.01	73 22.19	23 29.49	22 28.21	18 23.08	17 21.79	14 17.95
Two Week	49 14.89	51 15.50	20 6.08	21 6.38	16 4.86	9 11.54	10 12.82	2 2.56	2 2.56	1 1.28
Three Week	16 4.86	20 6.08	8 2.43	8 2.43	9 2.74	3 3.85	4 5.13	1 1.28	1 1.28	1 1.28
Three Week +	29 8.81	32 9.73	21 6.38	17 5.17	18 5.47	4 5.13	4 5.13	3 3.85	3 3.85	3 3.85

5.4 Teacher's training on resuming education after disaster

Teachers' training on disaster management aspects is one of the key strategies to ensure better disaster preparedness for the institutions since they are the front line driving agent of change for the educational institutions in this regard. They can take immediate decisions and actions, outline strategies and seek assistance from the external sources to strengthen their capacities to cope with disaster induced uncertainties and challenges. But it is pity that almost more than 80% of the educational institutions mentioned that they never received any training on disaster impacts management (1440 institutions out of 1800 surveyed) and almost all the institutions mentioned that the training is required and they will take part in the training if arranged by any corner. The participants attended in the discussion sessions indicated the areas where the training is required. They mentioned that they have limited knowledge on CDMP/DDM provided 'D Form' for amassing disaster damage information, new cyclone signaling system, even no idea about how to arrange a disaster mock drill (Table 5.4, Figure 5.6). They also suggested some other areas of training such as pre-disaster preparedness, during disaster actions, continue education in emergencies if disaster prolongs (e.g. water logging), handling traumatic situation, loss and damage assessment, introduce with government disaster management processes, institutional coordination, training on First Aid, contingency resources management.

Table 5.4: Awareness of educational institutions about disaster management systems.

Q: 63 SUBJ	Primary			School			Madrasa			College		
	(figures represent number of institutions followed by percentage)											
	Clear	Medium	Not clear	Clear	Medium	Not clear	Clear	Medium	Not clear	Clear	Medium	Not clear
D-Form	19 2.3	55 6.5	522 61.9	19 3.5	51 9.3	362 65.8	7 2.1	20 6.1	223 67.8	1 1.3	9 11.5	46 59.0
No signal system	78 9.3	281 33.3	295 35.0	48 8.7	203 36.9	215 39.1	22 6.7	144 43.8	116 35.3	6 7.7	28 35.9	25 32.1
Drill	80 9.5	315 37.4	272 32.3	61 11.1	219 39.8	199 36.2	25 7.6	131 39.8	122 37.1	5 6.4	27 34.6	29 37.2
Damage assessment method	55 6.5	301 35.7	257 30.5	49 8.9	211 38.4	190 34.5	22 6.7	141 42.9	96 29.2	4 5.1	28 35.9	24 30.8

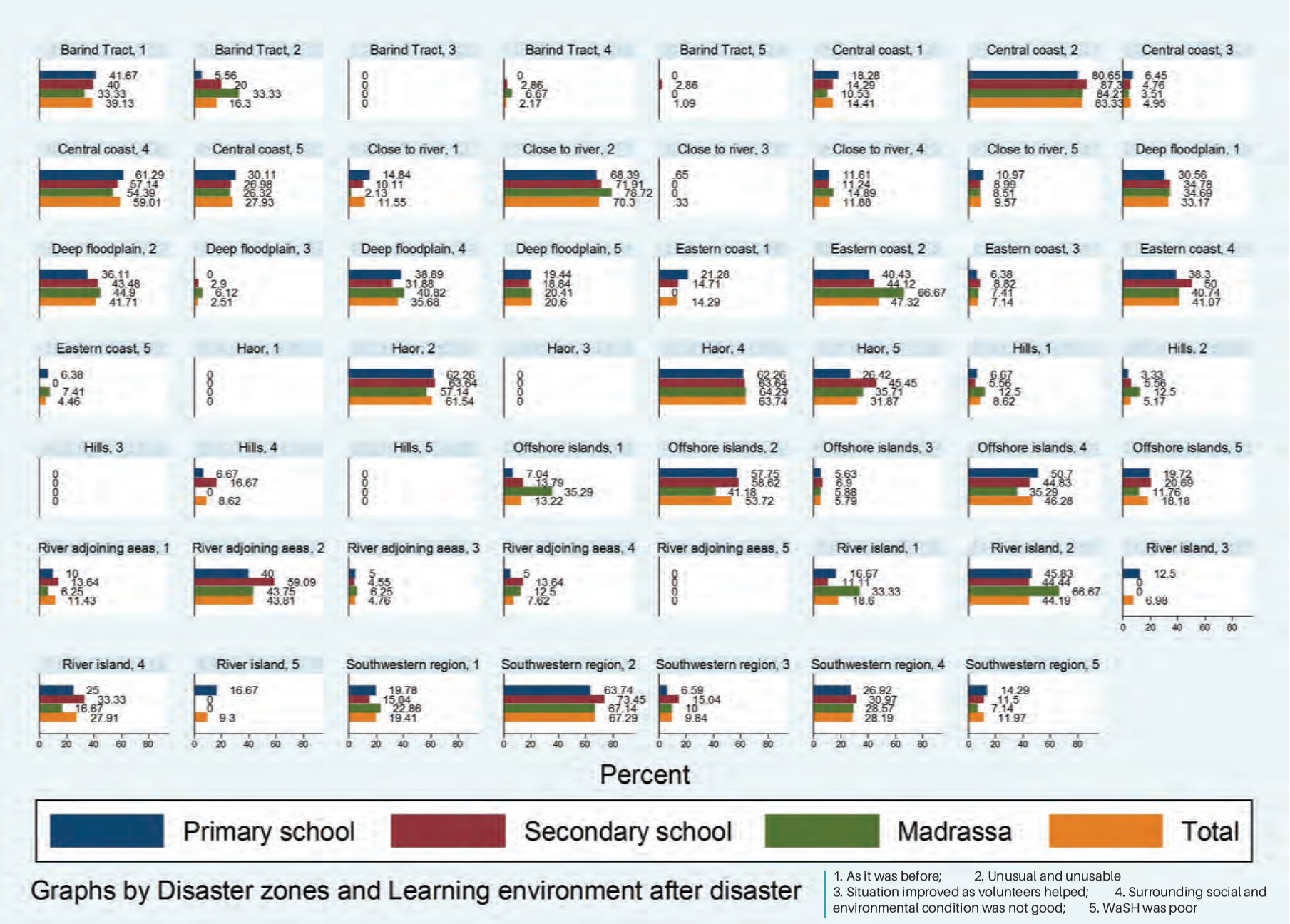


Figure 5.2: Condition of the institution immediate after disaster by disaster zones.

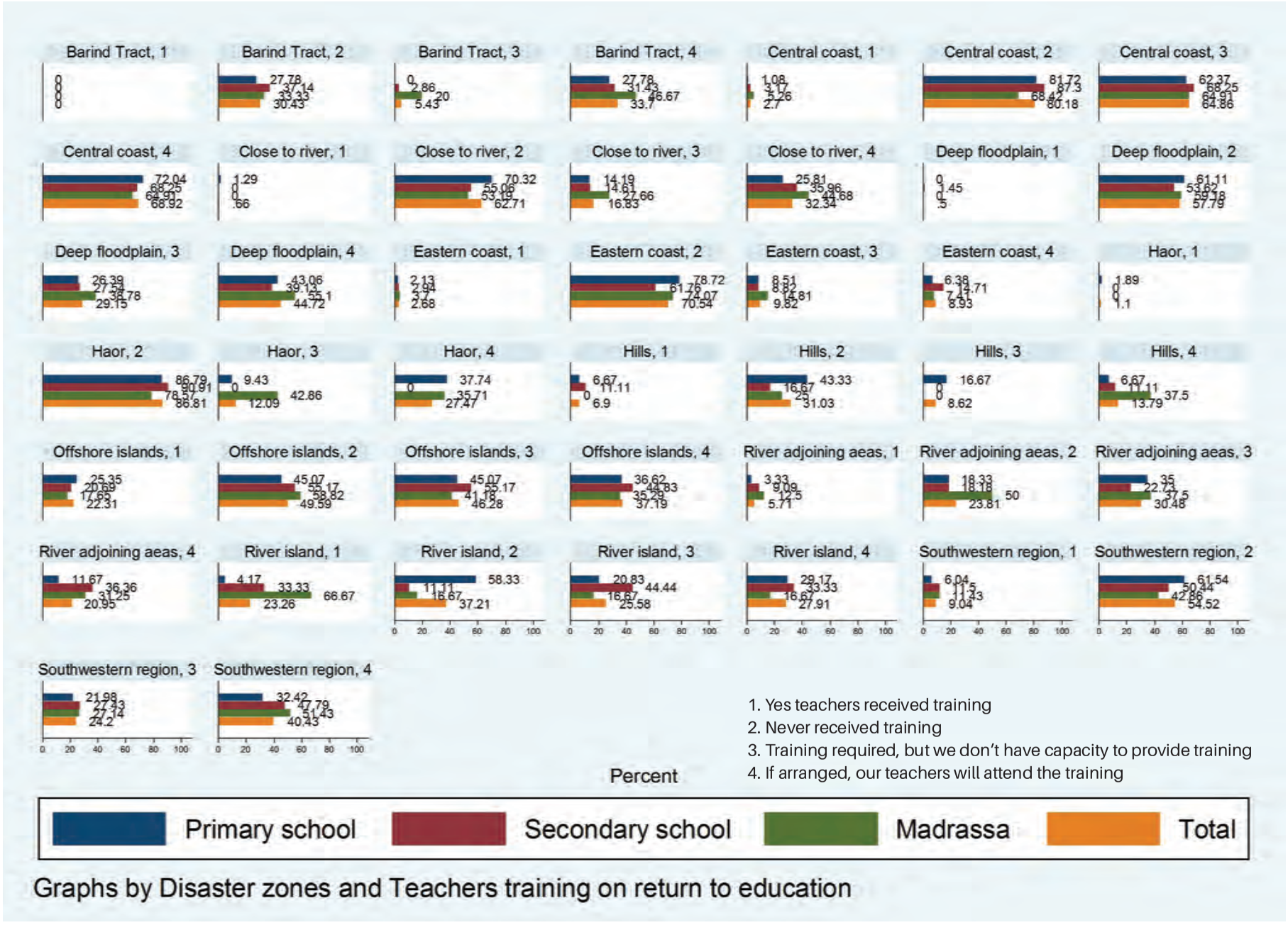


Figure 5.4: Condition of the institution immediate after disaster by disaster zones.

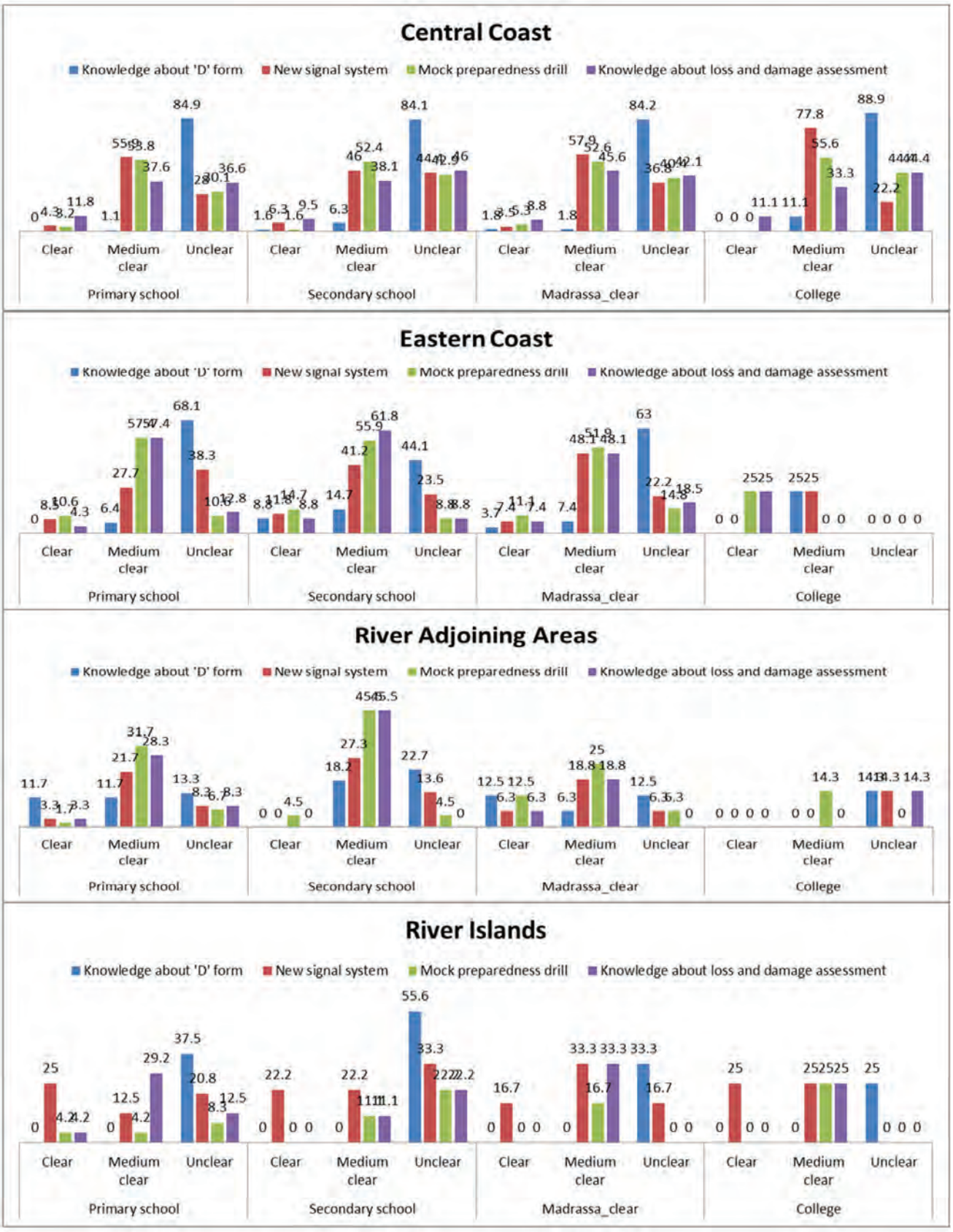


Figure 5.5a: Degree of understanding of teachers on disaster management aspects by disaster zones.

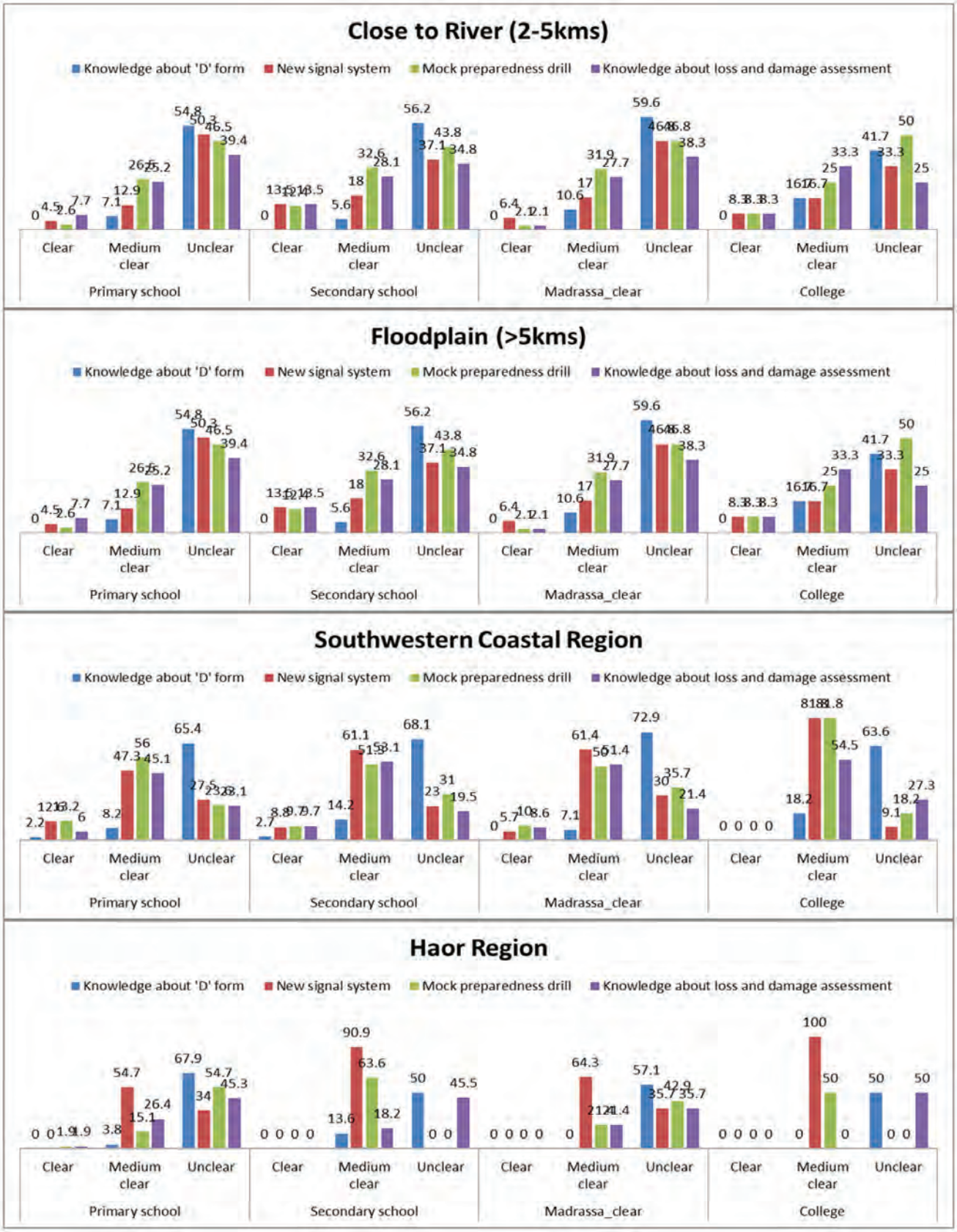


Figure 5.5b: Degree of understanding of teachers on disaster management aspects by disaster zones.

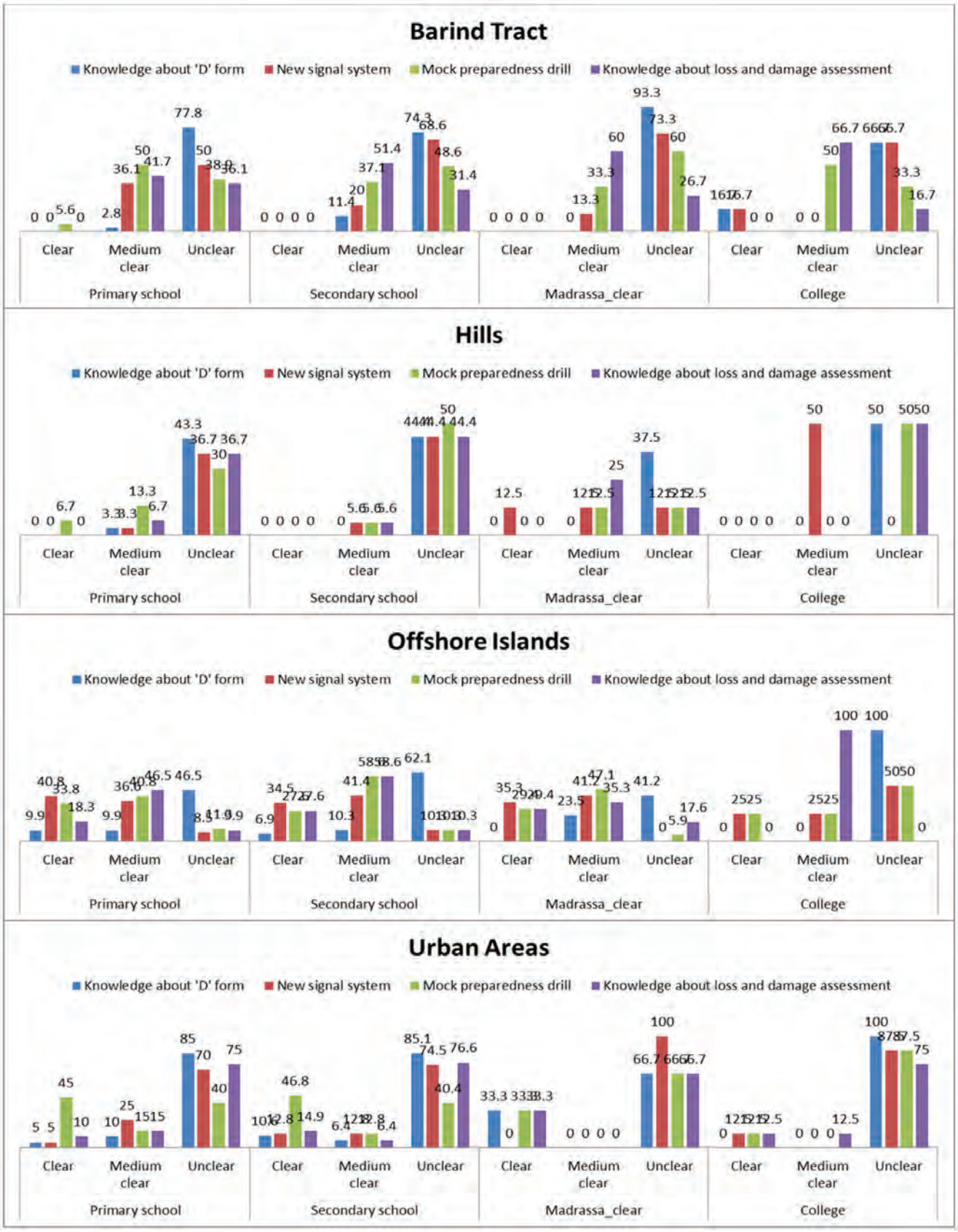


Figure 5.5c: Degree of understanding of teachers on disaster management aspects by disaster zones.

Table 5.5: Mock rehearsal and disaster preparedness

Drill	Primary	School	Madrasa	College	Total
	(figures represent number of institutions followed by percentage)				
Arrange one time	103 12.22	55 10.00	31 9.42	10 12.82	199 11.06
Arrange more then one time	87 10.32	62 11.27	22 6.69	7 8.97	178 9.89
Never arranged	527 62.51	334 60.73	204 62.01	45 57.69	1,110 61.67
No idea	110 13.05	59 10.73	31 9.42	6 7.69	206 11.44
Capabilities but no fund	75 8.90	60 10.91	50 15.20	7 8.97	192 10.67
No guideline	74 8.78	55 10.00	48 14.59	5 6.41	182 10.11

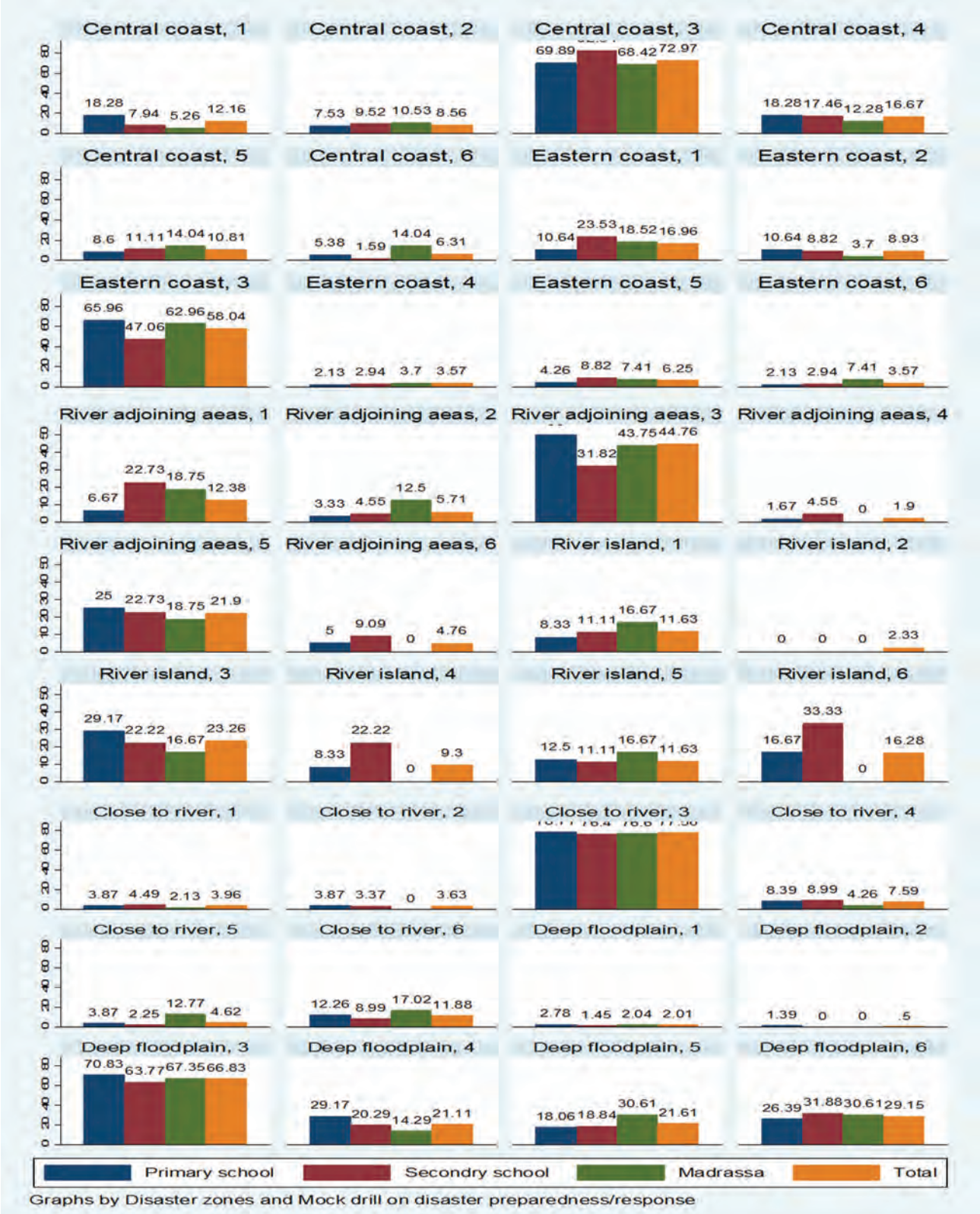
5.5 Drowning likelihoods and related preparedness

UNICEF[15] study suggests that drowning in water is one of the most significant killer for the children aged 5–9 years, it also create risks to other age groups as well. About 57% of the educational institutions (1026 number of institutions out of 1800 surveyed) reported that they have ponds in the premises of the institutions. In most of the cases these ponds remain exposed and cause of danger to the students, specially small children. Only Haor (25.9%) and urban area (5.34%) educational institutions (Table 5.6) reported less presence of ponds. However, it is important to note that in dry seasons many ponds got less amount of water and in wet season the ponds turn into big water reservoirs. Only swimming training of the students could help to reduce risks of drowning related injuries and deaths. But only 18.56% educational institutions mentioned that they took swimming training initiatives for the students. The educational institutions also mentioned that they informed the students and their parents about the benefits of swimming training and asked the parents to teach their children how to swim. Central coasts and offshore island institutions (Figure 5.7) indicated that they took initiatives for swimming training. Institutions located in Barind Tract (69.44% primary schools), Haor (52.83% primary school) and southwestern regions (35.91% primary schools) mentioned that swimming is an important event in their annual sports competition which gives them opportunities to train students swimming.

Table 5.6: Presence of ponds in the premises of educational institutions.

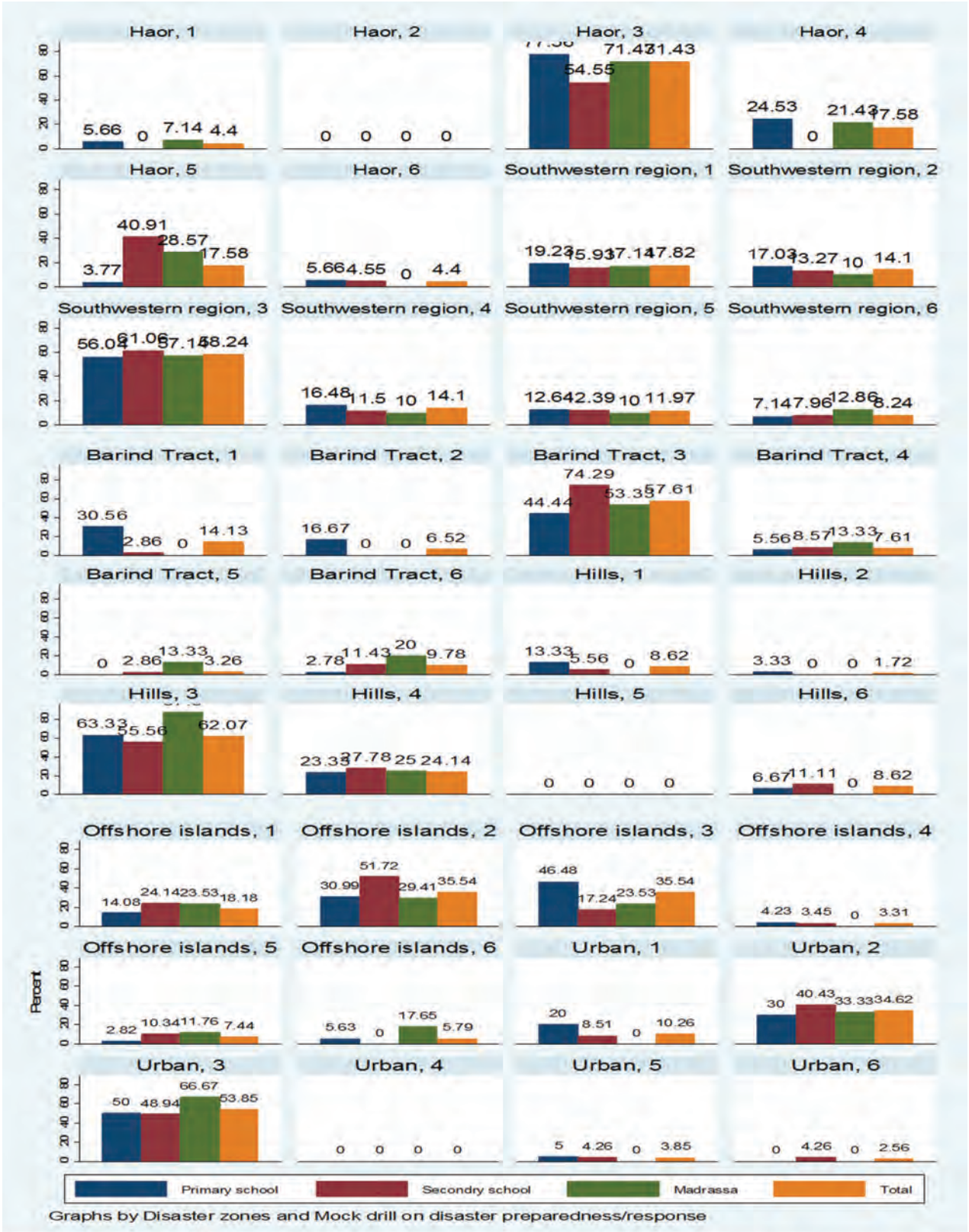
Q: 61 Type of institutions	Pond inside the School *(figures represent number of institutions followed by percentage)*		Total	Not Response
	Yes	No		
Primary	358 45.66	426 54.34	784	159
School	304 57.47	225 42.53	529	21
Madrasha	183 58.65	129 41.35	312	17
Collage	45 66.18	23 33.82	68	10
Average value	56.99%	43.01%	-	-

[15] Bangladesh Health and Injury Survey: Report on Children; published in 2005 by DGHS, Ministry of Health and Family Welfare (MoH&FW), Government of the People's Republic of Bangladesh.



1- Once we did, 2- We arranged it more than one time, 3- Never happened, 4- We don't have any idea or training on it, 5- We have the capacity to arrange it but don't have enough resources, 6- We did not receive any government/formal directions about it

Figure 5.6a: Mock drill exercise on disaster preparedness by disaster zones.



1- Once we did, 2- We arranged it more than one time, 3- Never happened, 4- We don't have any idea or training on it, 5- We have the capacity to arrange it but don't have enough resouces, 6- We did not receive any government/formal directions about it

Figure 5.6b: Mock drill exercise on disaster preparedness by disaster zones.

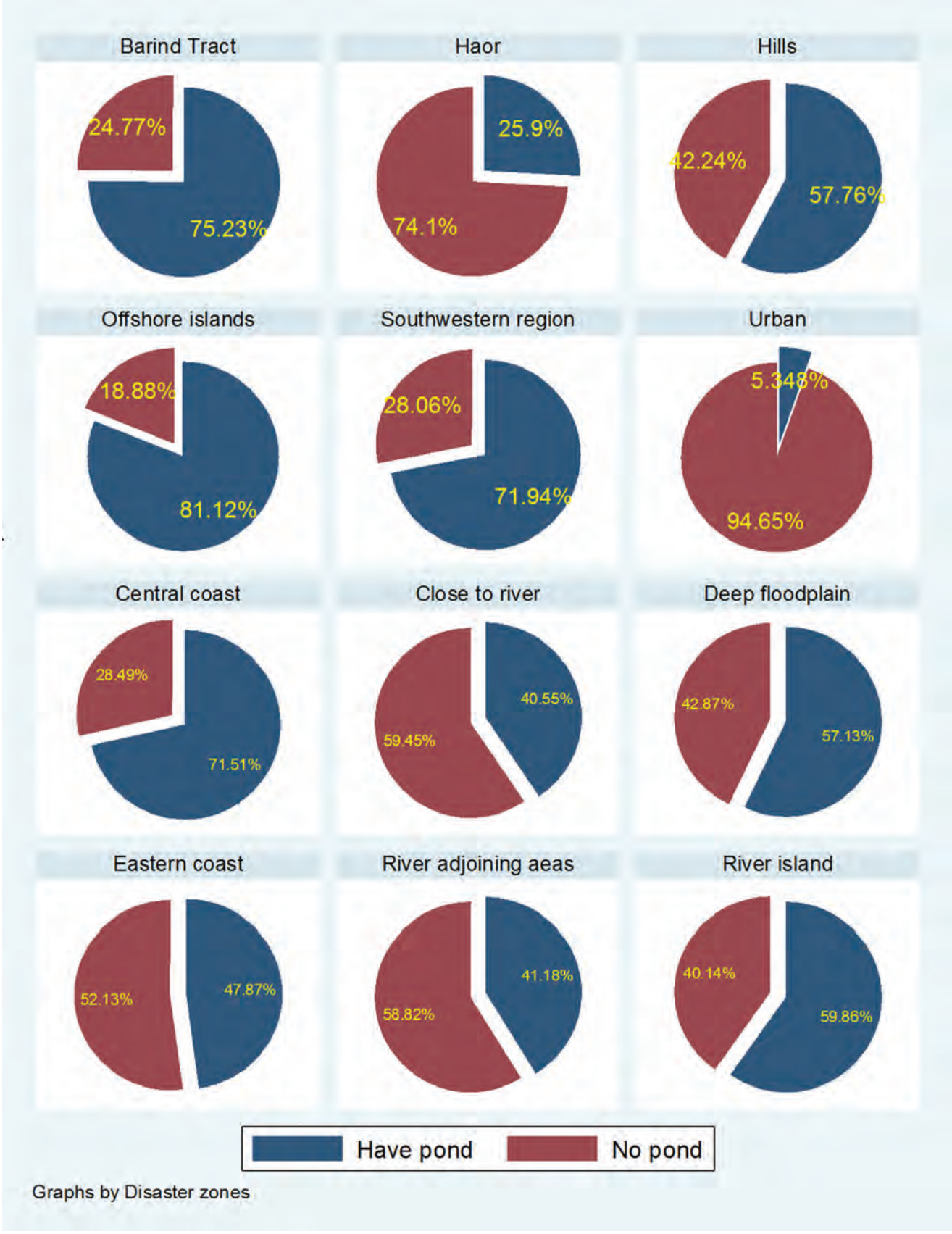
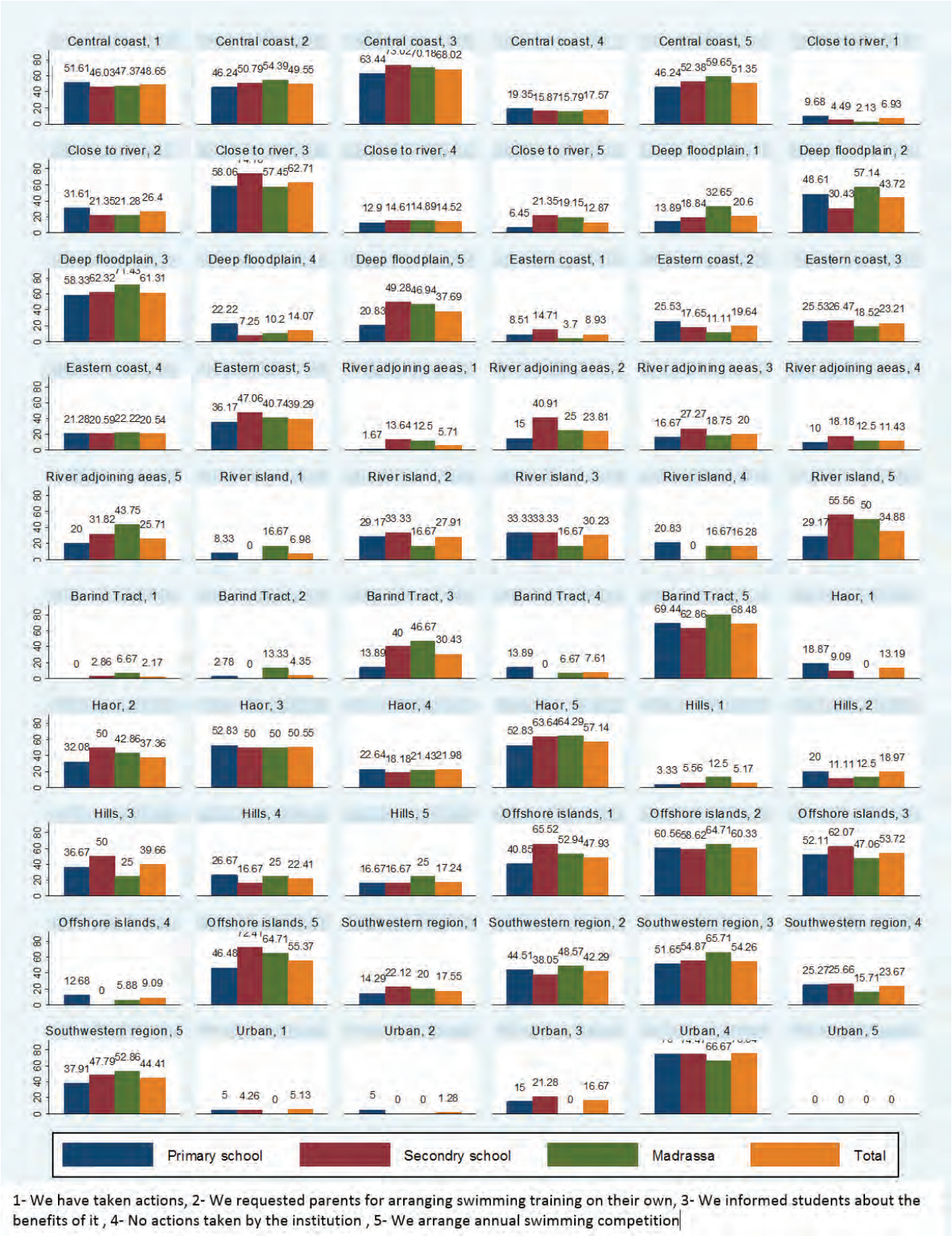


Figure 5.7: Presence of ponds in the premises of educational institutions by disaster zones.



1- We have taken actions, 2- We requested parents for arranging swimming training on their own, 3- We informed students about the benefits of it , 4- No actions taken by the institution , 5- We arrange annual swimming competition

Figure 5.8: Swimming training exercise arranged by educational institutions by disaster zones.

Table 5.7: Status of swimming training arrangement

Q;62 Sweeming_ Training	Primary	School	Madrasa	College	Total
	(figures represent number of institutions followed by percentage)				
Arranged by school	147 17.44	104 18.91	73 22.19	10 12.82	334 18.56
We took initiatives to develop awareness of parents in this regard	304 36.06	163 29.64	131 39.82	20 25.64	618 34.33
We informed the students about it	399 47.33	297 54.00	181 55.02	25 32.05	902 50.11
No initiatives taken from the institution	170 20.17	110 20.00	50 15.20	22 28.21	352 19.56
Swimming contests are integral parts of our annual sports event	264 31.32	228 41.45	158 48.02	23 29.49	673 37.39

5.6 Key findings of the chapter

The key findings of the chapter are given in the following sections.

Community people (with their limited capacity) act as support agents of the institutions to recover disaster loss

- Community people said even though they cannot provide material support to the institutions but people mentioned that they visited the school, showed solidarity and inquired about the wellbeing of the institution (56% mentioned about that), discuss about it and try to come up with some solutions. Some of them mentioned (35.83%) that they offered help with physical labor to fix up some damages.

Unsafe and unusual conditions are reported as the main challenge to resume education immediate after disaster occurrence; at least one week is required to create conditions for resuming education

- About 55.22% of the educational institutions reported unusual and unsafe conditions in the institutions immediate after disaster occurrence and about 60% institutions mentioned that school surrounding environment does not appeared to be good due to dead animals, broken and uprooted trees around and communication systems break down.
- Educational institutions located in different disaster affected zones also indicated that unsafe conditions in the school premises and also mentioned about unusual and poor environmental conditions in the surrounding areas. These reasons cause at least one week loss of education of the students in educational institutions located in disaster affected areas.

More than two thirds institutions (80%) do not have and training on disaster management and climate change issues including loss and damage assessment and reporting processes/formats

- More than 80% of the educational institutions mentioned that they never received any training on disaster management (1440 institutions out of 1800 surveyed) and almost all the institutions mentioned that the training is required and they will take part in the training if arranged by any corner.
- They mentioned that they have limited knowledge on CDMP/ DDM provided 'D Form' for amassing disaster damage information, new cyclone signaling system but no idea about how to arrange a disaster mock drill. Institutions recommended to

arrange training on topics/areas like pre disaster preparedness, during disaster actions, continue education if disaster prolongs (e.g. water logging), handling traumatic situation, loss and damage assessment, introduce with government disaster management processes, institutional coordination, training on First Aid, contingency resources management.

Death by drowning is a major threat as majority institutions got ponds in school premises but insignificant efforts for swimming training

- About 57% of the educational institutions (1026 number of institutions out of 1800 surveyed) reported that they have ponds in the premises of the institutions. In most of the cases these ponds remain exposed and cause of danger to the students, especially small children. Only Haor (25.9%) and urban area (5.34%) educational institutions reported less presence of ponds.
- But only 18.56% educational institutions mentioned that they took swimming training initiatives for the students.
- The educational institutions also mentioned that they informed the students and their parents about the benefits of swimming training and asked the parents to teach their children how to swim. Central coasts and offshore island institutions indicated that they took initiatives for swimming training. Institutions located in Barind Tract (69.44% primary schools), Haor (52.83% primary school) and southwestern regions (35.91% primary schools) mentioned that swimming is an important event in their annual sports competition which gives them opportunities to train students swimming.

CHAPTER 6:

Impact Recovery and Response Capacity of Educational Institutions

Impact Recovery and Response Capacity of Educational Institutions

6.1 Introduction

Once the impacts leave scars and damage in the educational institutions, the institutions in many ways try to recover the damage to resume education activities as soon as possible. In few instances the institutions got the capacity to carryout recover activities by dint of their own capacity, but in most of the instances institutions suffer from lack of internal and also external support to fight back better with disaster impacts. This chapter in this regard presents the results on recovery and response capacity of the institutions to recover disaster damages.

6.2 Damages that the institution did not able to recover

Damage of the building structure including doors and window, break down of the water supply and sanitation systems are the major damage areas that the educational institutions did not able to recover since last disaster impacts happened. Institutions located in the central coastal areas reported damage of building structure (50%), furniture damage (71.17%), doors and window break down (70.72%). These figures stand at 69.77%, 67.44% and 62.79% for river island areas and 65.96%, 63.56% and 60.11% for south-western coastal areas. Second area of damage that the educational institutions found difficult to recover is sanitation systems. About 51.80% institutions in the central coasts, 42.86% in river adjoining areas, 44.19% in river island areas, 40.26% in areas close to river, 44.22% in the floodplain areas mentioned that they are enduring with broken sanitation systems. Damage of water supply systems in the educational institutions is the third major area that the institutions did not able to recover. About 37.84% institutions in the central coastal regions, 27.68% in the south-eastern coastal areas, 46.67% in the river adjoin areas, 44.19% in the river island areas, 55.32% in south-western coastal areas, 29.67% in the Haor regions indicated that their water supply systems remained broken down since last disaster happened.

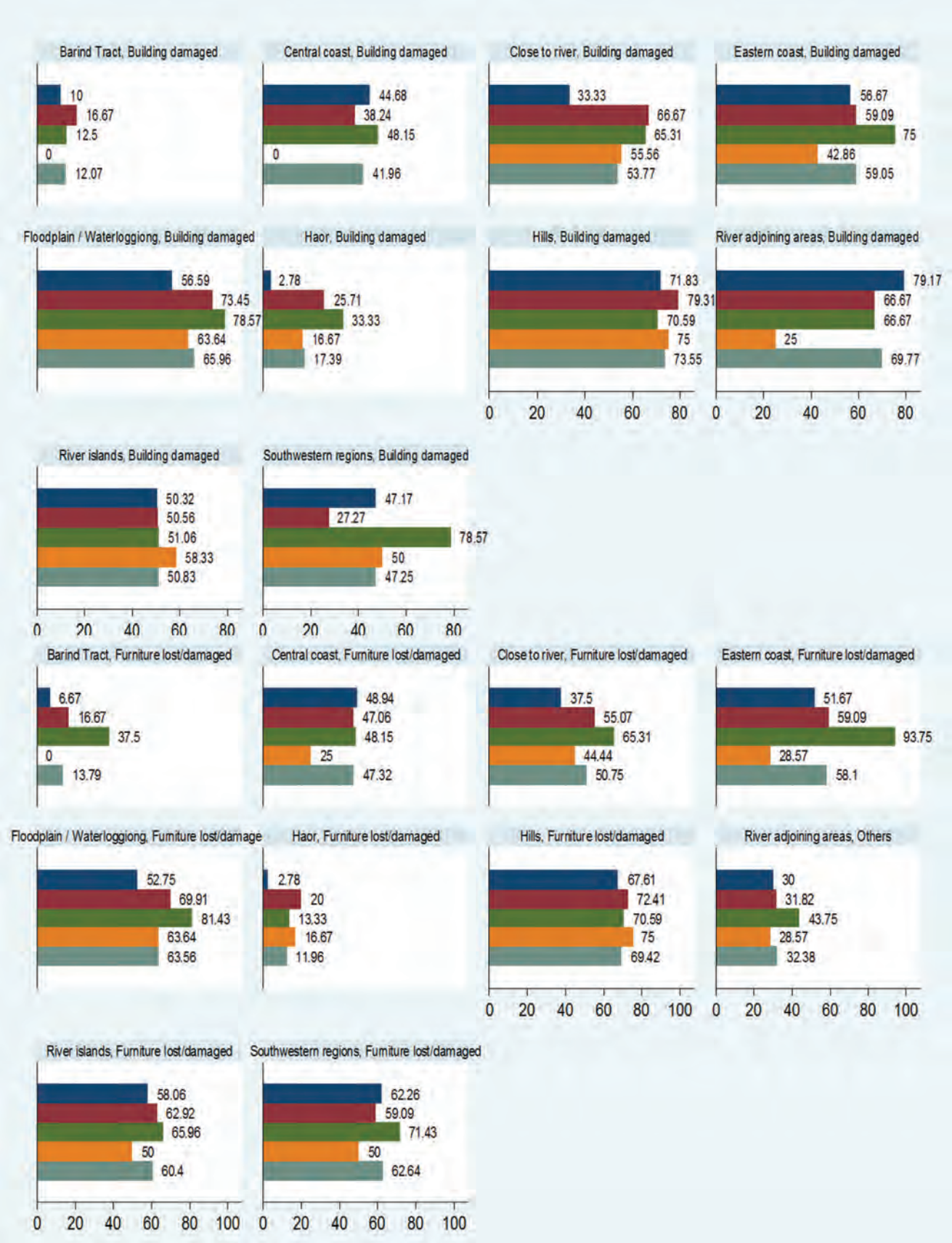


Figure 6.1a: Disaster damage experienced by educational institutions by disaster zones.

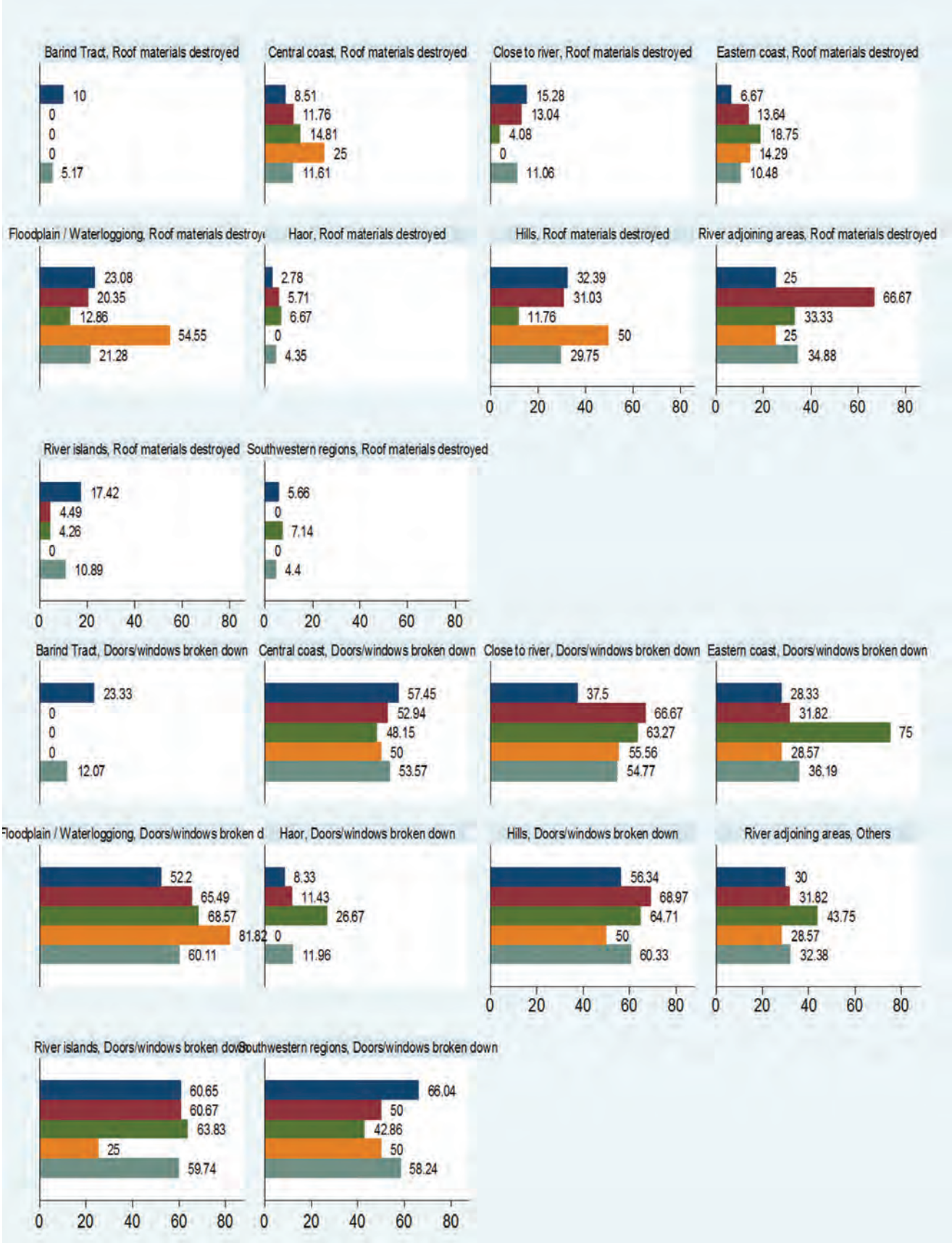


Figure 6.1b: Disaster damage experienced by educational institutions by disaster zones.

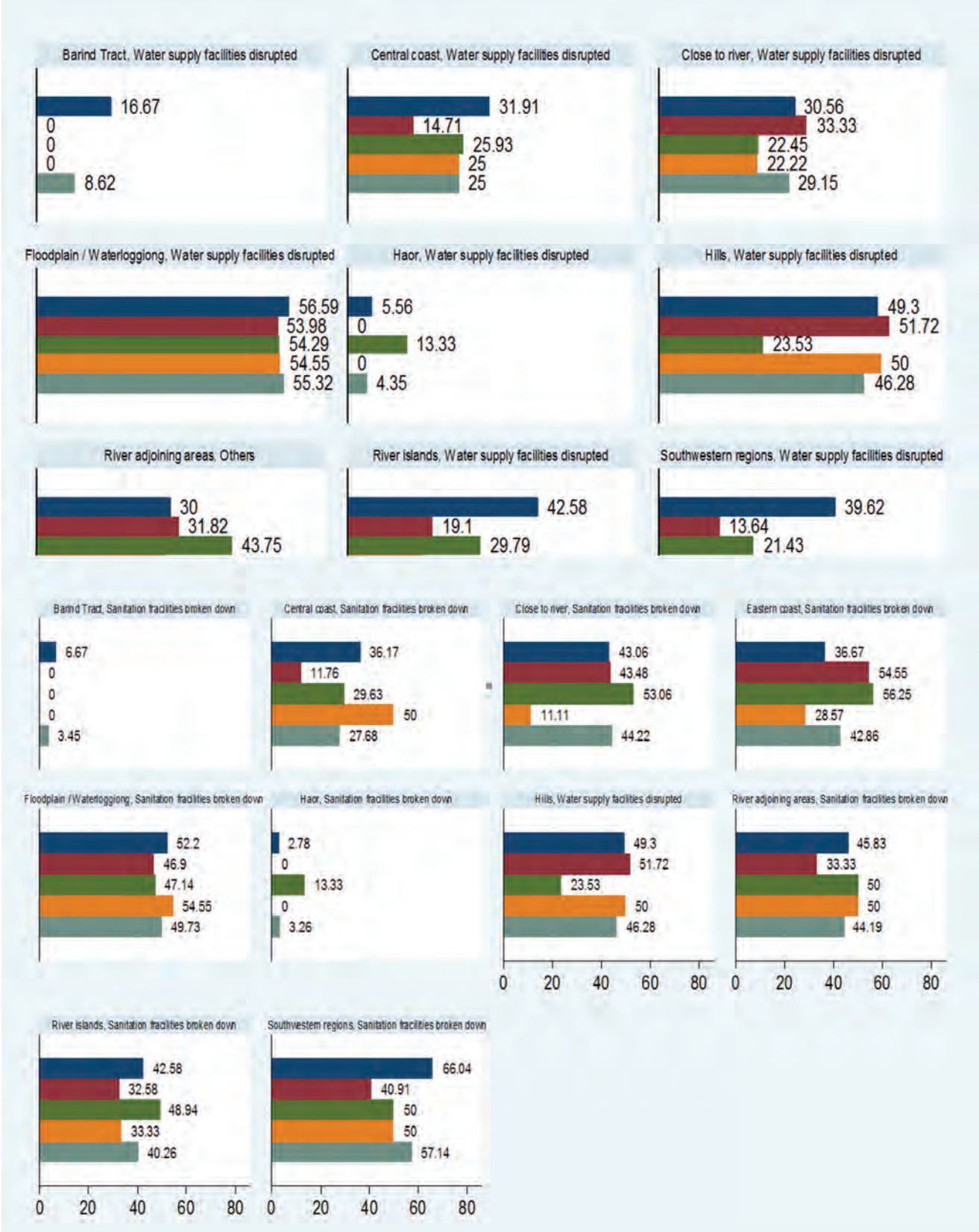


Figure 6.1c: Disaster damage experienced by educational institutions by disaster zones.

6.3 Partnerships and disaster impact recovery

More than 80% of the educational institutions (81.15%) did not take any plans or actions to address disaster impacts (Table 6.1). Educational institutions located in urban areas (66%), floodplains (40.7%), south-eastern coastal areas (40.18%), Haor regions (63.74%) mentioned that they did not take any actions to address disaster impacts. Most of the institutions reported that they raised disaster impacts and related concerns in stakeholder meetings, specially with PTA (Parents Teachers Association, 53.89%) and SMC (School Management Committee, 70.83%), (Table 6.2). In response to the question that asked institutions whether they ever prepared and sent loss and damage report to higher authorities, the institutions indicated that they do not understand the matter. Most of the institutions, in this regard, requested to supply them a guideline so that they can produce loss and damage for reporting purposes and to keep records.

Table 6.1: State of disaster management plans by educational institutions.

Any plan to face disaster impacts (56)	Yes	No	Total	Not responded
	(figures represent number of institutions followed by percentage)			
Primary school	104 16.72	518 83.28	622 100	221
Secondary school	97 21.90	346 78.10	443 100	107
Madrasah	43 17.48	203 82.52	246 100	83
Collage	11 19.30	46 80.70	57 100	21
Average	18.85%	81.15%		

Table 6.2: Discussion on disaster impacts with stakeholders by the institution authorities.

Discussion 53	Primary school	Secondary school	Madrasah	College	Total
	(figures represent number of institutions followed by percentage)				
Discussed in PTA meeting	465 55.16	299 54.36	179 54.41	27 34.62	970 53.89
Discussed in SMC meeting	602 71.41	381 69.27	246 74.77	46 58.97	1,275 70.83
Never discussed	46 5.46	54 9.82	15 4.56	12 15.38	127 7.06
We will do later	39 4.63	18 3.27	12 3.65	1 1.28	70 3.89
Never think about it	20 2.37	9 1.64	7 2.13	2 2.56	38 2.11
We need a guideline	198 23.49	140 25.45	95 28.88	14 17.95	447 24.83

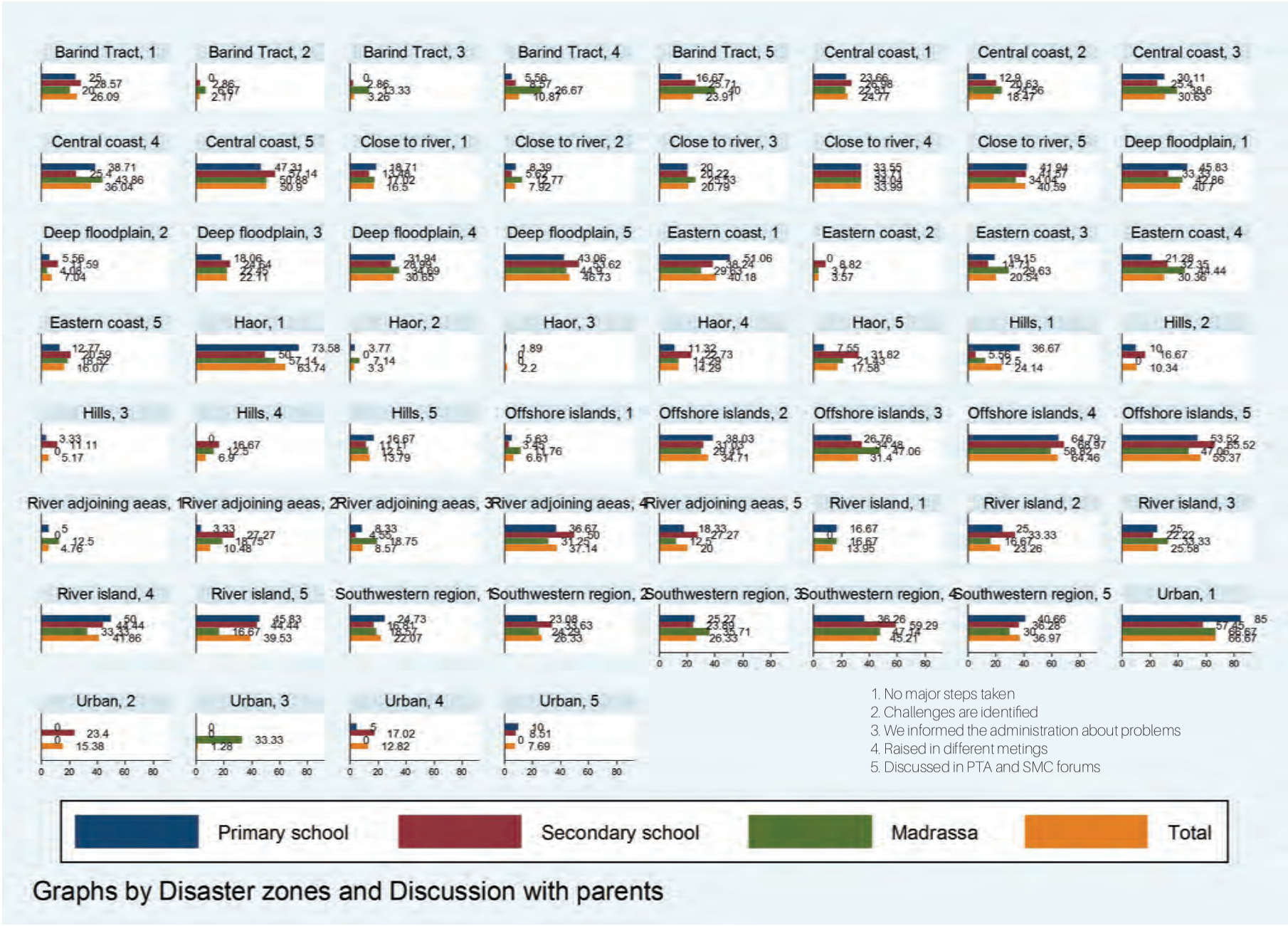


Figure 6.2: Measures so far taken by the institution to enhance the capacity of the institution to face disaster impacts, by disaster zones.

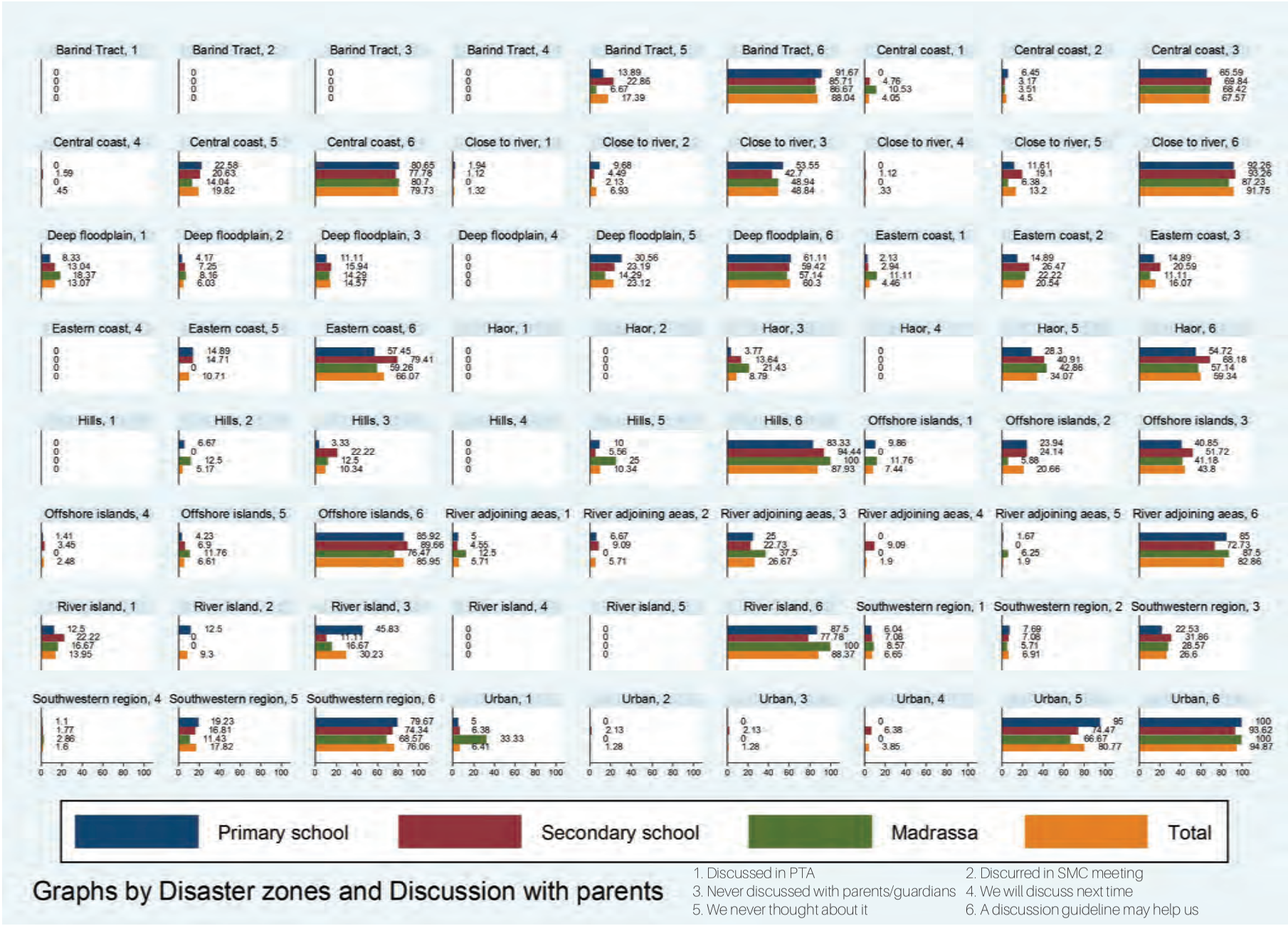


Figure 6.3: State of sharing disaster damage information with related stakeholders by disaster zones.

6.4 Availability of resources for improving disaster management capacity

The educational institutions informed that they do not have necessary contingency funds (85.50%) to spend where and when necessary to address loss and dames induced from disaster impacts (Table 6.3, Figure 6.5). About 95% institutions mentioned that they have no temporary places to continue education if emergency conditions prolongs.

Table 6.3: State of having contingency funds by educational institutions.

PLANNING_TYPE (Q57)	Primary school	Secondary school	Madrasah	College	Total
	(figures represent number of institutions followed by percentage)				
Having necessary Fund	2 0.24	12 2.18	1 0.30	0 0.00	15 0.83
Having Fund but not enough	9 1.07	30 5.45	11 3.34	2 2.56	52 2.89
Having no found	749 88.85	449 81.64	277 84.19	64 82.05	1,539 85.50
Donation as needed	50 5.93	39 7.09	29 8.81	3 3.85	121 6.72

Table 6.4: Alternative shelter places to continue education during emergencies

Q: 58 TYP	Temporary place		Total	Not responded
	Yes	No		
	(figures represent number of institutions followed by percentage)			
Primary school	54 7.26	690 92.74	744	99
Secondary school	40 8.05	457 91.95	497	53
Madrasah	17 5.65	284 94.35	301	28
Collage	1 1.56	63 98.44	64	14
Average	5.63%	94.37%		

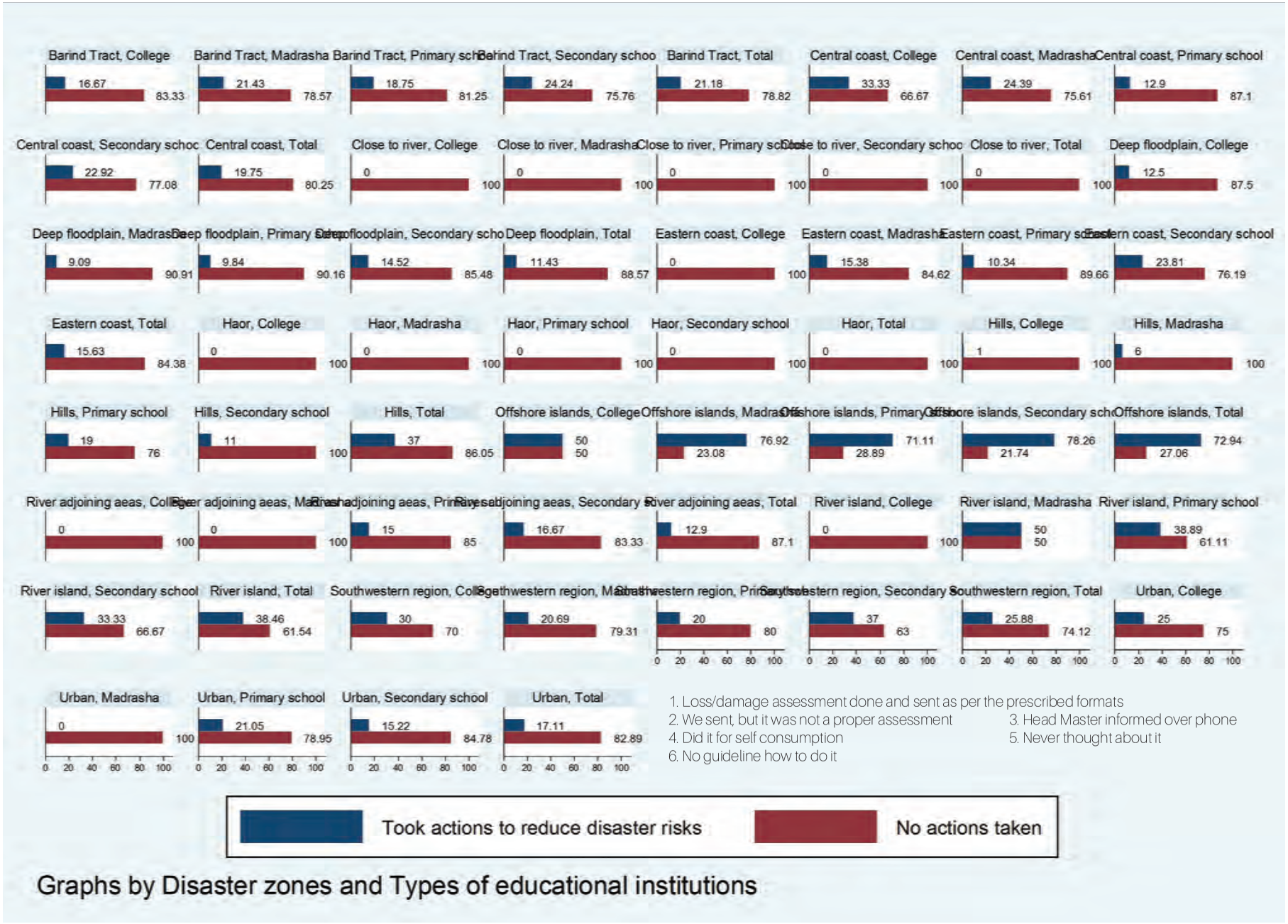


Figure 6.4: Actions taken to reduce disaster risks by disaster zones.

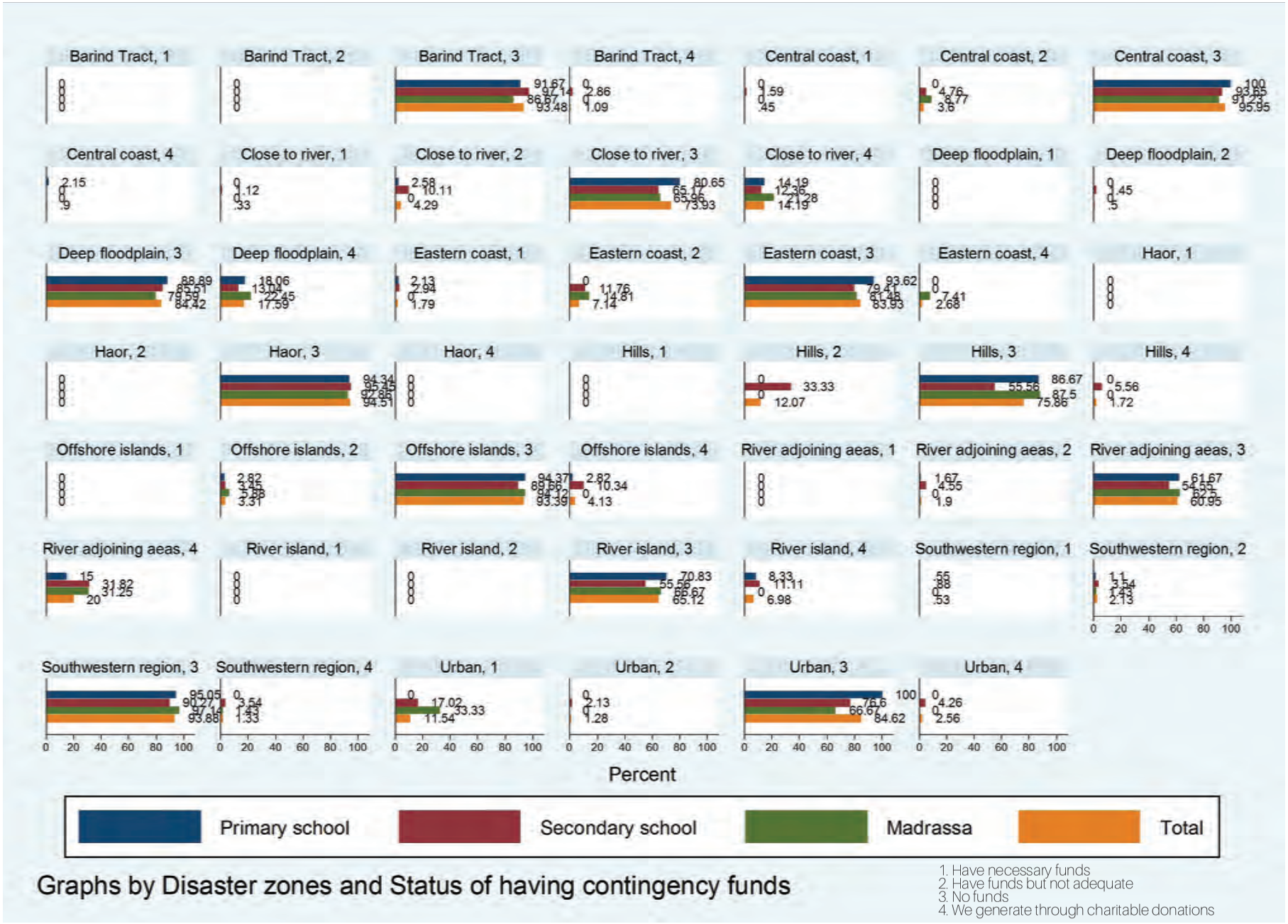


Figure 6.5: State of holding disaster contingency funds by institutions by disaster zones.

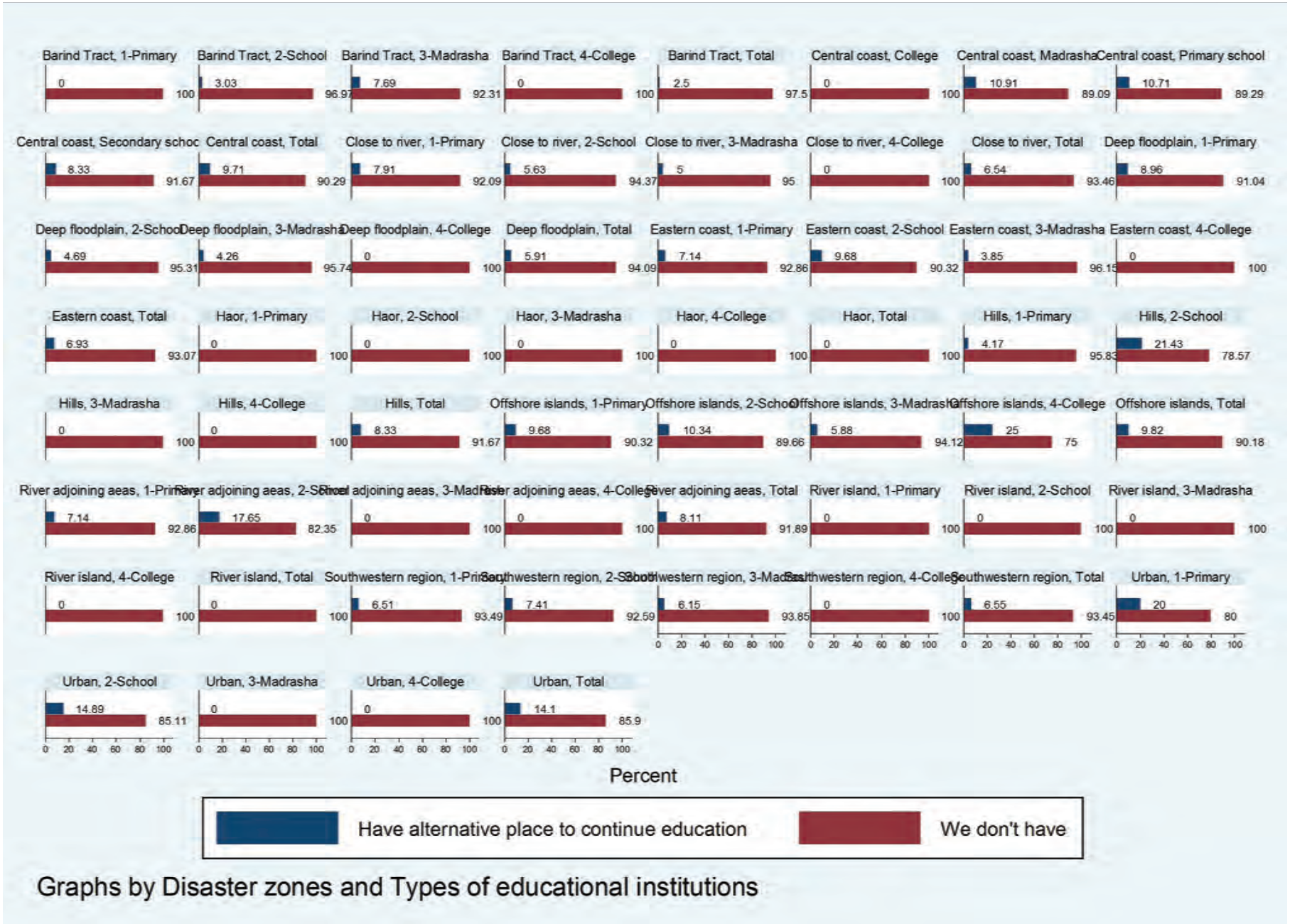


Figure 6.6: Alternative places to continue education during emergencies by disaster zones.

6.5 Action plan taken for increasing of school attendance

During field visits, it was observed that some of the educational institutions (Table 6.5, 6.6) adopted methods that fits for the local conditions in order to continue education during emergencies/uncertainties. In coastal areas school opening and closing times were found to be adjusted with local tidal fluctuation times so that students and teachers coming from remote islands can get advantage of tidal currents to commute to school. In southwestern regions some schools found that they take classes at night depending on solar lamps because students engage themselves with income generating activities during day times. In Haor regions younger students studying at lower classes wait for the senior class students so that they can return home together by boats.

The educational institutions were also asked that how actions could be taken as to reduce disaster induced challenges resulting to increased attendance of students and teachers in the institution. A total of fifteen response options were provided to choose from by the educational institutions. Eight major categories were taken by the institutions as means to increase attendance; these are repair of roads, supply of books and teaching materials, financial support for the students, filling up low lands in school adjoin areas, construct new buildings, repair damaged structures, tree plantation and constructing building suitable for the area. Certain regions opt for certain options (Table 6.7).

Table 6.5: Adoption of strategies suitable for the area to continue education.

Q60 Type	Having Special Technique (*figures represent number of institutions followed by percentage*)		Total	Not responded
	Yes	No		
Primary school	140 18.84	603 81.16	743	0
Secondary school	83 16.57	418 83.43	501	49
Madrasah	64 21.05	240 78.95	304	25
Collage	5 7.58	61 92.42	66	12

Table 6.6: Adaptation techniques to continue education.

Special Technique/60.1	Primary school	Secondary school	Madrasah	College	Total
	(figures represent number of institutions followed by percentage)				
High and low tide consider in taken class	36 4.27	19 3.45	17 5.17	2 2.56	74 4.11
Take class in safe place at the time of disaster	106 12.57	70 12.73	42 12.77	4 5.13	222 12.33
Taken class in groundbreaker	16 1.90	8 1.45	7 2.13	0 0.00	31 1.72
Said Other technique	6 0.71	2 0.36	1 0.30	1 1.28	10 0.56

Table 6.7: Measures that can help to increase the presence of students in the educational institutions.

TYPE_OF_ COOPERATION Q: 59	Primary school	Secondary school	Madrasah	College	Total	Significant regional response pattern
	(figures represent number of institutions followed by percentage)					
1. Road repair	618 73.31	368 66.91	234 71.12	47 60.26	1,267 70.39	Central coast, southeastern coast, river adjoining areas, river islands, close to river, floodplain, hoar, southeastern coast, offshore islands, urban areas
2. Bridge culvert repair	304 36.06	196 35.64	123 37.39	23 29.49	646 35.89	Central coast, hoar, offshore islands
3. Book and teaching materials supply	439 52.08	292 53.09	190 57.75	43 55.13	964 53.56	Central coast, southeastern coast, floodplain, southeastern coast, offshore islands, urban areas
4. Financial support for student	408 48.40	289 52.55	191 58.05	40 51.28	928 51.56	Central coast, floodplain, hoar, southeastern coast, offshore islands, urban areas
5. Disaster allowance for teacher	245 29.06	184 33.45	114 34.65	27 34.62	570 31.67	Offshore islands, urban areas
6. Reduce school fees	70 8.30	84 15.27	37 11.25	7 8.97	198 11.00	-
7. Change in class routines	126 14.95	106 19.27	60 18.24	15 19.23	307 17.06	Barind Tract
8. Fill up low land and make it disaster resilient	384 45.55	244 44.36	149 45.29	33 42.31	810 45.00	Central coast, floodplain, hoar
9. Construct new building	543 64.41	384 69.82	253 76.90	51 65.38	1,231 68.39	Central coast, southeastern coast, river adjoining areas, river island, close to river, floodplain, haor, southeastern areas, Barind Tract, offshore islands, urban areas
10. Repair damaged building	498 59.07	370 67.27	251 76.29	47 60.26	1,166 64.78	Central coast, southeastern coast, river adjoining areas, river island, close to river, floodplain, haor, southeastern areas, offshore islands, urban areas
11. Repair/build embankment	282 33.45	165 30.00	120 36.47	21 26.92	588 32.67	Central coast, haor, offshore islands
12. Tree plantation	531 62.99	346 62.91	226 68.69	49 62.82	1,152 64.00	Central coast, southeastern coast, close to river, floodplain, haor, Baring Tract, offshore islands, urban areas
13. Create disaster fund with local administration and easy provisions to use it by institutions	241 28.59	163 29.64	128 38.91	29 37.18	561 31.17	Central coast, offshore islands
14. Bring change in lesson planning suitable for that area	158 18.74	133 24.18	85 25.84	19 24.36	395 21.94	Central coast
15. Building construction that is suitable for that local area	463 54.92	337 61.27	219 66.57	51 65.38	1,070 59.44	Central coast, floodplain, haor, southeastern areas, offshore islands, urban areas

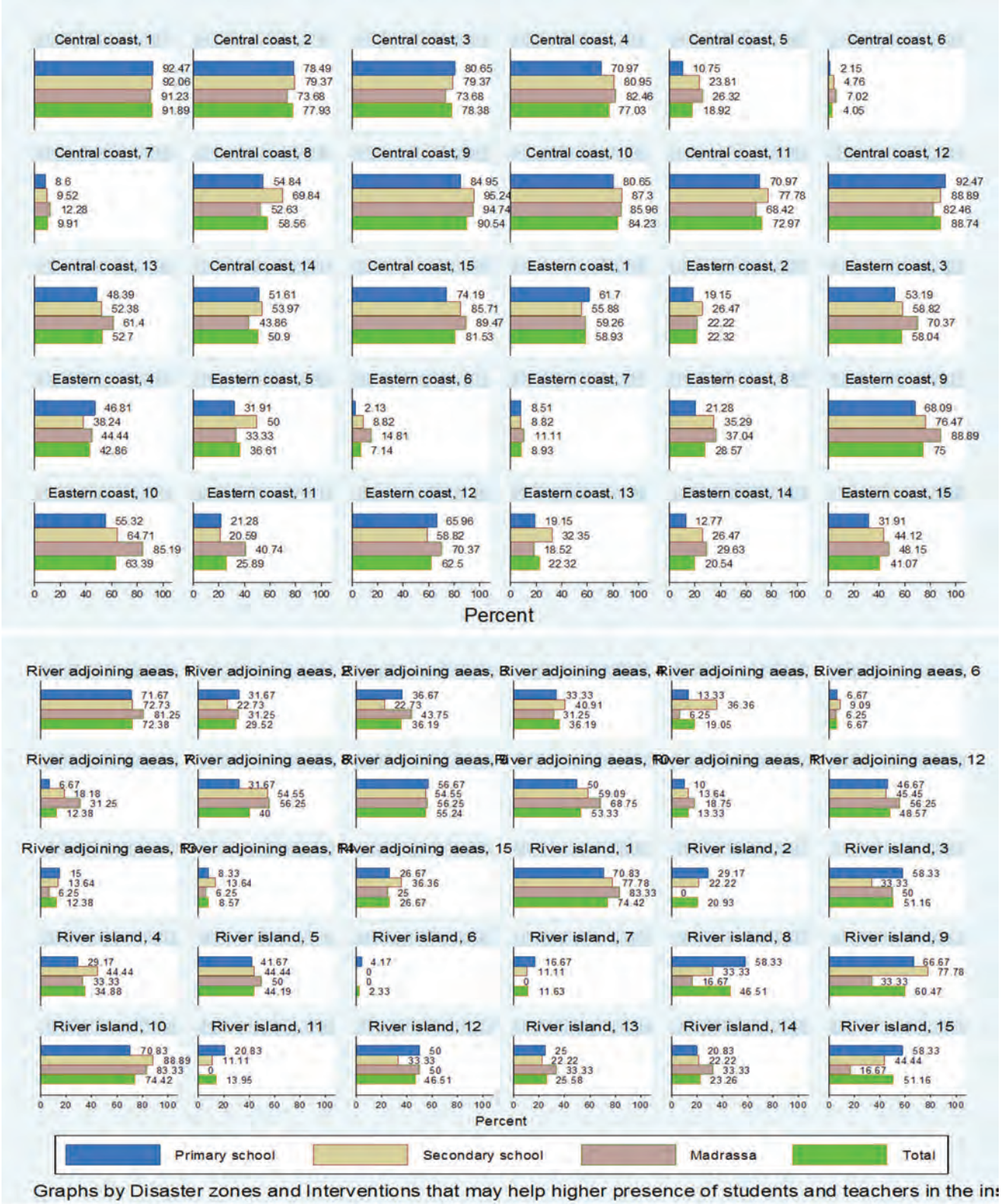


Figure 6.7a: Recommended measures that may help to increase students-teachers attendance in the institutions by disaster zones.

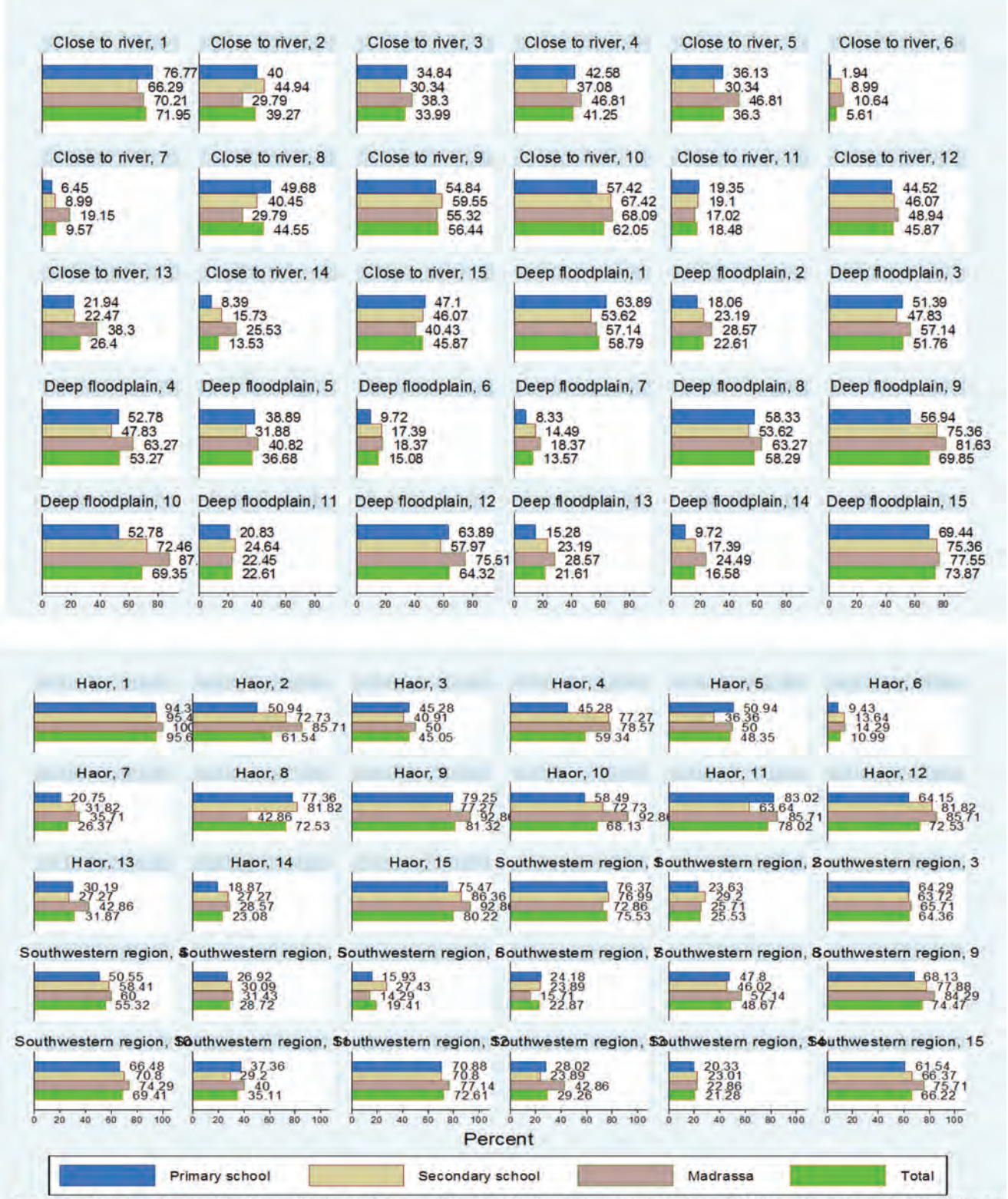


Figure 6.7b: Recommended measures that may help to increase students-teachers attendance in the institutions by disaster zones.

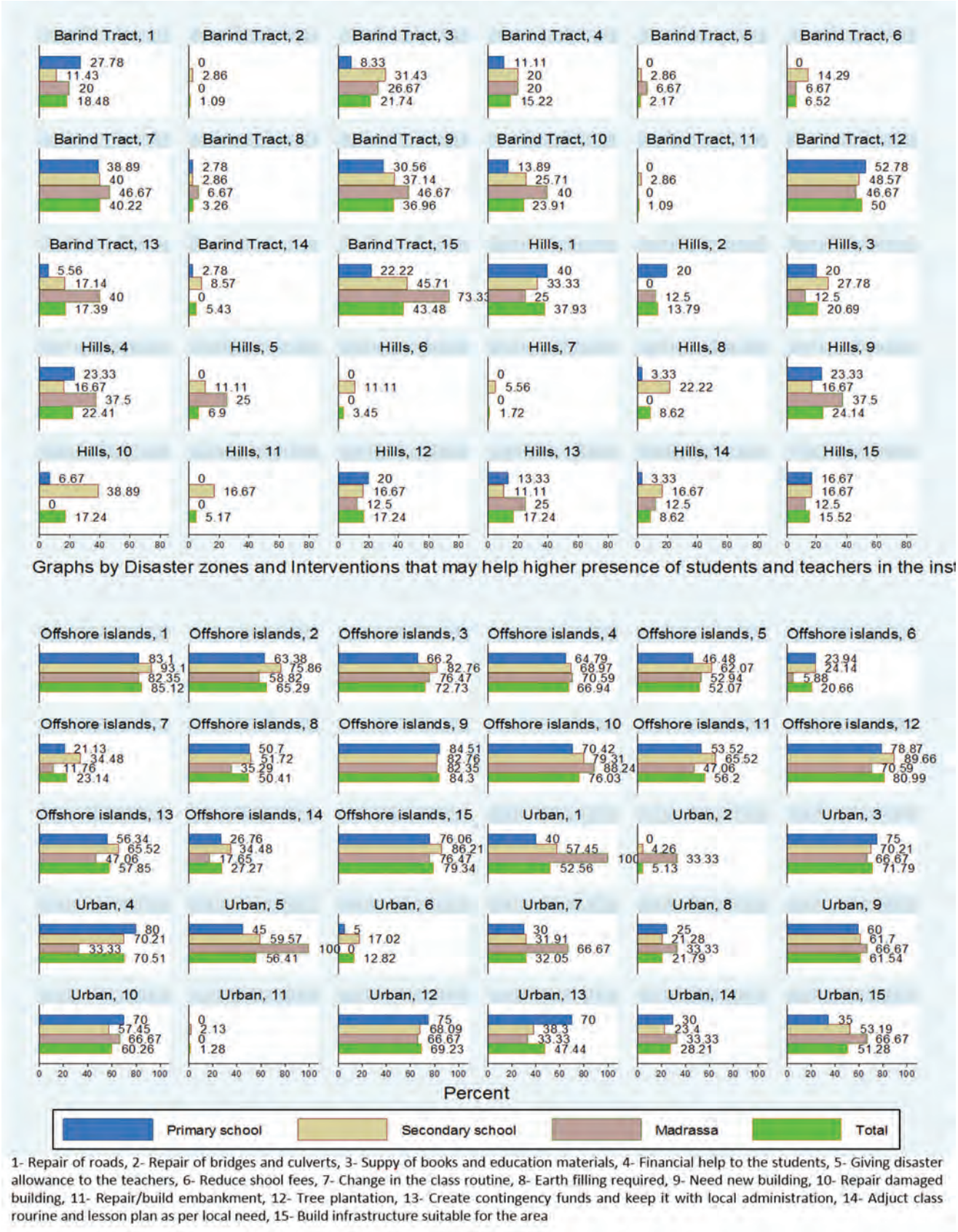


Figure 6.7c: Recommended measures that may help to increase students-teachers attendance in the institutions by disaster zones.

6.6 Key findings and recommendations

The major findings of the chapter are given in the following sections.

Unrecovered residual impacts cause institutions to remain weak to face upcoming hazards

- Damage of the building structure including doors and window, break down of the water supply and sanitation systems are the major damage areas that the educational institutions did not able to recover since last disaster impacts happened .
- Institutions located in the central coastal areas reported damage of building structure (50%), furniture damage (71.17%), doors and window break down (70.72%). These figures stand at 69.77%, 67.44% and 62.79% for river island areas and 65.96%, 63.56% and 60.11% for south-western coastal areas.
- Second area of damage that the educational institutions found difficult to recover is sanitation systems. About 51.80% institutions in the central coasts, 42.86% in river adjoining areas, 44.19% in river island areas, 40.26% in areas close to river, 44.22% in the floodplain areas mentioned that they are enduring with broken sanitation systems.
- Damage of water supply systems in the educational institutions is the third major area that the institutions did not able to recover. About 37.84% institutions in the central coastal regions, 27.68% in the south-eastern coastal areas, 46.67% in the river adjoin areas, 44.19% in the river island areas, 55.32% in south-western coastal areas, 29.67% in the Haor regions indicated that their water supply systems remained broken down since last disaster happened.

About 80% Institutions do not have DM (Disaster Management) plans in hand; 85% no contingency funds; 95% no alternative place to continue education in emergencies

- More than 80% of the educational institutions (81.15%) did not take any plans or actions to address disaster impacts. Educational institutions located in urban areas (66%), floodplains (40.7%), south-eastern coastal areas (40.18%), Haor regions (63.74%) mentioned that they did not take any actions to address disaster impacts.
- Most of the institutions reported that that they raised disaster impacts and related concerns in stakeholder meetings, specially with PTA (Parents Teachers Association, 53.89%) and SMC (School Management Committee, 70.83%),
- The educational institutions informed that they do not have necessary contingency funds (85.50%) to spend where and when necessary to address loss and dames induced from disaster impacts
- About 95% institutions mentioned that they have no temporary places to continue education if emergency conditions prolongs.
- During field visits, it was observed that some of the educational institutions (about 16%) adopted methods that fit for the local conditions in order to continue education. In coastal areas school opening and closing times were found to be adjusted with local tidal fluctuation times so that students and teachers coming from remote islands can get advantage of tidal currents to commute to school. In southwestern regions some schools found that they take classes at night depending on solar lamps because students engage themselves with income generating activities during day times. In haor regions younger students studying at lower classes wait for the senior class students so that they can return home together by boats.

CHAPTER 7:

Summary Appraisal and Recommendations

Summary Appraisal and Recommendations

7.1 Introduction

This chapter accommodates the major results generated and presented in different chapters of the report. The results are given for each chapter so that these can be read easily, logically and in corresponding fashion. The recommendations are follow the key results. The chapter provides the baseline condition of damage incurred by the educational institutions as results of occurrence of natural disasters. It appears that many impact conditions remained unnoticed and unrecovered and persist as residual impacts. When this residual impacts are appended with new impact conditions, the educational institutions cannot bear the load experience serious consequences.

7.2 The findings of the study

7.2.1 Attributes of educational institutions in disaster impact areas

CCESD pilot survey carried out in 12 disaster hot spots of Bangladesh

- The pilot questionnaire survey was conducted in 1800 educational institutions (46.72% government and remaining 53.27% non-government) distributed in different disaster hot spots of Bangladesh.

- A total of 683737 male and female students (47.64% boys, 52.35% girls) were covered in the survey, while this figure stands at 19523 for teachers (72.55% male and 27.44% female).

Structures of institutions are fragile may become easy prey to upcoming hazards

- More than half of the surveyed schools (57%) are non-concrete or semi-concrete structures, while the remaining 43% are concrete made.

- Primary schools got highest percentage (71%) of concrete made school building structures where Madrassas showed highest percentage of semi-concrete structures.

Nearly half (47%) of the classrooms are not-usable

- 1800 surveyed schools got a total of 28383 classrooms among which 53% found to be mal-functioning (14923 numbers) and the rest 47% (13460 numbers) are currently in working condition. This suggests that a significant portion of

classrooms remain unused by the educational institutions. Impacts of recent disasters, cumulative and residual impacts caused by disasters happened in previous years, poor quality construction, lack of maintenance is the factors responsible for damage of these classrooms.

- Schools located in coastal areas were found to be located in low lying areas (23% on an average in low lying areas, 13% on higher grounds 61% on adjoining area equal heights) from surrounding lands.

Seasons and locations determine the pattern of challenges to access to educational institutions; communication by local roads is the major means to access to school

- More than 80% of primary school students use non-asphalt local roads in dry seasons (in the winter) to go schools and this figure remains almost the same (i.e. 80%) in wet season.

- College students prefer (88% in both the seasons) road communications to come to their institutions.

- In wet season the average percentage stands at 16% who takes water ways which drops at 5% in dry season; students who take water ways to communicate to schools are also take risks during wet season when the rivers, canals or vast water terrains (in north-eastern Haor areas) remain full of water with strong water currents and waves.

- Boys and girls (especially in the primary school students) have to walk to access to school; these walkways might not be serviceable during wet or rainy season due to rainfall or flooding conditions. Even the use of walkways during dry seasons, especially in summer times, becomes difficult for those who live in riverine char lands where lands are exposed, sandy and lacks vegetation cover.

Coastal area institutions are more used as disaster shelters, thus more prone to damage of assets and loss of education by the shelter users

- Institutions located in the coastal areas where cyclonic disturbances are prominent were used more as shelter places compared to institutions located in other disaster affected zones. Thus the institutions situated in the central coast (Char Fashion upazila), southwestern coast (Shyamnagar and Tala upazilas), offshore island areas (Hatia upazila) show highest percentage of response in regards to the use of institution as disaster shelter.

- It is evidenced that primary and secondary schools used more than madrassa or colleges as shelter places.

- The significant percentage of primary and secondary schools mentioned (50% in Char Fashion and 35% in Shyamnagar) that the institutions was built as shelter therefore there remains a formal obligation to leave their space to disaster victims during emergencies and this is also reflected through the fact that the institutional premises were used as shelters (central coast 53%, offshore island 41%, southwestern coast 71% for primary schools). The institutions located in south-eastern coastal areas like Moheskhali and Pekua also mentioned that their structures were built and used as disaster shelters, but percentages in these area are low <20%) compared to central or south-western coastal areas.

One third of educational institutions still remained out of safe water supply systems

- Majority of the educational institutions got water supply facilities in their premises (78% said water facilities exist), but many institutions reported that existing water supply options are broken or mal-functioning. If the absent and mal-functioning water supply facilities are added then the figure stands at 28.88% for primary schools (i.e. 520 number of educational institutions out of 1800 institutions surveyed which got students about 190 thousands), 9.82% for secondary schools, 18.54% for madrassa and 8.87% for college.

- Shallow tube wells are the major water supply sources (58.68%) in the educational institutions and 34.54% institutions depend on deep tube wells for water supplies. This dependence on shallow tube wells for water supplies suggests that water supply options at school remains at unsteady states since dry seasons generally show drop in the ground water table in almost all the parts of the country.

About half of the educational institutions in disaster hotspots suffers from good sanitation facilities

- Sanitation options give more grim pictures, where only 52.22% educational institutions reported having good toilet facilities for all (47.78% reported mal-functioning sanitation systems). The primary schools show worst scenario in this regard where only 42.82% (57.18% reported negatively) schools mentioned that they have good toilet facilities for students, teachers and staffs.

Poor school facilities and support services provide weak education opportunities

- About 40% institutions mentioned that they have playgrounds that are currently not in usable conditions for different reasons (e.g. illegally occupied, unsafe, used for dumping construction materials etc.), 10% said they don't have any playground and remaining 50% educational institutions got playgrounds for by all the students both girls and boys.

- Among the institutions, colleges gave the highest response (74.36%) about having playgrounds in their premise and primary schools responded the least (40.21%). Disaster zone wise response pattern shows that a significant percentage of educational institutions located in Haor regions do not have any playgrounds; in Haor 48.35% responded no playgrounds at all and another 35.16% mentioned that they have playgrounds but not in usable condition. Response pattern shows that the conditions in the coastal areas, offshore islands and river islands areas also bad in terms of having playgrounds in the premises of educational institutions.

- When primary schools are concerned only 27.67% educational institutions responded that they provide tiffin to the students; among these 27.67% institutions, 18% comes from urban areas and other disaster affected regions showed more depressing conditions as only 2.3% in offshore islands, 0% in hills, Barind Tracts, close to river areas, river adjoining areas.

- 51.8% educational institutions in central coasts, 22.08% in southeastern coasts, 48.72% in river island areas, 44.06% in southwestern coasts, 17.65% in haor regions responded that they are they provide tiffin to students.

- Only 20.92% educational institutions indicated that they have electricity connection in their institutions (24.05% in the primary schools as the highest), only 5% mentioned that they have computer laboratories, 13.54% mentioned they have computers, 10.17% mentioned having internet facilities.

Forty percent institutions situate two kilometers beyond of nearest health care centers

- About 58.49% educational institutions indicated that nearest health care center is situated within 2 kilometers (suggests 41.51% located >2 kilometers) from the institution, 23.25% (419 institutions out of 1800 covering 158 thousand students) cases health centers are located in between 2 to 5 kilometers and 15.18% (273 institutions covering 103 thousand students) cases health care centers are located beyond 5 kilometers of the institutions.

- The remotest institutions from health care centers are mainly located in hills regions, Haor, river islands and river adjoining areas.

- About 80% of the urban area educational institutions mentioned that they are located with two kilometers of healthcare facilities.

- During disaster times, the educational institutions that are located beyond two kilometers of health care centers (about 41.51%, 747 institutions out of 1800 surveyed, covering about 283 thousand students) may face remain in anxiety that it will be very hard to receive health services if necessary when communication becomes a huge issue for the local area.

More than 50% institutions do not get benefits from First Aid Box; 70% do not have training on its use

- About 52.19% primary schools (939 institutions out of 1800 surveyed) responded that they are not in a position to get support from First Aid Box because they simple do not have it (32.62%) or it is not functioning (19.57%). Most poor conditions are demonstrated by institutions located in the Haor regions, hills, river islands, river adjoining areas and deep floodplain regions.

- FGD participants mentioned that First Aid Box are very important to have (along with regular change of outdated materials and other replenishments) because minor injuries from fall from high places, snake bites, drowning are common challenges they need to tackle during school opening hours.

- 56.11% primary schools those got First aid Box mentioned that they do not know about it or these have not been changed since got it. About 71.17% (1281 institutions out of 1800) institutions responded that they never receive any training on the use of First Aid Box equipment.

Access difficulty is the most significant challenge faced by students in disaster affected areas

- In most of the disaster zones educational institutions identified transportation difficulty as a common challenge faced by the students. Helping parents, engaged in income generating activities, feeling unsafe to go to school, families moved to other places are identified as major causes of irregular attendance of students to the educational institutions. Haor regions mentioned that all the options/factors are true for them.

Displacement of families is the main reason of students dropouts in river dominated areas

- It is interesting to note that the factor "families moving to other places" was chosen highest number of times by river islands, river adjoining areas. However, the causes in many instances are fused and negatively influence students' motivation to go to the school.

Sickness of teachers and their family members is a prime reason of teacher's irregular attendance in educational institutions

- Educational institutions located in offshore island areas mentioned that sickness (own and family members) at home is the prime reason (69% mentioned own sickness and about 70% mentioned about sickness of family members) for irregular appearance in the institution. Second important factors identified by the institutions of non-appearance is 'engaged in disaster damage recovery activities at home'. In some disaster affected areas male teachers are more engaged (e.g. 45.5% male against 27.3% female in Haor areas, 52.2% male against 43.4% female in southwestern coastal regions). In contrast, central and southeastern coastal areas male teachers are more engaged in disaster damage recovery activities at home (84.1% male against 57.1% female in central coast). A significant percentage of educational institutions mentioned 'feeling unsafe' as the reason for irregular attendance in the school. The highest percentage appears from Haor regions, where about 40% teachers both male and female expressed their fear while commuting to the institution.

7.2.2 Experiencing impacts of disasters

Flood and cyclonic disasters return in 2-5 years interval

- Disaster impacts in coastal areas have both time and space dimension, where time dimension indicates that in every 2-5 years the educational institutions face remarkable impact conditions from hydro-meteorological hazards like flood and cyclone hazards. On the other hand, types of hazards show a difference with the difference of location. Educational institutions in south-western areas mentioned that flooding is a concern for them, the institutions located in the central coastal regions mentioned about flood impacts, but 60% of them reported that they face flood impact every year and the institutions located in the south-eastern coastal areas did not indicate about flooding problem.

Sea erosion floods cyclones and Tsunami are important risk factors in central coastal areas

- Alike flood impacts, central coastal areas institutions also reported that they face cyclonic disturbances, irrespective of landfall happened or not, almost every year; they also identified river bank erosion as a hazard effecting every year.

- Institutions in all three coastal regions expressed their concern over Tsunami risks.

Abnormal high tides create serious threats to education in southwestern coastal regions

- Educational institutions of south-western coastal regions mentioned that abnormally high tides and related inundations (73.53%) cause problems to them and this abnormal high tide conditions happen in every 2-3 years interval.

Coupling hazards are phenomenal characteristic in southeastern (flashfloods-landslides) and southwestern coastal regions (salinity-waterlogging)

- South-eastern coastal areas mentioned about flash floods/ local floods and landslide hazards which other two coastal regions did not mention. Similarly, south-western coastal region reports slow onset disaster threats like salinity intrusion and water logging problems which the central and south-eastern coastal areas did not mention. Comparative assessment disaster impact conditions

Flood frequency intensity and impact duration are location specific; floods and related hazards (river bank erosion and water logging) are common in river influenced regions

- Flood impacts are identified as major threats by the institutions located in river adjoining areas (within 2 kilometers of the river), areas close to river (2-5 kilometers of the river) and floodplain interiors (termed as deep floodplain located beyond 5 kilometers of the river)

- Institutions located in river adjacent areas (both river adjoin and close to river areas) mentioned that experiencing flood impacts is a every year phenomenon for them, on the other hand floodplain area educational institutions face major flood impacts in 2-5 years interval.

- Waterlogging problem turns out as a characteristic hazard phenomenon for floodplain areas, among 91.8% educational institutions who responded yes to waterlogging problem 47.54% mentioned that inundation of the area happens more than 6 months of a year and 44.26% indicated that it is a 3-6 month-prolonged phenomenon from waterlogging hazard.

Seasons (wet and dry) determine the nature of challenges in Haor regions

- This region got two contrasting seasons (hot and humid rainy seasons from March to august and dry and cold winter season spreads from September to the month of February) and problems that the educational institutions of this regions face are also correspond the seasons. Flashfloods happening as a result of huge amount of water coming down from the adjoining Indian hills is a major threat in haor region. Inundation by flood waters, strong current, waves, gusty winds all collectively create serious conditions in the regions.

- Taking a journey by country boats is the only means for the students to get to schools. It was reported during field visits that capsize of boats happen sometimes causing deaths and injuries. In dry and winter season boats cannot ply and poor road communication put students, teachers in different troubles to access to institutions, about 88.71% institutions mentioned that access difficulty is a major threat for them in dry season.

High temperature, tornados (in summer) and biting cold (in winter) trigger many secondary hazards in Baring Tract areas

- The educational institutions located in Barind Tract areas mentioned that drought conditions and associated other hazards like high temperatures cause problems in the areas. It was reported that dry conditions cause shortage of drinking water and also impacts radiate in sanitation and hygiene processes. Students mentioned that it is sometimes very difficult for them to stay at schools due to hot ambient conditions. Sometimes tornados associated with thunderstorms (happening in the afternoons and evenings in summer times) smash assets and necessary service systems in the institutions in Barind Tract regions While in the hills, respondents mentioned that heavy rainfall during summer and rainy seasons cause problems to them.

Bank erosion caused by river and sea and inundation due to floods are major challenges in river and offshore island areas

- Flood is reported by the educational institutions as one of the common natural hazard in both river and offshore island areas. About 81.67% respondents from river island areas told that they face flood problems almost every year while 74.49% in the offshore island areas mentioned the similar problem. Similarly, educational

institutions in both the areas mentioned that bank erosion from water currents and waves is a serious threat for them. Offshore islands indicated about sea erosion along with river erosion hazards.

Earthquakes fire hazards and water congestion (urban flooding) are major threats in urban areas

- Hazards faced by urban areas educational institutions are different from the hazard faced by institutions located in other areas. Earthquakes, urban floods generated mainly from water congestion and drainage problems and fire hazards are found to be the major hazards in urban contexts.

- It is interesting to note that fire hazards and earthquake hazards are identified by majority of the institutions (64.29% mentioned about earthquake and 79.27% mentioned about fire hazard), but they said it is not a serious problem for them and they are better prepared to address related threats.

Institutions those situate in Hydro-meteorological hazard regions devastated maximum 6 times in their disaster memoire; in majority cases impact intensities were moderate

- The response pattern suggests that hydro-meteorological hazards (i.e. cyclone, floods, river bank erosion, flashfloods, water logging, severe rainfall, strong wind) returns in cyclic order and almost in the same time of the year. The highest response show that educational institutions had experienced hazards 1 to 6 times in disaster impact history (257 institutions in cyclone affected areas mentioned 1-6 time while 86 institutions mentioned more than 6 times impact experience; for floods this numbers are 383 and 184, for river bank erosion 69 and 6 respectively).

- In impact intensity scale (the options were high, moderate and low), institutions mentioned moderate in majority cases, though some of the institutions indicated high impacts.

- The slow onset hazards like salinity intrusion, water logging, high temperature, unusual high tide and related inundation, drought conditions are associated with hydrological and meteorological factors.

April to June is the most challenging time of the year

- The educational institutions expressed the April, May and June are the month of the year when most of these hydro-meteorological hazards generally occur, some of the institutions also mentioned that August to December as disaster impact times.

English Mathematics and Social Sciences are major subjects where learning competencies fall as a result of disaster impacts

- The educational institutions identified three subjects, i.e. English, Mathematics and Social Sciences, that they cannot recover the loss of lessons and related competencies as a result of disaster impacts.

- The institutions mentioned that they did nothing to recover loss (e.g. unban area institutions; 80% primary schools, 74.47% secondary schools, 66.67% madrassa and 73.08% colleges)

- Educational institutions located in the offshore island areas mentioned that they were successful in taking extra class to make up the loss, although some of them mentioned that extra classes were taken but those were not enough to recover the loss.

7.2.3 State of disaster preparedness

Community people (with their limited capacity) act as support agents of the institutions to recover disaster loss

- Community people said even though they cannot provide material support to the institutions but people mentioned that they visited the school, showed solidarity and inquired about the wellbeing of the institution (56% mentioned about that), discuss about it and try to come up with some solutions. Some of them mentioned (35.83%) that they offered help with physical labor to fix up some damages.

Unsafe and unusual conditions are reported as the main challenge to resume education immediate after disaster occurrence; at least one week is required to create conditions for resuming education

- About 55.22% of the educational institutions reported unusual and unsafe conditions in the institutions immediate after disaster occurrence and about

60% institutions mentioned that school surrounding environment does not appeared to be good due to dead animals, broken and uprooted trees around and communication systems break down.

- Educational institutions located in different disaster affected zones also indicated that unsafe conditions in the school premises and also mentioned about unusual and poor environmental conditions in the surrounding areas. These reasons cause at least one week loss of education of the students in educational institutions located in disaster affected areas.

More than two thirds institutions (80%) do not have and training on disaster management and climate change issues including loss and damage assessment and reporting processes/formats

- More than 80% of the educational institutions mentioned that they never received any training on disaster management (1440 institutions out of 1800 surveyed) and almost all the institutions mentioned that the training is required and they will take part in the training if arranged by any corner.

- They mentioned that they have limited knowledge on CDMP/DDM provided 'D Form' for amassing disaster damage information, new cyclone signaling system but no idea about how to arrange a disaster mock drill. Institutions recommended to arrange training on topics/areas like pre disaster preparedness, during disaster actions, continue education if disaster prolongs (e.g. water logging), handling traumatic situation, loss and damage assessment, introduce with government disaster management processes, institutional coordination, training on First Aid, contingency resources management.

Death by drowning is a major threat as majority institutions got ponds in school premises but insignificant efforts for swimming training

- About 57% of the educational institutions (1026 number of institutions out of 1800 surveyed) reported that they have ponds in the premises of the institutions. In most of the cases these ponds remain exposed and cause of danger to the students, especially small children. Only Haor (25.9%) and urban area (5.34%) educational institutions reported less presence of ponds.

- But only 18.56% educational institutions mentioned that they took swimming training initiatives for the students.

- The educational institutions also mentioned that they informed the students and their parents about the benefits of swimming training and asked the parents to teach their children how to swim. Central coasts and offshore island institutions indicated that they took initiatives for swimming training. Institutions located in Barind Tract (69.44% primary schools), Haor (52.83% primary school) and southwestern regions (35.91% primary schools) mentioned that swimming is an important event in their annual sports competition which gives them opportunities to train students swimming.

7.2.4 : Impact recovery and response capacity of educational institutions

Unrecovered residual impacts cause institutions to remain weak to face upcoming hazards

- Damage of the building structure including doors and window, break down of the water supply and sanitation systems are the major damage areas that the educational institutions did not able to recover since last disaster impacts happened .

- Institutions located in the central coastal areas reported damage of building structure (50%), furniture damage (71.17%), doors and window break down (70.72%). These figures stand at 69.77%, 67.44% and 62.79% for river island areas and 65.96%, 63.56% and 60.11% for south-western coastal areas.

- Second area of damage that the educational institutions found difficult to recover is sanitation systems. About 51.80% institutions in the central coasts, 42.86% in river adjoining areas, 44.19% in river island areas, 40.26% in areas close to river, 44.22% in the floodplain areas mentioned that they are enduring with broken sanitation systems.

- Damage of water supply systems in the educational institutions is the third major area that the institutions did not able to recover. About 37.84% institutions in the

central coastal regions, 27.68% in the south-eastern coastal areas, 46.67% in the river adjoin areas, 44.19% in the river island areas, 55.32% in south-western coastal areas, 29.67% in the Haor regions indicated that their water supply systems remained broken down since last disaster happened.

About 80% Institutions do not have DM (Disaster Management) plans in hand; 85% no contingency funds; 95% no alternative place to continue education in emergencies

- More than 80% of the educational institutions (81.15%) did not take any plans or actions to address disaster impacts. Educational institutions located in urban areas (66%), floodplains (40.7%), south-eastern coastal areas (40.18%), Haor regions (63.74%) mentioned that they did not take any actions to address disaster impacts.

- Most of the institutions reported that that they raised disaster impacts and related concerns in stakeholder meetings, specially with PTA (Parents Teachers Association, 53.89%) and SMC (School Management Committee, 70.83%),

- The educational institutions informed that they do not have necessary contingency funds (85.50%) to spend where and when necessary to address loss and dames induced from disaster impacts

- About 95% institutions mentioned that they have no temporary places to continue education if emergency conditions prolongs.

- During field visits, it was observed that some of the educational institutions (about 16%) adopted methods that fit for the local conditions in order to continue education. In coastal areas school opening and closing times were found to be adjusted with local tidal fluctuation times so that students and teachers coming from remote islands can get advantage of tidal currents to commute to school. In southwestern regions some schools found that they take classes at night depending on solar lamps because students engage themselves with income generating activities during day times. In haor regions younger students studying at lower classes wait for the senior class students so that they can return home together by boats.

7.2.2 CCESD pilot study recommendations

Recommendation 1 (resilient building structure): Non-concrete and fragile structures of educational institutions should be properly identified and based on the relative location (location in the context of the surrounding areas) of the institution in different disaster affected areas appropriate designs should be made so that the structures are more resilient to face disaster impacts and maintenance activities is done in regular time intervals irrespective of impact conditions (to avoid inspection-decisions-budget allocation process of the government which is time consuming). Disaster affected areas like Haors, river bank erosion prone areas, coastal areas, hills, Barind tracts etc. requires special types of structures that fits for that regional characteristics.

Recommendation 2 (disaster contingency funds for sustainable education): The major percentage (53%) of classrooms was found to be malfunctioning due to disaster impacts which create space shortage (per capita space allocation) resulting to discomfort for boys and girls while they are in teaching-learning processes in the classrooms. In extreme cases, scheduled classes are cancelled due to classroom shortage. This special phenomenon, especially in disaster affected areas should be addressed by allocation of necessary funds. A 'Disaster Contingency Funds for Sustainable Education (DCFSE)' could be established at national level that might be channeled through Upazila Nirbahi Officer (UNO) at grassroots level for this purposes.

Recommendation 3 (adjusted class routine): The educational institutions should be allowed to adjust their class schedules as per the pattern of disaster prevalence of the area. For example, institutions in Barind Tract regions should not be opened in the afternoons in the months of April, May, June to avoid thunder storms and lightening threats (which appears to be significantly high in frequency in recent times under climate change conditions). Similarly, students and teachers in river island areas, coastal areas, Haor regions face different forms of challenges in accessing to schools, specially in summer and wet seasons.

Recommendation 4 (special allocation for schools used as shelter places): The schools those are used as disaster shelters should be given with special allocation of funds so that the damages that are accrued as a result of the institution was used as shelter could be recovered quickly. In addition, if the disaster episode prolongs provisions should be made to continue education in alternative places, in makeshift places if required and necessary supports in this regard should be given.

Recommendation 5 (secured WasH facilities for education): One third of educational institutions in disaster affected areas still suffer from proper WaSH services. Government agencies (e.g. DPHE), local government agencies including Union Parisads, NGOs should come forward with solutions in terms of technology and finance to address the issues. The private sectors agencies could also be engaged in this regard through their CSR (Corporate Social Responsibility) commitments. Bangladesh Bank could play a role in this regard (as they are now fostering Green Banking provisions).

Recommendation 6 (proper sanitation for regular school attendance): Poor sanitation facilities in schools discourage both students and teachers to appear to the institution regularly. In addition, use of school neighboring homes as an alternative, specially by girls, would be risky too. Therefore, allocation of required resources for development, repair activities and maintenance has to be done in this regard; also regular inspection by authorities has to be ensured.

Recommendation 7 (educational institutions should have usable playgrounds): There should be a school playground policy which may outline the existence of playgrounds (of a certain size based on the number of students of the institution) minimum standards of it (e.g. elevation), use of this resource. In addition to recreational use the playgrounds could be used to continue education in emergencies in makeshift facilities and also for disaster drill exercises.

Recommendation 8 (health care facilities for educational institutions): Educational institutions located in different disaster affected areas sometimes need health facilities (for drowning, falling from high places, injuries and poisoning from bites of insects and snakes, sickness of diarrhea, hot ambient conditions etc.) from health care centers. Because of communication difficulty in these disaster affected areas, location of health care centers beyond two kilometers of the school is a challenge to receive timely treatments. The government should take necessary actions so that existing health care centers establish satellite centers nearby educational institutions.

Recommendation 9 (First Aid Box and related training): There should be a policy that educational institutions should have First Aid Box facilities in the institution (number might be one unit for every 200 students). Training on the use of its resources should be mandatory for the teachers and staffs.

Recommendation 10 (better access to educational institutions): It was evidenced that more than two-thirds of the students get to the institutions using local roads of various types. Local government agencies like Union Parisads and LGED should be given directives so that they give priority to build school neighboring road communications so that students could access to educational institutions more safely and easily. Government also could take special projects to build necessary roads within two kilometers of buffer circle area of the institution so that educational institutions are better connected with nearby settlements and with major roads.

Recommendation 11 (unique and permanent registration number for all students): The students should be taken into a formal registry process, where primary attributes will be stored for long time. A registration number (may be birth identification number) should be allocated so that students can be tracked all along the displacements (to avoid counting for multiple times in case of dropouts) and progress.

Recommendation 12 (adequate number of teachers in the educational institutions): More teachers should be recruited in the schools located in different disaster affected areas so that absence of one teacher could be substituted by the other since challenges back home of teachers is appeared to be a concern for the institutions located in disaster affected areas. 'Disaster Risk Allowance' could be given to the teachers to encourage them regular attendance in the schools.

Recommendation 13 (repair activities should follow impact cycles): It was observed that disaster induced sufferings return every 2-5 years interval in the educational institutions. Therefore, repair activities, review of contingency planning and disaster preparedness activities should be aligned to this recurrent timeframe.

Recommendation 14 (create Disaster Education Directorate, DED): Institutions in different disaster affected areas face multiple challenges (sometimes in cumulative forms when one issue is added to the other), therefore construction of building structures should be appropriate for that region, their requirement for financial allocations (to repair disaster damages) is much higher compared to institutions located in other places. An agency to be named 'Disaster Education Directorate' could be established at Ministry of Education so that it can regularly assess/ monitor the challenges and provide suggestions about required activities so that education is not impaired as result of disaster induced challenges.

Recommendation 15 (Local Government agencies for sustainable education in Haor): It was observed that students in Haor regions in both dry and wet seasons face acute difficulty in accessing to schools. Government through local government agencies should provide transportation facilities to the students in Haor regions so that students and teachers are safe in communicating to the institutions. In addition, schools could be given financial subsidies so that they can operate safe modes of transportation for students and teachers during disaster emergencies.

Recommendation 16 (morning shifts should use used more effectively in Barind Tracts): Morning shifts in schools should be more utilized so that students could go home early in hot and wet seasons (April, May and June) since thunderstorms and lightening hazards are common in afternoons in regular conditions. The institutions should plant more (shade) trees so that temperature impacts are less in classrooms conditions.

Recommendation 17 (movable structures in river bank erosion areas): Government built structures in educational institutions are generally concrete made in river bank erosion affected areas, which are sometimes devoured by the river because of its fixed state in the ground. In this areas government should build movable structures so that it can be relocated in need.

Recommendation 18 (disaster preparedness training): Disaster preparedness training of the teachers and school staffs (with special focus on fire and earthquake hazards) should be mandatory so that they can play important roles in case of such emergencies. Working First Aid Box, usable playgrounds (which may act as emergency meeting places) should also be ensured in the urban area schools.

Recommendation 19 (cumulative and residual impact conditions): Cumulative and residual impact conditions put the educational institutions in multiple challenges conditions and keep the institution in a fragile state. An assessment framework (i.e. residual impact assessment) should be developed under the 'Loss and Damage' assessment framework outlined in the UNFCCC's COP 16 (Cancun meeting) for the educational institutions so that they can identify impact conditions and assess the financial requirements. This assessment results may be used to allocate necessary funds from local funding resources and also from upcoming global Green Climate Fund (GCF) to recover those challenges and to reduce vulnerability of the institution.

Recommendation 20 (recovering learning competencies): It was appeared that the learning competencies of students drop in subjects like English, Mathematics and Social Sciences as a result of disaster impacts. Educational institutions make different measures like taking extra class to recover competency loss; Government should support these initiatives by providing necessary resources. Government agencies and other partners may develop multimedia based demonstration of lessons on these subjects so that teachers could use these resources to recover competency loss easily and quickly. Student volunteers and other community level volunteers could also be used in this regard.

Recommendation 21 (partnerships with community): Community members and local institutions could be motivated to contribute in disaster contingency funds of the institution so that small contributions can support in developing a strong funding framework for performing disaster

risks and climate change impact reduction activities. It requires a policy regarding contribution of funds, guidelines for use and for related transparency aspects.

Recommendation 22 (avert losing one week immediate after disaster): It was reported that unsafe and unusual conditions in the premises of institution and in the surrounding areas cause educational institutions delay at least one week to return to regular teaching-learning activities. This delay discourages both the teachers and students to regular attendance in the institution. The local (government) administration, authority of the institution, PTA (Parent Teachers Association) and SMC (School Management Committee) all should be aware of this fact and take prior actions and planning so that this delay is prevented and education is continued.

Recommendation 23 (Disaster Management training): Many government and NGOs took initiatives to arrange training on disaster management aspects for the teachers. But field impression suggests that the schools authorities still need training on aspects like Loss and Damage assessment, important government forms like "D Form" of DDM (Department of Disaster Management) on disaster impacts, new cyclone signal systems etc. The respondents also urged for training on topics/areas like pre disaster preparedness, during disaster actions, continue education if disaster prolongs (e.g. water logging), handling traumatic situation, loss and damage assessment, introduce with government disaster management processes, institutional coordination, training on First Aid, contingency resources management. A regular refreshers course is also necessary in regards to these trainings.

Recommendation 24 (introduce Disaster Skills Training, DST): Survey suggests that drowning related deaths and injuries of children become more common in disaster affected areas especially in wet seasons when rivers, canals, ponds remain full of waters. In this regard it could be recommended that different small but important skills training components (e.g. swimming training, First Aid Training, DRR on education to practice at home to prevent damage of education materials, safety and precautions in commuting to schools etc.) could be brought together and make a comprehensive training package for the students, may be termed as 'Disaster Skills Training, DST'. A DST Guideline and other necessary provisions should also be developed for this purpose.

Recommendation 25 (Schools Disaster Management Plan, SDMP): Educational institutions should have School Disaster Management Plans (SDMP) so that they can assess their risks, residual impacts (the earlier impacts that they did not able to recover), know about their capacities and gaps and operational strategies and corresponding activities to address impact conditions. A guideline in this regard should be developed and necessary training should be provided to the institutions so that every school can do the exercise and has their own SDMP and supply to relevant parties when necessary. This SDMP should be properly aligned with national (NPDM[16], NAPA[17], BCCSAP[18]) and international policies (HFA 2005-2015[19], Sendai Framework for DRR 2015-2030[20]) and instruments (e.g INEE[21] guidelines).

[16] http://www.kmp.dmic.org.bd/handle/123456789/14
[17] http://unfccc.int/resource/docs/napa/ban01.pdf
[18] http://www.sdnbd.org/moef.pdf
[19] http://www.unisdr.org/we/coordinate/hfa
[20] http://www.preventionweb.net/files/resolutions/N1514318.pdf
[21] http://toolkit.ineesite.org/toolkit/INEEcms/uploads/1012/INEE_GuideBook_EN_2012%20LoRes.pdf

7.3 Final remarks

It is indicated before that total 1800 educational institutions located in different geographical regions were covered in this CCESD pilot study. These geographical areas have many disasters in common and at the same time many disasters that are only featured in that location for their respective location, physical and hazard environment/conditions they belong to. Therefore impact conditions in the educational institutions are different and may require different types of area specific actions to improve the conditions. These differential actions aiming to achieve identical goal (i.e. disaster resilient education system) could be designed/developed only then when detail level data and information is available in hand. This study, in that contexts, contributed the producing disaster-education data and information covering twelve different disaster affected areas such as central coast (Char Fasson, Bhola), south-eastern coast (Maheshkhali and Pekua, Coxs Bazar), river adjoining areas (Chauhali, Sirajgonj), river island (Char Rajibpur, Kurigram), areas close to rivers (Madarganj and Melandaha, Jamalpur), deep floodplain areas (Keshabpur, Jessore), southwestern coastal regions (Shyamnagar, Satkhira), Haor regions (Mithamain and Itna, Kishoregonj) and Barind Tract (Nachole, Nawabgonj). These regions experience hazards like cyclone, floods, river and sea erosion, flash floods, heavy rainfalls associated with floods and landslides, Tsunami, high temperature with burning terrain, waterlogging, unusual/abnormal high tides, salinity intrusion, drought conditions, cold bites, earthquake, fire hazards etc. This UNESCO supported CCESD pilot study contributes in developing a national baseline scenario regarding disaster and climate change impacts on education sector for the first time in Bangladesh. The information may help education planners and disaster and climate change professionals to act in line with national and international policy directives towards developing a strong and disaster and climate change impact resilient education system in Bangladesh. And finally it can be expected that resilient education system will support actions of the government and other sectors to attain many related national level goals like MDG, SDG.