

Situation Analysis/Risk Assessment Government Schools in Hazard-prone Areas and Safer Schools & Reviewing Building Code of Pakistan

Districts
Thatta and Badin, the province of Sindh
& Rajanpur, Layyah and Muzaffargarh, the province of Punjab

Dec 2012

Assessment By
Muhammad Memon
Development and Humanitarian Specialist

Contents

Acknowledgment	4
Glossary and Abbreviations	5
Executive Summary.....	6
Chapter 1 Background and Introduction	8
1.1 Disasters on Increase: A Global Perspective	8
1.2 Pakistan and Disasters	8
1.3 Rationale of Risk Assessment.....	9
Chapter 2 Synopsis of Assessment	10
2.1 Objectives and Scope	10
2.2 Geographic Coverage.....	10
2.3 Tools and Techniques.....	11
2.4 Sample and Sampling.....	13
2.5 Data Sources	14
2.6 Audience	14
2.7 Timeline.....	15
Chapter 3 Government Primary School Buildings: Feasibility, Design, Approval and Construction	16
3.1 Introduction	16
3.2 Feasibility Assessment	16
3.2 Development of PC-I	16
3.3 Approval of PC-I and Determination of Rates for Procurement.....	17
3.4 Tendering, Contracting and Construction.....	17
3.5 Recommendations	18
Chapter 4 Risk Assessment of Hazard Prone Government Schools	19
4.1 Hazard Analysis (Government School Buildings Perspective)	19
4.2 Potential Hazards	19
4.3 Vulnerabilities (Government Schools)	22
4.4 General Picture of Individual Districts	24
4.5 Recommendation.....	26
Chapter 5 Safer Schools: Camps during Emergencies	28
5.1 Introduction	28

5.2 Safer Schools in the target districts (Basic Facts).....	29
5.3 Current Condition of School Buildings	30
5.4 How Government Schools Serve as IDP Camps?	31
5.5 Challenges faced by IDPs	32
5.6 Technical Recommendations	36
Chapter 6 Building Code for Hazard Prone Areas.....	41
6.1 Brief Synopsis	41
6.2 The International Building Code	41
6.3 The National Building Code of India.....	42
6.4 Building Code of Pakistan.....	42
6.5 Issues and Recommendation	44
6.6 Recommendations for Building Construction.....	44
6.6.1 Stakeholder Consultation and Coordination	44
6.6.2 Site Selection.....	45
6.6.3 Building Design.....	45
6.6.4 Construction Technicalities and Quality	46
6.6.5 Essential Facilities	46
6.6.6 Cross-cutting Considerations	46
Chapter 7 Inter-departmental Coordination	48
7.1 Introduction	48
7.2 Inter-departmental Coordination	48
7.3 Recommendations	49
Annexure.....	50
Annex-A PCs Defined	50
References	52

Acknowledgment

The consultant is grateful to the IC management for their cooperation to provide important information and share some of the important sources of secondary data that contributed to generate quality product. He is also thankful to the heads of all the IC member organizations and Oxfam Novib focal person for their support and cooperation during the assessment. The IC member field teams that supported the consultant and his teams in the field work i.e. meetings with the communities, visit to the schools, dialogues with the government officials and provision of preliminary data of the assessment schools; their support and cooperation and logistic arrangements. Special thanks to the communities, SMCs/SCs, teachers and government officials that provided actual data and information that enabled the consultant to generate and come up with this product. Thanks to all the team members (consultant team) without whose support and input, this product may not have been generated.

ABC

Glossary and Abbreviations

<i>ADO</i>	<i>Assistant District Officer</i>	<i>MAUZA</i>	<i>Revenue Village</i>
<i>ADP</i>	Annual Development Plan	MNA	Member National Assembly
<i>AJK</i>	Azad Jamu & Kashmir	MOHW	Ministry of Housing and Works
<i>BC</i>	Before Christ	MPA	Member Provincial Assembly
<i>BIS</i>	Bureau of Indian Standards	NBC	National Building Code
<i>BOQs</i>	Bill of Quantities	NDMA	National Disaster Management Authority
<i>CED</i>	Civil Engineering Department	NESPAK	National Engineering Services Pakistan
<i>CSR</i>	Composite Schedule of Rates	NGO	Non-Government Organization
<i>DC</i>	Deputy Commissioner	O & M	Operations and Maintenance
<i>DCO</i>	District Coordination Officer	P & D	Planning and Development
<i>DCR</i>	District Census Report	PC	Provincial Commission
<i>DDMA</i>	District Disaster Management Authority	PDMA	Provincial Disaster Management Authority
<i>Deh</i>	Revenue Village	PEC	Pakistan Engineering Council
<i>DELD</i>	District Education and Literacy Department	PHE	Public Health and Engineering
<i>DRR</i>	Disaster Risk Reduction	PHVCA	Participatory Hazard Vulnerability Capacity Assessment
<i>DWSD</i>	District Works and Services Department	PKR	Pakistan Rupees
<i>EMIS</i>	Education Management Information System	PPA	Participatory Poverty Analysis/Appraisal
<i>FGD</i>	Focus Group Discuss	PPRA	Punjab Public Procurement Rules
<i>FY</i>	Fiscal Year	PRA	Participatory Rural Appraisal
<i>GGPS</i>	Government Girls' Primary School	RCC	Reinforced Cement Concrete
<i>GHG</i>	Green House Gas	SBC	Seismic Building Code
<i>GoP</i>	Government of Pakistan	SDO	Sub-divisional Officer
<i>GPS</i>	Government Primary School	SEMIS	Sindh Education Management Information System
<i>HP</i>	Hand Pump	SMC	School Management Committee/Council
<i>IBC</i>	International Building Code	SNE	Sanctioned New Expenses
<i>IC</i>	Indus Consortium	SPRA	Sindh Public Procurement Rules
<i>ICC</i>	International Code Council	TEHSIL	Second-last Administrative Tier in Pakistan
<i>IDP</i>	Internally Displaced Person/Population	TMA	Tehsil Municipal Authority
<i>KBCA</i>	Karachi Building Control Authority	UC	Union Council
<i>KDA</i>	Karachi Development Authority	UN	United Nations
<i>KIT</i>	Karachi Improvement Trust	USA	United States of America
<i>KMC</i>	Karachi Metropolitan Corporation	USD	United Nations Dollar
<i>LBOD</i>	Left Bank Outfall Drain	PC-I	Provincial Commission Proforma for New Development Schemes
<i>PC-II</i>	Provincial Commission Proforma for Renewal or Evaluation of Development Schemes	PC-III	Provincial Commission Proforma Monitoring Reports
<i>PC-IV</i>	Provincial Commission Proforma for Completion of Scheme Report	PDWP	Provincial Development Working Party

Executive Summary

Brief: The experiences of the past humanitarian emergencies suggest the government schools in safer areas (not prone to hazards and humanitarian crises) are declared and utilized as camp sites for internally displaced population (IDPs). The schools in the disaster prone areas are neither disaster resistant nor resilient. When emergency situations occur, the school buildings and schooling process in both categories are affected. The assessment entails exploring ways to make the schools disaster resistant/resilient, IDP friendly if utilized as camps and make the schooling process continue in both categories of the schools as soon as the emergency situation is over. The assessment is meant to draw benchmarks for *advocacy strategy that IC member organizations will launch*.

Objective: The overall objective of the assessment is to analyze multiple hazard risks to the government schools located in hazard prone areas along the river Indus and identify areas of improvement for the safer schools that are used as camps in the provinces of Sindh and Punjab. The assessment entails to identify structural flaws in buildings, the availability of necessary facilities as per the international standards, functioning and role of SMCs, means to protect the school building against future disasters, lacking facilities in safer schools to be utilized as camps and preparedness at the level of safer school for proper management of school as camp. There are three salient components of this report:

- i- Risk analysis of disaster prone government schools (primary focus on advocacy agenda)
- ii- Assessment of safer schools in terms of how they served during the past emergencies and what improvements need be done
- iii- Recommendations for multi-hazard building code

Besides, the process of construction and establishment of government schools, consideration of DRR aspects in school building designs and inter-departmental coordination are also in focus of the assessment.

Geographical Coverage: The areas under assessment are located in districts Thatta and Badin in Sindh and Layyah, Muzaffargarh and Rajanpur in Punjab provinces and have been and are likely to be affected by disasters as they are posed to certain hazards and fall under certain vulnerabilities. The government schools located in these areas have sustained and will sustain the impacts of disasters that not only affect the building structures but also the schooling process.

Construction/Rehabilitation of Government Schools: The procedure for the establishment and construction of schools in the provinces of Sindh and Punjab is very complicated in terms of feasibility assessments, development of PC-1, technical assessment of PC-I and where necessary development of PC-II, budget estimation, budget allocations from ADP, administrative approval, drawing and design of school building, tendering and work orders, onsite construction processes and construction inspection, PC-III and PC-IV and finally handing and taking over of the school building. There are several gaps in the process that add to the risk of disasters to the school buildings i.e. selection of site, design, compliance with the building code and DRR considerations.

Hazards and Vulnerabilities: After experiencing the flooding during 2010 and 2011, almost all the schools located in the disaster prone areas are exposed to high risk of flood. In district Thatta and Badin, the schools under assessment are not located inside the river bed, the frequency of flooding outside the river may vary if compared with the Punjab context. In Rajanpur district, the schools under the

assessment that were located in the proximity of Mithan Kot (in district Muzaffargarh the schools in pacca areas) have flood risk. In district Layyah, all the schools under the assessment were located inside the river area and are posed to high risk of flood.

The districts of Thatta and Badin are located in the province of Sindh along and share the coastal line of the Arabian Sea. The district of Thatta lies on the Indus Delta downstream Kotri Barrage (the last barrage built on the river Indus) and has been subject to riverine floods since the recorded history. It has also been affected and may be affected by cyclones, tropical storms and storm surges in future. The district of Badin has been hit by the 100-year flood in 2011 and highly devastating cyclone in 1999 that affected thousands of people. The flood of 2010 left unprecedented traces in the districts of Muzaffargarh, Layyah and Rajanpur, as well. Though the scale and intensity of the hazards in these areas have been terribly devastating, but the conspicuous vulnerability areas have also contributed to the devastation these districted witnessed in the past and may witness in future if not properly dealt with. The vulnerabilities in the target districts have been almost identical.

District Thatta: 60% of the schools located in disaster prone areas are at high, 30% at medium and 10% at low flood risk. Similarly 79% at high and 21% at low cyclone risk.

District Badin: 25% of the schools located in disaster prone areas are at high, 61% at medium and 14% at low flood risk (due to rains and breaches in LBOD). Similarly 85% at high and 15% at low cyclone risk.

Districts Muzaffargarh and Layyah: 57% of the schools located in disaster prone areas are at high, 32% at medium and 11% at low riverine flood risk.

District Rajanpur: 57% of the schools located in disaster prone areas are at high, 25% at medium and 18% at low riverine flood risk. Similarly 48% at high, 30 at medium and 22% at low flash flood risk.

Retrofitting of Safer Schools: Based on the physical inspection of the school buildings, experiences shared by the IDPs that used the school buildings as camps during emergency, the management of schools, SMCs and IS member organizations and international humanitarian requirements the retrofitting of all the safer schools is required.

Pakistan Building Code was first published in 1986 by Ministry of Housing and Works, Govt. of Pakistan. It was to be used as a reference by the engineers; however, it was not enforced as a mandatory requirement. After the 8 October 2005 earthquake, Ministry of Housing and Works Government of Pakistan decided to revise and update the Building Code. The revised version is Seismic Building Code of Pakistan 2007 (SBC-07). Within the overall scope of development of the Building Code, priority was assigned to the preparation of provisions for seismic design of buildings. It is recommended to revise the building code including multi-hazard aspects and technical requirements in it.

Inter-governmental Coordination: It was learnt during the discussions and dialogues with the officials of different government departments that each department works in isolation as far as the planning, designing and implementation phase of development schemes is concerned. Administratively the departments have well defined mandates, roles and responsibilities; and cannot exaggerate from their authorities. The Chapter 3 of this report can be referred to for better understanding of inter-departmental coordination that exists and gaps there in.

Chapter 1 Background and Introduction

1.1 Disasters on Increase: A Global Perspective

Humanitarian emergencies across the globe have been on the increase as indicated by the disasters traced a couple of decades back that have affected millions of human souls and caused destruction of property and infrastructure worth billions of dollars besides disruption of social, traditional and economic status quo. Natural and human induced disasters are now and again experienced across all four corners of the world affecting developed, developing and underdeveloped countries with varying degrees of frequency, intensity and scale. The climatologists threaten the frequency, intensity and scale of weather-related disasters will increase because of the rising atmospheric temperatures and changing climatic conditions. Earthquakes, Floods, droughts, hurricanes, typhoons, cyclones and other natural phenomena could not be regarded as disasters if no civilization were affected by these hazards.

The contemporary generations here in the 21st century may be forgiven for thinking that recent times have been the toughest due to the awe of the events we have witnessed (only in the year 2011, around 302 natural and human-induced disasters were recorded)¹. This would include the recent terrifying floods in Pakistan 2010-12 that affected more than 30 million people, hurricane Sandy and flooding 2012 in the USA that caused losses amounting USD 65 billion², the earthquake / tsunami in Japan and the damage to their nuclear power plant facility, the Haiti earthquake 2010 that left around 1 million people homeless, Oct 2005 earthquake in Pakistan and AJK that caused death of over 73,000³ human souls, Hurricane Katrina 2005 that caused losses worth USD 100 billion⁴, the Indian Ocean Tsunami 2004 that caused death of 230,000⁵ individuals in fourteen countries and tropical cyclone 1999 in Pakistan that caused inestimable losses . However, records show that 2011 was a particularly quiet year compared to the last 10 years and there are far greater horrific historical events that dwarf any perils of the 21st century. In developed countries of the world human fatalities of natural disasters tend to be much less than developing and underdeveloped countries due to their ability to react, state of preparedness and capacity for recovery. However, developed countries usually incur significant economic losses whilst developing countries do not have the resources and rely on international assistance.

1.2 Pakistan and Disasters

Pakistan is among the countries with high risk of disasters though it contributes fractionally to the GHG emission in the world (fraction of the total volume of GHG emitted per annum in the world)⁶. The history of the last couple of decades indicates there have been intermittent disasters cloaked in drought, riverine and flash floods, cyclone, earthquake, heavy rains, landslides and avalanches, sea-intrusion and water-logging and salinity. If we look back to 1990s, Pakistan experienced floods of 1992 and 1996, drought spell that began in 1999⁷ and giant sea wave (cyclone) of 1999⁸. If we look ahead of 1990s,

¹ <http://www.cdrc-phil.com/wp-content/uploads/2009/08/PDR-2011.pdf>

² <http://www.presstv.ir/usdetail/285433.html>

³ <http://www.ndma.gov.pk/Publications/EQBook.pdf>

⁴ <http://www.ncdc.noaa.gov/special-reports/katrina.html>

⁵ http://www.bbc.co.uk/science/earth/natural_disasters/tsunami

⁶ <http://archives.dawn.com/archives/41771>

⁷ <http://un.org.pk/drought/rcreport13.htm>

⁸ http://www.adrc.asia/nationframe.php?URL=../view_disaster_en.php?NationCode=&lang=en&KEY=42

Pakistan experienced floods in 2005, 2010, 2011 and 2012, devastating earthquake in 2005 and storms in 2007 and 2010. Pakistan for the last 20 years have sustained colossal losses caused due to the disasters. The frequency, intensity and scale of the disasters have been fluctuating, mostly increasing and may increase in future in wake of the changing climatic conditions.

1.3 Rationale of Risk Assessment

The experiences of the past humanitarian emergencies suggest the government schools in safer areas (not prone to hazards and humanitarian crises) are declared and utilized as camp sites for internally displaced population (IDPs). The schools in the disaster prone areas are neither disaster resistant nor resilient. When emergency situations occur, the school buildings and schooling process in both categories are affected. The assessment entails exploring ways to make the schools disaster resistant/resilient, IDP friendly if utilized as such and make the schooling process continue in both categories of the schools as soon as the emergency situation is over. The assessment is meant to draw benchmarks for advocacy strategy that IC member organizations will launch.

Chapter 2 Synopsis of Assessment

2.1 Objectives and Scope

The overall objective of the assessment is to analyse multiple hazard risks to the government schools located in hazard prone areas along the river Indus and identify areas of improvement for the safer schools that are used as camps in the provinces of Sindh and Punjab. It has been observed that during disasters the schools buildings if located in safer areas are utilized as camps and if located in hazard prone areas they are either structurally damaged and if not the schooling process after the emergency is much delayed. The assessment entails to identify structural flaws in buildings, the availability of necessary facilities as per the international standards, functioning and role of SMCs, means to protect the school building against future disasters, lacking facilities in safer schools to be utilized as camps and preparedness at the level of safer school for proper management of school as camp. The specific objectives of the assessment include:

- -Situational Analysis/Risk Assessment of proposed schools at all levels including
 - Hazard Analysis of schools
 - Vulnerabilities Analysis of schools
- Hazard Analysis will focus on Hazard Classification, Locations and Inter-Actions
- Vulnerability Analysis will look in to Economic, Physical and Social dimensions of Vulnerability as well as especial focus with gender related issues.
- Situational Analysis will also include the following
 - Understanding the structural problems / vulnerability of schools keeping in view the standard building codes
 - Assessment of Schools on Indicators of using Schools as Shelter during Disaster by using various standards

The assessment was conducted in 25 government schools located along the river Indus and were affected by disaster during the last couple of decades and are prone to future disasters and 10 government schools that were utilized as IDP camps (referred here as safer schools-section 5.1 of this report). Besides, 485 schools were taken for cursory assessment so as to depict entire district picture (each target district separately). The assessed schools and concerned communities were taken representative sample in each district, but the margin of error ($\pm 5\%$) cannot be overruled as most of the data was collected from the communities, members of the SMCs, teachers and other key stakeholders (refer to section 2.5 of this report). ***The findings of the assessment may apply to all the disaster prone areas along the river Indus in South Punjab and Deltaic districts of Sindh in terms of building code, building design and construction, hazard risks and vulnerabilities.***

2.2 Geographic Coverage

The Risk Assessment exercise was conducted in three districts of South Punjab and two districts of South Sindh. All the five districts are located along the river Indus frequently affected by floods and in case of South Sindh by Tropical Storms and Cyclones. In each district five government primary schools were selected that have been disaster affected and are prone to future hazards. Besides, two government schools in each district were assessed that are considered as safer schools utilized as IDP camps during

2010 and 2011 floods⁹. The villages where the hazard prone as well as safer schools existed were also covered during the assessment.

2.3 Tools and Techniques

The assessment was multi-aspect-faceted and technical in nature therefore the tools and techniques utilized were developed with precision considerations. The assessment was conducted utilizing the following tools and techniques:

Focus Group Discussions—FGDs: FGD is considered powerful Participatory Rural/Poverty Assessment (PR/PPA) tool for qualitative social research, needs’ assessments, evaluations and risk analysis including PHVCA. The focus of the FGDs was to understand the risks the school buildings were exposed to, how education process is disturbs when the risks materialize, what coping mechanisms are usually used to manage the risks, and what needs be done to minimize the risks. The FGDs also focused how the local people were affected during the past emergencies, whether they utilized the school buildings for temporary stay, whether schools were on their priority list for protection and rehabilitation and what role the SMCs played during the past emergencies.

In each of the target districts, five FGDs were conducted each with women and men (communities at the location of the schools). Each group consisted of 7-10 individuals. Separate FGDs were conducted with the SMC/SC members and teachers in each of the sample school. In total, 50 FGDs were conducted with the communities and 25 with the SMCs and teachers.

Table 1 FGDs

District	Tehsil	UC	Male FGDs	Female FGDs	SMC/SC FGDs	Total
Thatta	Jati	Kothi	2	2	2	6
		Jati	1	1	1	3
	Shah Bandar	Daulatpur	2	2	2	6
Badin	Tando Bagho	Dai Jarkas	3	3	3	9
	Badin	Nindo	2	2	2	6
Muzafargarh	Muzafargarh	Rangpur	2	2	2	6
		Chak Farazi	3	3	3	9
Layyah	Layyah	Shado Khan	3	3	3	9
		Kotla Haji Shah	1	1	1	3
		Lohanch Nashaib	1	1	1	3
Rajanpur	Rajanpur	Kit Mithan	3	3	3	9
		Murgai	2	2	2	6
Total			25	25	25	75

Informant and Stakeholder Interviews: Informant here implies the person with maximum information about the school, schooling process, and situation of school during the past emergencies, how the schooling process was revived once emergency situation was over and what roles different stakeholders played for reviving the schooling process. In this context, the informants were school heads and village

⁹ 2010 floods in Sindh and Punjab and 2011 floods in Sindh only

elders. In total, 40 informants were interviewed that provided pragmatic information for easy analysis of risks to the schools.

Table 2 Key Informants per District

District	Government Officials ¹⁰	Community Leaders	Local CBOs	Total
Thatta	5	6	2	13
Badin	3	4	3	10
Muzarffargarh	4	3	2	9
Layyah	5	2	1	8
Rajanpur	6	3	1	10
Total	23	18	9	50

Physical Inspection of School Buildings: For realistic and technical risk analysis, it was necessary to physically visit the school sites to understand the structural facts and identify potential risks and suggest measures for reducing the potential risks. The assessment team along with experienced civil engineers visited all 35 schools and conducted technical assessment.

For triangulation of data and understanding coordination mechanisms, the assessment teams met with the representatives/officials of key stakeholder departments including DDMA, District Finance and Planning Department, District Education Departments, Building and Works and Services Department and Public Health Engineering Department. The focus of discussions with the officials was to understand inter-departmental coordination, consultation and technical contribution to planning and designing the development schemes especially construction and rehabilitation of government school buildings. The discussions also focused inter-departmental coordination during the emergencies, pre-preparedness at schools to be utilized as camps, management of school buildings as camp and rehabilitation of school buildings after the IDPs staying in the schools leave.

Table 3 Schools for Physical Inspection

District	Tehsil	UC	# Disaster Prone Schools	Safer Schools	Total
Thatta	Jati	Kothi	2	0	2
		Jati	1	1	2
Badin	Shah Bandar	Daulatpur	2	1	3
		Tando Bagho	3	2	5
		Badin	2	0	2
Muzafargarh	Muzafargarh	Rangpur	2	1	3
		Chak Farazi	3	0	3
		Muradabad	0	1	1

¹⁰ Officials from education, building, works and services, PHE, finance and planning departments and DDMA

Layyah	Layyah	Shado Khan	3	0	3
		Kotla Haji Shah	1	0	1
		Lohanch Nashaib	1	0	1
		Layyah-3	0	1	1
		Layyah-15	0	1	1
Rajanpur	Rajanpur	Kit Mithan	3	2	5
		Murgai	2	0	2
Total			25	10	35

Literature Review: Besides collecting primary data from the communities, SMCs, management of schools and key stakeholders and physical inspection of the school sites, the consultant and his team reviewed literature related to planning and designing of school buildings, national and international building codes, SPRA and PPRA Rules, Sphere Standards, UN-Habitat Recommended Construction Guidelines, Building Energy Code of Pakistan 1990, Approaches to DRR (Concern), Guidelines for Reducing Flood Losses (UN), Manual for Development Projects (Planning Commission Pakistan), Reducing Flood Risk through Building Code Reinforcement (Oklahoma Flood Plain Managers Association), Risk Factors and Social Vulnerability (Department of Geography, Kent State University USA), Sindh Public Procurement Act 2009, PPPRA and PPPRA Rules 2009, The Role of Land Planning in Flood Management (World Meteorological Department 2007), NDMA and PDMAs reports of past emergencies, Schedule of Rates, and Planning Commission Proformas.

2.4 Sample and Sampling

Indus Consortium has identified 200 government primary schools located in disaster prone areas of districts Badin and Thatta of in Sindh and Rajanpur, Layyah and Muzaffargarh in Punjab (40 schools in each district). Besides, two safer schools in each district have also been identified that are used as IDP camps during the emergencies. The safer schools and schools in the disaster prone areas have been selected as per the following criteria:

XXXXXXXXXXXXXXXXXXXXX to be inserted by IC

For risk assessment, the IC has selected 40 schools per district of that the consultant selected 5 schools in each district that implies 25 schools in total and 10 safer schools i.e. two in each district. The assessment team visited all 40 schools in each of the districts for cursory observations and identified five disaster prone schools in each district in consultation with the concerned IC member organizations in that district. All the selected schools have been affected during the past emergencies, especially during the floods of 2010 and 2011. The 10 safer schools selected for the assessment were utilized as IDP camps during the past emergencies, especially during the floods of 2010 and 2011. The assessment teams also visited the disaster prone (485 schools) and safer schools (40 schools) in different parts of each district (extra schools not included in the sample) so that the assessment findings should depict overall district scenario (cursory observations and brief meetings with the communities available).

Table 4 Union Councils Selected for Assessment

District	Tehsil	UC	District	Tehsil	UC
Thatta	Jati	Kothi	Layyah	Layyah	Shado Khan
		Jati			Kotla Haji Shah
	Shah Bandar	Daulatpur			Lohanch Nashaib
Badin	Tando Bagho	Dai Jarkas			Layyah-3
	Badin	Nindo			Layyah-15
Muzaffargarh	Muzaffargarh	Rangpur	Rajanpur	Rajanpur	Kit Mithan
		Chak Farazi			Murgai
		Muradabad			

Note: Number of schools per UC mentioned in Table 2

Table 5 Non-sampled Schools

District	# Schools
Thatta	115
Badin	85
Muzaffargarh	95
Layyah	125
Rajanpur	65
Total	485

2.5 Data Sources

The required data for the risk assessment exercise was collect from two types of sources i.e. primary and secondary sources. The primary sources included the concerned communities, SMCs, teachers and school management, officials of various government departments and IC member organizations. The secondary sources included reports and publication of government, national and international institutions/organizations and different acts and ordinances.

2.6 Audience

The risk analysis report is primarily for developing the advocacy strategy of IC and its member organizations but could be referred to for various purposes and by various stakeholders. The probable audience of this report may include:

- Concerned Communities
- IC and its Member Organizations
- Planning and Development Departments
- Planning Commission of Pakistan
- Education Department
- Building and Works and Services Department
- PPRA and SPRA
- NDMA, PDMA and DDMA
- NGOs/INGOs with advocacy focus programs

- The individuals and Institutions with Mandate for Government Schools and DRR

2.7 Timeline

The risk assessment exercise was completed in 45 days starting on November 01, 2012. The process started with the consultation among the team members and the IC management followed by development and finalization of tools that took around two days. For the next 15 days, the teams were in the field for collection of primary data from the communities and schools followed by meetings with the key stakeholders that took five more days in the field. The rest of the time the team served for review of available literature, analysis of data, and report writing.

Chapter 3 Government Primary School Buildings: Feasibility, Design, Approval and Construction

3.1 Introduction

After the 18th Amendment of the Constitution of Pakistan, education sector has been devolved to the provinces and is now a provincial chapter in all aspects. It implies all the management and administrative responsibilities are vested with the provincial education (& literacy) department. The establishment of new schools and rehabilitation and upgrading of the schools lie with the education department and the expenses are incurred from the provincial annual budget (Annual Development Plan—ADP).

The procedure for the establishment and construction of schools in the provinces of Sindh and Punjab is very complicated in terms of feasibility assessments, development of PC-1, technical assessment of PC-I and where necessary development of PC-II, budget estimation, budget allocations from ADP, administrative approval, drawing and design of school building, tendering and work orders, onsite construction processes and construction inspection, PC-III and PC-IV and finally handing and taking over of the school building.

3.2 Feasibility Assessment

The process of school construction and establishment is initiated by the education department at tehsil level ADO/SDO. The demand for new school either comes from the communities or the elected representatives of the area (MPAs and MNAs). As per the procedures defined by the government¹¹, the education department¹² at the tehsil level forwards the demand to the district education department for consideration and further actions. The district education department authorizes the ADO/SDO for feasibility assessment. The assessment looks for the following salient aspects:

- Presence of existing school in 1.5 km meters radius (previously the range was 3 km, but after the recommendations of the World Bank the radius has been reduced to 1.5 km)¹³
- Total population within that radius
- Total school going population within that radius
- Identification of tentative village/ site for the construction of the school building

The education department receives the demands for new school throughout the year. After the presentation and approval of the new fiscal year (FY) budget and Annual Development Program (ADP) by the provincial Assembly and Cabinet, the department conducts feasibility assessments for all the demanded schools and prioritizes the number of schools that could be adjusted within the budget allocated for construction of new schools in each district of the province.

3.2 Development of PC-I¹⁴

After the feasibility assessment, the second step is development of PC-I. It is standardized document to be developed for every type of social and development schemes. The district education department

¹¹ www.pc.gov.pk/.../Manual%20for%20development%20projects.pdf

¹² The government rules do not mention any department and are generic for all the departments for construction of government buildings

¹³ www.pc.gov.pk/five%20year%20plans/7th/.../part3f000101.pdf can be referred for minimum range for compulsory primary education.

¹⁴ Planning Commission Proforma-I

develops PC-I for new schools in the district in accordance with the provision of funds in the provincial ADP for that FY. The PC-I (in terms of development sectors.....technical and financial proposal) is submitted to P & D Department through DC in case of the present commissioner(y) system in Sindh and DDO (C) and DCO in Punjab.

3.3 Approval of PC-I and Determination of Rates for Procurement

The Education Department submits a single PC-I to P & D Department that includes all PC-Is of the districts as schemes. For example, in district A 20 new schools are to be constructed, in district B 10 and in district C 30; the Education Department will incorporate all 60 schemes in a single PC-I and submit to the P & D Department for initial appraisal and approval through PDWP¹⁵. Here it is important to note that the budget for all the schools is common /same irrespective of the actual ground realities. The budget for a scheme is calculated according to the Composite Schedule of Rates (CSR) determined by Standing Rates Committee in Sindh and Market Rates (MR) by Finance department in Punjab. CSR is revised every five years and MR every six month. The rates for wages and material are common across the province (for example a new school building budget as per the CSR is PKR 1 million it will be applicable in district Thatta, Sanghar, Sukkur, Dadu and similarly Rajanpur, Layyah, Narowal, Sialkot and so on) and not compatible to the market rates. Each province has different schedules of rates. The competent authority awarding the contracts for material and works and services can revise the budget approved in PC-I or PC-II¹⁶ by a factor of 5-10% plus minus that is already built-in in the PC-1.

3.4 Tendering, Contracting and Construction

Once the PC-I or II is approved by the PDWP; it is duly signed and stamped and goes to the concerned administrative department in this case the Education and Literacy Department. The concerned department through competent authority issues Administrative Approval (AA) and sends to Works and Services Department (WSD) for initiating tendering, contracting and construction process. The AA is also sent to the district Education and Literacy Department for perusal. The land for construction of school building is usually donated by the community and the DELD are responsible to mobilize the community to donate plot. As per rule, BD/DWSD should delegate a technical person to accompany the DELD officials to technically observe the proposed plot and guide the community what type of plot is needed on technical grounds, but in practice the DELD officials as per suggestions of the community notify some plots in the village / locality of that the DWSD engineer selects and finally approves one that nearly meets the technical site selection criteria. Thenceforth, the DELD is not involved in the process till the school building is constructed and ready for handing and taking over.

The DWSD as per the Sindh Public Procurement Act 2009, Sindh Public Procurement Rules 2010 (SPRA) and Punjab Public Procurement Rules 2009 (PPRA) initiates the process. The process includes preparation of procurement plan, advertisement of tender, formation of tendering/bidding committee, receipts of bids, bid evaluation, selection of contractor, signing of agreement and issuance of work order. The rates in a bid must be in proximity of CSR/MRS it implies the contractors already know what rates they have to quote for their bid to be shortlisted and finally approved. The contractor thus selected starts construction at the suggested location and till the construction is completed sub-

¹⁵ Provincial Development Working Party

¹⁶ Revised PC-I If rejected or revision required by the PDWP

engineers from DWSD seldom visit the site as they already know within the cost agreed with the contractor, the contractor can never construct the building as per the agreed design and use agreed quality material. Once the construction work is completed, the building is handed over to the DELD (if the SNE is already approved the schooling process begins if teachers are recruited and they attend the schools and if the SNE is not approved the building remains unused till SNE is approved that sometimes takes one-three years.

3.5 Recommendations

The communities, local activists and even the education officials recommended:

- Participatory feasibility assessment should be conducted against each demanded new school
- The feasibility assessment should also focus on the genuine need for either girls or boys (sometimes the need is for GGPS but the demand is for GPS)
- The communities must be communicated whether demand accepted and recommended or not (the tangible reasons)
- The education department should launch an education campaign for the communities clarifying and detailing the criteria and government procedures for demand of new schools so that the demands should be submitted in as limited number as the education department could easily conduct the feasibility assessments for all the registered demands.
- **Technical:** The feasibility assessment must also cover the future extension aspects according to the rate of the population increase. It should also focus protection issues i.e. the children coming from surrounding villages feel safe and secure, if GGPS the female teachers feel safe and secure. It should also focus the availability of drinking water i.e. surface water, groundwater, etc. The assessment should also take in DRR aspects i.e. hazards and vulnerabilities
- PC-I should be developed by the works and services department in consultation with the education, finance and planning, planning and development and DCO/DC offices
- Building design and drawing should be the mandatory components of PC-I
- Technical assessment of the proposed building site should be conducted before the development of PC-I
- BOQs and cost estimates should be prepared before the approval of PC-I
- Before preparation of BOQs a detailed market assessment should be conducted for rates of material and works and services
- The budget for each individual school should be cost as per the market assessment and BOQs
- If single PC-1 is developed for more than one school schemes then budget and design variation margin should be considered
- Instead of developing a single PC-I incorporating schemes from different districts, separate PC-I should be for each district or if the PC-I is to be kept common then budget for each individual scheme should be calculated based on the design, material needed, rates of material and labor and net cartage.
- The CSR/MRS should frequently be revised based on the market fluctuation and soaring prices for each individual district. (Advisable is to conduct market assessment at the time of detailed cost estimation (DCE) by the building/works and services department¹⁷.

¹⁷ In Sindh rates are revised by provincial committee and in Punjab by the finance department at the province

Chapter 4 Risk Assessment of Hazard Prone Government Schools

4.1 Hazard Analysis (Government School Buildings Perspective)

A hazard is an event that is a threat to people, their homes, and their livelihoods. Hazards exist through the interactions of social and natural systems and they exist within a social, political, historical, and environmental context (Cutter 2001). Risk is the probability that an event, the hazard, will occur. A disaster is a hazard event that causes widespread losses to people or the infrastructure in a society. Mitigation is a collection of actions that can be taken to reduce impacts of hazards and reduce vulnerability in society. Vulnerability to hazards is a measure of the potential for loss and is a complex interaction among risk, mitigation, and the social fabric of a place. Social fabric includes community experience with hazards and the ability to respond to, cope with, recover from, and adapt to the hazard (Cutter et al. 2003).

Disaster risk is the combination of hazards and vulnerabilities that result in destruction in terms of life, infrastructure, livelihoods, communication and social fabric. Education that holds significance role for the overall development of society and nation-building is also severely affected during the disasters and nominal significance is given to the restoration of and disaster risk reduction measures for schools for future disasters. This risk assessment report is an attempt to analyze the risks associated with the government school buildings located in the disaster prone areas and how those risks can be minimized by taking recommended measures.

The areas under assessment have been and are likely to be affected by disasters as they are posed to certain hazards and fall under certain vulnerabilities. The government schools located in these areas have sustained and will sustain the impacts of disasters that not only affect the building structures but also the schooling process. During the risk assessment exercise, the following hazards and vulnerabilities were identified (shared by the communities, SMCs, field observations and literature review):

“The flood caused by heavy to very heavy down pour, breaches in the LBOD and water coming from the upper districts destroyed almost everything in our area. I have been teaching in this school for more than ten years and have not seen such devastation. Our school was under four ft water for three months. All that period the schooling process was disturbed. Due to the flood water standing for long period, the floor, walls and foundation of the building have severely been damaged”, said Mr. Khalid Hussain, Naib teacher at GBPS Jeand Khan Chhlagari UC Nindo, Deh Sialki, Tehsil and District Badin

4.2 Potential Hazards¹⁸

District	Hazard	Frequency	Impact Level	Potential Impact on Government School Buildings and Schooling Process
Thatta	Riverine Flood	(1973, 1976, 1993, 2010) ¹⁹ and (1940, 1942, 1946, 1956, 1973-74-76-78,	M to S ²¹	The floods of 1973 and 2010 were super floods in scale and potential. The government school buildings in the sample villages were submerged for two-four months and structures terribly damaged (visible cracks in roof and walls, boundary walls collapsed, sanitation facilities damaged and now defunct). The education process in

¹⁸ Analysis basis is information collected from the concerned communities, meetings with the stakeholders and secondary literature referred (references cites as footnotes and given at the end of this report)

¹⁹ Shared by Communities

		1988, 1992-3-4-5-99, 2003, 2006-7) ²⁰		those schools remained suspended for the period till flood water either receded or dried up. The floods of 1976 and 1993 were medium in scale and low in potential impact. In most ²² of the sample villages the school buildings were constructed with mud (Odkki Structures ²³) and local thatched material; therefore they could not withstand the flood water and collapsed. The new buildings were constructed using fired bricks and cement but the technical structural considerations were not taken care of. During the flood of 2010, the boundary walls of the buildings have severally been damaged, the floor inside the classrooms have settled due to saturation of soil (at the time of construction no proper soil compression was done) and the foundations of the walls have been eroded. The schooling process remained suspended for the period the buildings were marooned.
	Cyclone	(1999, 2007, 2010) ²⁴ and (²⁵ 1964, 1993, 1999, 2003-4, 2007, 2010)	L to H	The cycle of 1999 was worst of its kind in the known history of the area. It caused huge devastation in Badin and Jati tehsils of districts Badin and Thatta, respectively. The cyclones of 2007 and 2010 were tropical storms in nature and did not cause alarming situation. In 1999, where cyclone affected other infrastructure the school buildings were also affected i.e. partially damaged and the schooling process remained suspended for over four months.
	Heavy Rains with Thunderstorm	Regular Phenomenon	L to M	The impact of rains on school buildings has not been significant but when it rains after the month of August (summer vacation ends and the schools reopen) the schools are not accessible. In most of disaster prone areas the school building are not connected by link roads or pavements. When it rains, the soil gets marshy and dangerous to walk on. Thus the schooling process remains suspended till the soil dries up.
	Water-logging ²⁶			Water-logging can be found in the area but till not affected the school buildings. If it continues and expands in scale the school buildings will not withstand and collapse due to capillary action. The underground water aquifer has changed (become brackish in quality)
	Earthquake	2005, 2011	Mild	According to Building Code of Pakistan 2007, this area comes in Zone A2 where the risk of devastating quakes is

²¹ M to S: Medium to Super Level

²⁰ Disaster Contingency Plan 2011 District Thatta

²² The number cannot be quantified as community members were not 100% sure and were responding in dubious way

²³ Structure made with layers of mud and were common in the rural areas of Sindh a couple of decades back

²⁴ Shared by Communities

²⁵ Disaster Contingency Plan 2011 District Thatta

²⁶ MANAGEMENT PLAN FOR RIVERINE FORESTS by ZULFIQAR ALI MEMON Sub-Divisional Forest Officer Thatta

				minimum. The mild jolts of 2005 and 2011 did not cause any structural damages to the school buildings.
	Sea Intrusion	1990s onward	H	It has been a perpetual issue since late 1990s. The schools under the assessment have been affected in terms of changing quality of underground aquifer and may damage the school buildings if the erosion of landmass continues due to the sea intrusion.
	RBOD		H	Still in the process of construction and may cause similar destruction as caused by LBOD
Badin ²⁷²⁸	LBOD ²⁹	1980s onward	H	Degrading land and causing water-logging and salinity. Due to the capillary action of water the foundations and walls of the school buildings are being eroded. LBOD has caused several floods due to over-flowing because no de-silting activities are carried out or due to breaches in its embankments. One cause of the massive flooding in 2011 was over-flowing and breaches in its embankments. As the result, along with other infrastructure the school buildings were also affected and the schooling process remained suspended for over three-four months. Due to seepage of chemically contaminated water that flows past LBOD the underground aquifer has change and water is not fit for drinking as the result the schools where source of drinking water is either hand pump or bore hole face huge challenge to manage for safe water.
	Cyclone	1964, 1999, 2007, 2010	H	Badin being the coastal district is prone to cyclones and have received of one the world's deadliest cyclone in 1999 but the areas under the assessment were not affected and less prone to the cyclone impact.
	Heavy Rains with Thunderstorm	Regular Phenomenon	L to H	Before 2011, the impact of rains on school buildings has not been significant but when it rains after the month of August (summer vacation ends and the schools reopen) the schools are not accessible. In most of disaster prone areas the school building are not connected by link roads or pavements. When it rains, the soil gets marshy and dangerous to walk on. Thus the schooling process remains suspended till the soil dries up. The rains during the monsoon season of 2011 the people witnessed unprecedented downpour in the history of the area that caused huge flood added up by the breaches in LBOD. Every building in the area was marooned for 3-4 months. The school buildings were also inundated and severely damaged and the schooling process remained suspended.
	Sea Intrusion	1990s	H	It has been a perpetual issue since late 1990s. The schools

²⁷ Sindh Provincial Flood/Monsoon Contingency Plan 2012

²⁸ District Disaster Risk Management Plan Badin 200708

²⁹ LHDP Monsoon Contingency Plan Badin 2009

		onward		under the assessment have been affected in terms of changing quality of underground aquifer and may damage the school buildings if the erosion of landmass continues due to the sea intrusion.
Muzaffargarh	Riverine Flood	1973, 1976, 1993, 1996 & 2010 (super flood)	L to H	The government school buildings in the sample villages were submerged for two-four months and structures terribly damaged (water and sanitation facilities badly affected). The education process in those schools remained suspended for the period till flood water either receded or dried up.
	Heavy Rains with Thunderstorms	Regular Phenomenon	L	The accessibility to the schools is disturbed, rainwater gathers inside the school premises and the schooling process remains suspended for certain period
Layyah	Riverine Flood	Regular Phenomenon, super flood in 2010	L to H	The government school buildings in the sample villages were submerged for two-four months and structures terribly damaged (water and sanitation facilities badly affected). The education process in those schools remained suspended for the period till flood water either receded or dried up.
	Heavy Rains with Thunderstorms	Regular Phenomenon	L	The accessibility to the schools is disturbed, rainwater gathers inside the school premises and the schooling process remains suspended for certain period
Rajanpur	Riverine Flood	Regular Phenomenon, super flood in 2010	L to H	The government school buildings in the sample villages were submerged for two-four months and structures terribly damaged (water and sanitation facilities badly affected). The education process in those schools remained suspended for the period till flood water either receded or dried up.
	Heavy Rains with Thunderstorms	Regular Phenomenon	L	The accessibility to the schools is disturbed, rainwater gathers inside the school premises and the schooling process remains suspended for certain period

Footnote³⁰

4.3 Vulnerabilities (Government Schools)

The above hazard analysis matrix indicates three varying scenarios respective to the geographical locations. The districts of Thatta and Badin are located in the province of Sindh along with and share the coastal line of the Arabian Sea. The district of Thatta lies on the Indus Delta downstream Kotri Barrage (the last barrage built on the river Indus) and has been subject to riverine floods since the unrecorded history. It has also been affected and may be affected by cyclones, tropical storms and storm surges in future. The district Badin has been hit by the 100-year flood in 2011 and highly devastating cyclone in 1999 that affected thousands of people. The flood of 2010 left unprecedented traces in the districts of Muzaffargarh, Layyah and Rajanpur, as well. Though the scale and intensity of the hazards in these areas have been terribly devastating, but the conspicuous vulnerability areas have also contributed to the

³⁰ Pre-monsoon Cabinet Meeting June 2011 can be referred for more clarity on South Punjab Risk Assessment at pdma.punjab.gov.pk/pdf/ACS_Forecast_ScenariosV3.pdf

devastation these districts witnessed in the past and may witness in future if not properly dealt with. The vulnerabilities in the target districts have been almost identical. The matrix given below depicts the vulnerabilities that contributed and may contribute to the future disasters, especially in the context of the government schools and the schooling process there in.

Vulnerabilities (Government Schools)

Hazard	Vulnerability		
	Physical	Social	Economic
Riverine Flood	<ul style="list-style-type: none"> - The school buildings are located inside the river-bed (kacha area) in Rajanpur, Layyah and Muzaffargarh districts and near to the river in Thatta district (schools in district Badin are not much vulnerable to the riverine flood) - The construction of the buildings does not meet DRR requirements (to some extent flood resilient but not resistant) - The construction material is not of good quality, therefore the parts of the building exposed to flood water readily erode - In Thatta and Badin districts, the buildings are constructed in land-depressions - The boundary walls are not strong enough to resist flood water - Water and sanitation facilities are constructed in land-depressions and with no easy access from the main building structure 	<ul style="list-style-type: none"> - Common for all districts and hazards - Communities are not well organized with common vision and mission - Social and political influence: Schools are approved and constructed as per the will of the elected representatives, the need assessment does not exist, teachers' recruitments are political preferences and in case of the target schools Thatta and Badin districts in 80% of the schools teachers are absentee³¹ - The communities have almost no say in 	<ul style="list-style-type: none"> - Common for all districts and hazards - Poor communities that hardly can contribute to the retrofitting of the buildings to gain minimum resilience - Poor communities that keep family subsistence as their first priority during normal days as well as emergencies - Limited financial resources allocated the government for construction of school buildings - Child labor: The parents give tertiary preference to schools
Flash Flood (only in district Rajanpur)	<ul style="list-style-type: none"> - The schools located on the natural pathway of hill torrents in district Rajanpur only (Suleiman Ranges) - The construction of the buildings does not meet DRR requirements (to some extent flood resilient but not resistant) - The construction material is not of good quality, therefore the parts of the building exposed to flood water readily erode - The boundary walls are not strong enough to resist flood water - Water and sanitation facilities are constructed in land-depressions and with no easy access from the main building structure 		
Earthquake	<ul style="list-style-type: none"> - All the target schools lie on A-2 seismic zone - The buildings are not constructed as per the 		

³¹ Out of ten schools visited, the communities of eight villages (where schools were located) the teachers were absentee. The team observed the schools were closed through it was official school time

	requirements of A-2 seismic zone	SMCs led by the village heads or landlords - The SMCs function only for funds to be utilized (SMC funds) and play no other role
Cyclone (only in districts Badin and Thatta)	- Proximity of the buildings to the Arabian Sea Coast (for Thatta and Badin districts only) - The building structures are not cyclone resilient	
Heavy Rains	- In case of heavy rains as of 2010 and 2011, the same vulnerabilities as of riverine floods for districts Badin and Thatta	
LBOD Sea Intrusion Water-logging (only in districts Badin and Thatta)	- Location of buildings - The building structures do not have capillary action resistant characteristics - In case of flooding due to overflowing of or breaches in the LBOD, the same vulnerabilities as of the riverine flood	

4.4 General Picture of Individual Districts

The tables above show picture of specific schools in each district as they were assessed in detail. The overall picture of government schools in all the five districts is not much different. The assessment teams visited different parts of the target districts to have cursory picture of risks associated with the government school buildings. In total they visited 485 government schools in all the five target districts. Literature review (past disasters), meetings with key informants, sharing by the communities and field observations (both sampled and non-sampled schools) for the entire districts are summarized below.

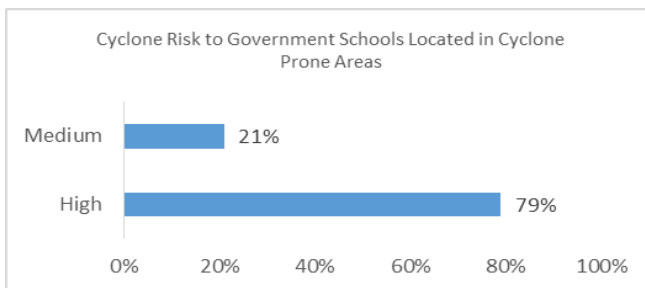
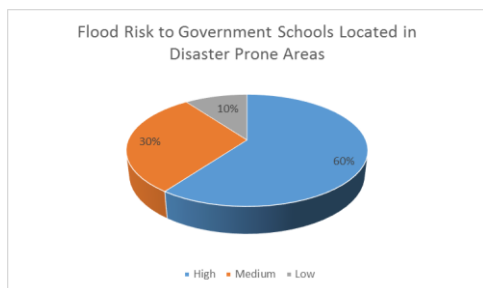
Table 6 Non-sampled Schools

District	# Schools
Thatta	115
Badin	85
Muzaffargarh	95
Layyah	125
Rajanpur	65
Total	485

District Thatta

District Thatta is prone to two major hazards (riverine flood and cyclone) that have caused and can again cause humanitarian emergencies of huge scale of devastation. If such emergency situation occurs the government schools will be affected along with human souls, other infrastructure, livelihoods etc. All the schools located inside the river Indus are at high risk of being flooded, those located outside the river but near to the river are exposed to medium risk and those far away from the river are exposed to low risk of being flooded. The flood of 2010 was 100-year flood that affected the government schools located far away from the river similar as inside the river therefore the risk can be high for all the schools that cannot withstand floods, but considering the frequency risk can be calculated low for those schools. Similarly the government schools located along and near the coastalline are exposed to high risk and those distantly located at low low risk.

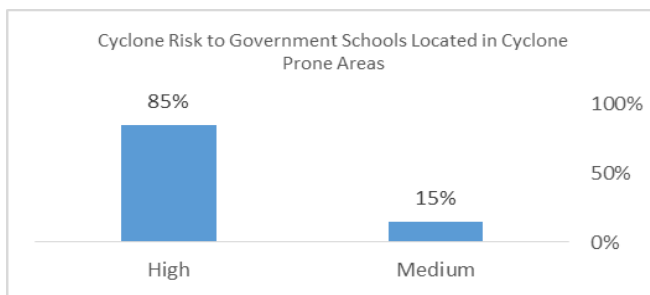
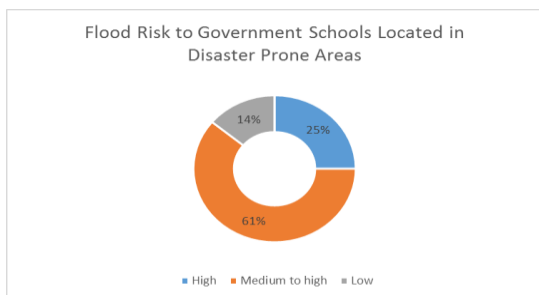
“Our organization conducted survey in tehsils Jati and Sujawal and found most of the school under water for more than two months and I can recall the schooling process had been disturbed for more than six months until the flood water (flood 2010) receded and the soil dried up”, *said Mr. Zafar Iqbal Soomro head Bahr-al-Sindh Foundation Jati district Thatta.*



District Badin

District Badin is also exposed to two major hazards (cyclone and flood generated due to breaches in LBOD). Like Thatta, the government schools in Badin will also be affected if hazards get converted into disaster. Based on visits to around 85 government schools in the disaster prone areas of district Badin, the risk is analyzed as depicted in the graphs below:

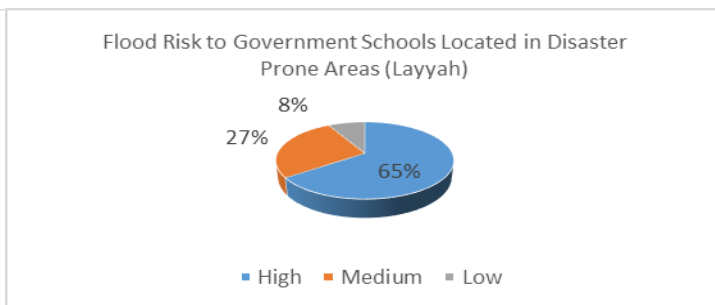
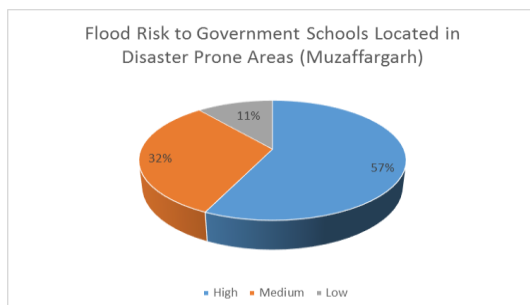
“I have never seen such flooding in my whole life. In 2011 it was like dooms day (qayamat-e-sughra), look around there was nothing but water. Almost all the schools in adjacent villages were under water”, **said the headmaster of GBPS Chaudhri Din Muhammad, UC Dai Jarqas tehsil Tando Bagho, district Badin**



Districts Muzaffargarh and Layyah

Districts Muzaffargarh and Layyah are exposed to one major hazard (riverine flood) that have affected and may affected in future the government schools located in the disaster prone areas and are vulnerable (non-flood resistant structures). The below given graphs

“The flood 2010 was unprecedented in the history that caused millions of people to displace. It was first time that our school was utilized as camp and flood affected people came from far flung areas. Our school was safe but most of the schools in the flood affected areas were inundated for month and the schooling process disturbed”, **said Mr. Ghulam Abbas incharge camp Government Model School Layyah.**

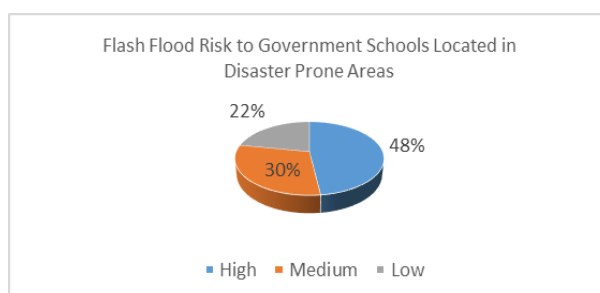
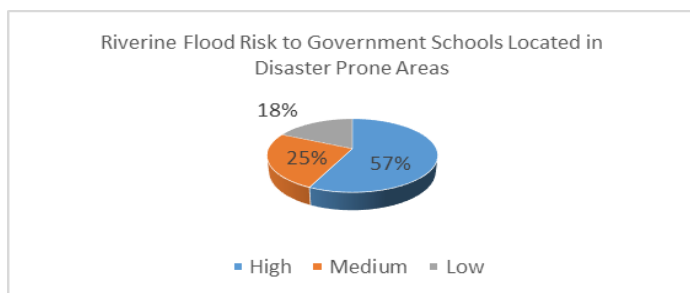


depict the general picture of government schools based on the visits to 95 and 125 disaster prone areas in Muzaffargarh and Layyah, respectively.

District Rajanpur

District Rajanpur is prone to two major hazards (riverine and flash floods) that have affected and may affect the government schools located in the disaster prone areas. Rajanpur is located along the river Indus and at the foot of the Suleiman Ranges (hill torrents). Thus, the district has been experiencing low, low to medium and medium to high level floods. In 2010, it experienced super flood ever took place in the recorded history. The brief

When asked, the DDMA Rajanpur coordinator said, "Off course the flood 2010 and 2011 the government schools in this district, damaging the buildings and disturbing the schooling process".



assessment of 65 schools located in the disaster prone areas of district Rajanpur shows the overall risk picture as depicted by the following graphs.

4.5 Recommendation

The risk of hazards and existing vulnerabilities for the schools in disaster prone areas of all the target districts are almost identical; therefore the following recommendations may be applicable to increase the resilience of the school buildings so that the schooling process should immediately recommence once emergency conditions end.

- All the buildings need retrofitting: Raising ground level with earth-filling, raising the main gate one ft above the last flood level, overlapping of boundary walls with earth-filling and stone-pitching, overlapping of building foundations with RCC block and manage proper drainage mechanism so that rainwater collected inside the school premises is easily drained out. The logic of retrofitting is to reduce direct exposure of vulnerable parts of the building to water and soil moisture (capillary action). If the boundary wall is reinforced with earth-filling and stone pitching and main gate raised at least 1 ft above the last flood, the flood and/or rain water will not enter the premises; and if proper drainage mechanism is arranged and maintained water collected inside the premises (whether rain or cyclone) will be drained out. Thus the structure will receive maximum resilience.
- In case of Sindh, all the target schools need renovation such as reconstruction of settled floor, plastering of walls, foundation and ceiling and topping of roof (roofs seep during rains) and white washing.
- Water and Sanitation facilities in all the target schools need be re-installed and reconstructed. The logic is i) the facilities are located at vulnerable sites where accessibility during rains/flood is risky, ii) the latrine structures and pits are technically not constructed, iii) the hand pumps and/or bore holes are closer to latrine pits (less than 10 m distance), and iv) when the building ground is raised through earth-filling the water and sanitation facilities will technically need be raised and that is re-installed and reconstructed.
- Most of the school buildings are not connected with the link roads or houses in a village by metalloid or brick path, therefore during floods (low level) and rains it is risky to access the

building; therefore it is advisable to construct raised brick paths from the road or houses to the school building.

- In case of Sindh, the underground aquifer at the school locations is not fit for drinking though used for drinking. It is advisable to install hand pumps with lead technology or arrange alternate ways.
- The regular presence of teachers should be ensured in the target schools in Sindh.
- The SMCs should be reconstituted, trained in school management skills and DRR and DRM and sensitized to play their actual role as the very spirit of SMC philosophy says.
- The education department should develop a mechanism to monitor the school buildings during emergencies (like irrigation department monitors river bands during flood season).
- Each school should have school improvement plan that should include DRR aspects of school and schooling delegating responsibilities to different departments as per their mandate and capacity
- In each disaster prone school, proper arrangements should be made to protect the record of the school even if huge emergencies occur.
- If proper operation and maintenance of the school building and facilities is not ensured, the idea of disaster resilience for the target schools may remain an idea.

Chapter 5 Safer Schools: Camps during Emergencies

5.1 Introduction

The school buildings in Pakistan are usually utilized for several purposes other than the education process and that includes temporary camps among others. Whenever an emergency takes place and people need be displaced the first option the government for the displaced people have for temporary settlement is public buildings (especially government schools).³² The schools that are utilized as IDP camps during the emergencies are termed as Safer Schools.³³

Safer School: The school building located in an area either not or slightly exposed to Hazards (either natural and/or human-induced) where the populace affected by the disasters can be accommodated as IDPs for the period till the emergency ends and the IDPs feel it safer to move back to the places of their origin.

In each of the target district, two government schools (that were utilized as IDP camps during the floods 2010 and 2011) were selected for assessment. The overall objective to assess those schools was to understand do school buildings meet the requirements of an IDP camp and how far the buildings and facilities there in could be improved to meet an IDP camp requirements (Sphere Standards) and suggest recommendation for the concerned government departments for identified improvements. The specific objectives of the assessment of safer schools included:

- To technically inspect the school buildings for safety and security, accessibility and overall condition of the buildings
- To measure the total area utilized for camp purpose, how many persons can be accommodated and actually how many persons were accommodated last time when utilized as camp
- To assess the availability of essential facilities such as water, sanitation, drainage, lighting, and heating and how far the essential facilities sufficed the needs of the IDPs and will meet if the building is again utilized as camp
- To understand the challenges the IDPs faced last time when they stayed in the buildings
- To understand how the building as camp was managed and what relief activities were carried out
- To identify key areas of improvement in terms of availability of essential facilities, camp management, women and children specific issues, safety and protection and preparedness
- To recommend retrofitting measures for the school buildings

³² The private schools can be the safest places with maximum facilities and protection

³³ Definition of Safer School by Indus Consortium (IC) Pakistan

5.2 Safer Schools in the target districts (Basic Facts)

Sr. No	Code Assigned for this assessment	Name of School	SEMIS Old	Semis New	Deh/Mauza	UC	Tehsil	District	Establishment	New Building Construction	Enrolment	Used as Camp	IDPs that used the building as camp
1	A	Chaudhry Din Muhammad	6038	401040196	Jaarkas	Dai Jaarkas	Tando Bhago	Badin	1956	1997	110	During 2011 flood	16 families
2	B	GGPS Baloch Chak	6505	401040113	Dhubni	Dai Jaarkas	Tando Bhago	Badin	N/A	2011	236	During 2011 flood	20 families
3	C	GBPS Muhammad Raheem Rajo	68055	404020295	Haji Ali Muhammad Samejo	Jati-1	Jati	Thatta	1999	1995	36	yes	10 families
4	D	Pir Agedino Shah	78148	404070039	Pir Agedino Shah	Daulatpur	Shahbandar	Thatta	1989	1989	25	yes	8 families
5	E	GHS Langar Sarai	N/A	32330020	Muzaffargarh	Rangpur	Muzaffargarh	Muzaffargarh	1844	N/A	319	During 2010 Flood	N/A
6	F	GHS Rangpur	N/A	32330022	Rangpur	Muradabad	Muzaffargarh	Muzaffargarh	1880	N/A	480	Yes	10 families
7	G	GGPS-3 Kot Mithan	N/A	32420337	Kot Kithan	Kot Kithan	Rajanpur	Rajanpur	1963	2000	105	Yes	20
8	H	GGPS-6 Kot Mithan	N/A	32420328	Kot Kithan	Kot Kithan	Rajanpur	Rajanpur	1978	1995	133	Yes	15
9	I	GMS ³⁴ Layyah	N/A	32230016	N/A	UC-3 Layyah	Layyah	Layyah	1896	N/A	1373	Yes	159 families
10	J	GHS Karor	N/A	32220003	N/A	UC-15 Layyah	Layyah	Layyah	1889	N/A	1315	Yes	20 families

³⁴ Government Model School

5.3 Current Condition of School Buildings

School Code	Rooms	Condition of Rooms	Availability of Latrines	Availability of water for multi-purposes	Availability of Cooking facility	Electricity	Gas	Ground	Boundary Wall ³⁵
A	7	Not recommended to use and needs critical repair	02 Defunct pour flush latrines	01 HP, groundwater brackish	Nil	Yes	In village	Yes	Yes
B	5	Good	02 pour flush latrines in usable condition	Nil	Nil	Yes	Nil	Yes	Yes
C	2	Needs repair	01 Defunct pour flush latrine	Nil	Nil	Yes, solar	Nil	Yes	No
D	2	Needs Renovation	01 Defunct pour flush latrine	Nil	Nil	Nil	Nil	No	Nil
E	15	Good	4 latrines in workable condition	01 each HP and motor in working condition	Nil	Yes	Nil	Yes	Yes
F	30	Good	12 pour flush latrines in usable condition	05 each HPs and electric router in working condition	Nil	Yes	Nil	Yes	Yes
G	4	Good	02 pour flush latrines in usable condition	01 each HP and electric router in working condition	Nil	Yes	Nil	Yes	Yes
H	4	Good	02 pour flush latrines in usable condition	01 shallow HP in working condition	Nil	Yes	Nil	Yes	Yes
I	30	Good	20 pour flush latrines in usable condition	02 HPs and 05 electric routers in working condition	Nil	Yes	Yes	Yes	Yes
J	22	Needs Renovation	14 pour flush latrines in usable condition	4 HPs and 5 electric routers in working condition	Nil	Yes	Yes	Yes	Yes

³⁵ Boundary wall condition detailed in section 5.6 of this report

5.4 How Government Schools Serve as IDP Camps?

It was learnt during the risk assessment exercises in the target districts that when an emergency situation takes place and the government (either provincial or district) declares the affected districts as emergency hit and when there is possibility of displacement of the people in those areas the DC/DCO office instructs the education and literacy department at district level to notify the safer schools (schools in the areas not probably be affected by the disaster in question) as camps. The education and literacy department at district level instructs the supervisors and the supervisors instruct back the school heads to open the school premises for the disaster affected families to stay for certain period till the emergency situation is over (the government declares the emergency situation is over and all the public buildings must be vacated of the IDPs and where required forcibly). It was learnt that the schools had no preparedness in advance and the management of schools and SMCs/SCs did not have sufficient capacity for camp management. There was no contingency/camp management plan in place. The school administration opened certain portions of the building for IDPs to settle along with their belongings and livestock/cattle and other than that took no responsibility to register and manage the IDPs, efforts for relief provision and cleaning and maintenance of essential facilities (the exception was safer schools in Layyah and Muzaffargarh where the school administration designated focal persons to keep care of the IDPs in terms of registration and coordination with the DDMA for needs of the IDPs).

Before a school building is declared as camp, almost no efforts are undertaken to repair and make water and sanitation facilities in running condition. The succeeding section of this chapter further indicates how the safer schools serve IDPs.

Recommendation

- The government schools to possibly be utilized as IDP camps should be mentioned in the DDMA disaster/flood contingency plans (these are mentioned in District Flood Fighting Plans in Punjab) and while preparing the contingency plans the management/administration of those schools must be consulted so that the preparatory needs and resources needed during the emergency should be identified (it would be best to analyze the flood fighting plan or DDMPs of the selected districts to make recommendations more powerful)
- Each safer school should have camp management plan with clear roles and responsibilities of the concerned stakeholders including the school management/administration, resources required and contingency efforts to be taken. It should also mention the total space available and number of persons that could be accommodated (the plan should be endorsed by the DC/DCO and all the concerned stakeholders)

Mr. Sajjad Ahmed Assistant camp incharge GMS

Layyah said, "The important thing is the IDPs that camp to this school did not know how to use latrines, that is why most of the latrines got choked. During their stay, they broke the locks of the storerooms and used the furniture as fuel. The lights and fans remains switched on 24 hours a day as the result out of 120 fans 24 short circuited. They had brought livestock with them that grazed most of the plants, flowers and trees. During the first week, some NGOs provided food of good quality but afterwards the food provided by DCO was substandard. TMA Layyah arrange water tanks but not sufficient for the needs of the IDPs".

SMCs/SCs:

SMCs/SCs do exist in all the selected schools but their function is limited to the utilization of their funds from the provincial government. It was learnt that they were mostly led by village influential person and the other members did not know they were members except for the teachers. The role of SMCs/SCs needs be ensured as per the philosophy and purpose of their establishment.

- The contingency and camp management plans should be implemented in true spirit. The previous experience indicate no proper compliance with the plans that resulted to adding the sufferings of the disaster affected families
- The essential facilities such as water for multiple purposes, sanitation, heating and cooling and lighting must be made functional in advance and should suffice the needs of the IDPs to be accommodated
- The camp should meet not only the human requirements, but also the livestock/cattle that the IDPs bring with them

5.5 Challenges faced by IDPs

School Code	A
Space	In total 16 families (100 individuals) stayed for three months along with their livestock. The school building is located in depression, therefore the entire ground inside the school premises was inundated and not utilized by the IDPs. Out of seven rooms, only three rooms were vacated by the school administration for IDPs' stay. The total space of three rooms was not enough to accommodate 100 individuals. The total covered area of the building is 251 sq meter that implies 72 individuals can be accommodated in the building if total covered area is utilized. The area of the school combining covered and uncovered is around 1 acre, but as the ground due to shallowness was flooded that space could not be utilized. If the technical recommendation given at the end of this chapter are followed, 500 families can easily be accommodated with essential facilities.
Water	One shallow hand pump with 30 ft bore depth was installed with 300 ft lead-pipe (the HP machine is installed 300 ft away from the bore and water is pumped out to the machine through lead-pipe). Lead-pipe technique is used because the underground water inside the school is not fit for drinking. The borehole is near an irrigation water channel and seepage water to be pumped out through HP is available. During the flood 2011, the HP was also under water and could not be utilized by the IDPs and used the flood water for all their needs
Sanitation	Two pour flush latrines were available but inundated and were not used by the IDPs. The latrines are still in defunct position, thus no latrines for school children and teachers. The IDP women and children had to sit into the flood water for urination and defecation whereas the IDP men had to find some place outside the school for this purpose.
Food	For the first few days, the villagers (whose houses were not flooded) provided cooked food, later on some NGOs provided cooked food and food ration. The food provided was not as per the Sphere Standards.
NFIs	The IDPs did not receive any type of NFIs from the government or NGOs; while displacing from their villages they had managed to save and bring clothes, bedding items and utensils that they used till the water receded from their villages and they moved back.
Protection	No protection related issues were reported
Health	No health services were available
Cooking	The IDPs had brought cooking utensils with them but the fuel arrangements were not there, therefore they utilized the broken furniture and in some cases the safe furniture as fuel.
Registration	There was no IDP registration
Privacy	The families staying in the school were from different villages and felt privacy issues

School Code B	
Space	The school building has 5 rooms that were utilized as camp for 20 IDP families. The total area of the rooms is 223 sq meter that can accommodate around 10 families (Sphere Standards). It implies the space for 20 families was not enough. Ground inside the school premises was under 1 ft flood water, therefore it could not be utilized.
Water	No water facility is available in the school. The IDP families would fetch water from the adjacent villages that were not flooded and where hand pumps were available.
Sanitation	two pour flush latrines were available but locked by the school administration fearing the IDPs may damage the newly constructed structures; therefore the IDP women and children used backside of the rooms for sanitation purpose and the IDP men had to find dry land outside the school building
Food	The IDPs stayed in the school for one month and all that time the villagers provided them cooked food
NFIs	No provision of any kind of NFIs provided
Protection	No protection related issues were reported
Health	No health services were available
Cooking	The IDPs need not cook food as they were provided cooked food by the villagers
Registration	The school administration kept the record of the IDP families on their own, but no registration arrangements were there by the designated revenue department
Privacy	The IDP families coming from different villages were allocated separate rooms, therefore no critical privacy issue was reported

School Code C	
Space	The school building consists of two rooms where 10 IDP families stayed for over two weeks and later on moved to some other safer place as there were no facilities available in the school. The total area of the rooms is 53 sq meters and can accommodate only 15 individuals (Sphere Standards).
Water	No water facility and how the IDPs managed water was not known
Sanitation	No sanitation facilities (one latrines but defunct and under flood water) and the IDPs relied on open defecation
Food	Occasional cooked food provision by the government and NGOs but not regular and sufficient therefore the IDPs did not stay there longer and moved to other safer place
NFIs	Not reported
Protection	The school building has no boundary wall, therefore the IDPs may have felt unsafe
Health	No health services were available
Cooking	No cooking facilities available
Registration	There was no IDP registration
Privacy	The families staying in the school were from different villages and may have felt privacy issues but not reported

School Code D	
---------------	--

Space	The school building consists of two rooms where 8 IDP families stayed for over one week and later on moved to some other safer place as there were no facilities available in the school. The total area of the rooms is 53 sq meters and can accommodate only 15 individuals (Sphere Standards).
Water	No water facility and how the IDPs managed water was not known
Sanitation	No sanitation facilities (one latrines but defunct and under flood water) and the IDPs relied on open defecation
Food	Occasional cooked food provision by the government and NGOs but not regular and sufficient therefore the IDPs did not stay there longer and moved to other safer place
NFIs	Not reported
Protection	The school building has no boundary wall, therefore the IDPs may have felt unsafe
Health	No health services were available
Cooking	No cooking facilities available
Registration	There was no IDP registration
Privacy	The communities adjacent to the school reported they did not know who the IDP families were

School Code	E
Space	The school building consists of 15 rooms with total 475 sq m covered area and can accommodate 135 individuals. The school was declared as camp by the district administration but no IDPs stayed there because the boundary wall (no-load bearing structure) could not withstand the horizontal pressure of flood water and collapsed. As the result the entire building was under 3 ft flood water.
The IDPs left the school building for other safer place (the details of the challenges faced by the IDPs were not known)	

School Code	F
Space	The total covered area of the school is 1,120 sq m sufficient for 320 individuals as camp (Sphere Standards). It consists of 10 rooms, 4 laboratory halls, one library hall and three store rooms. There is large quantity of furniture and other essential items in the school therefore all the space cannot be utilized for IDP stay. During the flood 2010, 10 IDP families stayed for around 3 months and the space available for them was sufficient
Water	Sufficient arrangements for water are available (underground borehole and HPs, therefore the IDPs did not face any challenge regarding water for multi-purpose needs
Sanitation	12 latrines in working condition are available, therefore the IDP families (women, children and men) did not face problems for defecation and bathing
Food	The IDP families brought stored food ration with them, cooked food for first two weeks was provided by the villagers, government and NGOs and later on NGOs also provided food ration
NFIs	NGOs provided kitchen sets and hygiene kits sufficient for the needs of the IDP families
Protection	The school building has boundary wall and government security guard is available 24 hours therefore the IDP families did not face any protection issues
Health	No health services were available
Cooking	There are no kitchen arrangements in the school, therefore the IDP families used broken furniture and wood of trees inside the school building as fuel arrangements
Registration	The school administration kept the record of the IDP families on their own, but no registration arrangements were there by the designated revenue department
Privacy	There was sufficient space to accommodate 10 families ensuring privacy

School Code	G
Space	The school building consists of 4 rooms with 223 sq m covered area sufficient for 64 individuals' stay. During the flood 2010, 100 individuals stayed for two months and then forced to evacuate school building and shifted to the tent city in Rajanpur town
Water	One each shallow hand pump and electric router in working position. The IDPs did not face problems regarding water for multi-purpose needs
Sanitation	Two latrines in working position available
Food	Cooked food by government and NGOs for two months, later on shifted to tent-city
NFIs	NGOs provided kitchen sets and hygiene kits sufficient for the needs of the IDP families
Protection	The school building has boundary wall and government security guard is available 24 hours therefore the IDP families did not face any protection issues
Health	No health services were available
Cooking	No kitchen arrangements and the families need not cook food as sufficient food was provided either by government or NGOS
Registration	The IDP families were registered by the revenue department
Privacy	Privacy was as issue as people belonged to different communities and space was not enough for privacy arrangements

School Code	H
Space	The school building consists of 4 rooms with 175 sq m covered area sufficient for 50 individuals' stay. During the flood 2010, 100 individuals stayed for two months and then forced to evacuate school building and shifted to the tent city in Rajanpur town
Water	One shallow hand pump in working position. The IDPs did not face problems regarding water for multi-purpose needs
Sanitation	Two latrines in working position available
Food	Cooked food by government and NGOs for two months, later on shifted to tent-city
NFIs	NGOs provided kitchen sets and hygiene kits sufficient for the needs of the IDP families
Protection	The school building has boundary wall and government security guard is available 24 hours therefore the IDP families did not face any protection issues
Health	No health services were available
Cooking	No kitchen arrangements and the families need not cook food as sufficient food was provided either by government or NGOS
Registration	The IDP families were registered by the revenue department
Privacy	Privacy was as issue as people belonged to different communities and space was not enough for privacy arrangements

School Code	I
Space	The building consisted of 30 rooms, 4 laboratory halls and 10 offices with 2,670 sq m sufficient for 110 families to be accommodated as per Sphere Standards. During the flood 2010, 159 IDP families stayed in the school. The covered area was not sufficient, there some families erected temporary sheds in the ground and stayed there.
Water	2 hand pumps and 5 electric routes and one water tank arranged and managed by TMA available sufficient for 159 families

Sanitation	20 latrines not in good condition but working position available sufficient for emergency arrangements for 159 families
Food	For first two weeks NGOs provided food and for the rest of four weeks the DCO office arranged cooked food. The food was somehow sufficient for 20 families
NFIs	NGOs provided kitchen sets and hygiene kits sufficient for the needs of the IDP families
Protection	The school building has boundary wall and government security guard is available 24 hours therefore the IDP families did not face any protection issues
Health	No health services were available
Cooking	No kitchen arrangements and the families need not cook food as sufficient food was provided either by government or NGOs
Registration	The IDP families were registered by the revenue department
Privacy	There was sufficient space (covered and uncovered) to accommodate 159 families ensuring privacy

School Code	J
Space	The school building consists of 22 rooms with 3,700 sq m covered area sufficient for 150 families to accommodate. During the flood 2010, only 20 IDP families stayed in the school and space was sufficient as per Sphere Standards even more IDP families could be accommodated but the school administration did not allow use of the entire building as camp
Water	4 HPs and 5 electric routers in working position available (more than sufficient for 20 families)
Sanitation	14 latrines in working position (more than sufficient for 20 families)
Food	For first two weeks NGOs provided food and for the rest of four weeks the DCO office arranged cooked food. The food was somehow sufficient for 20 families
NFIs	NGOs provided kitchen sets and hygiene kits sufficient for the needs of the IDP families
Protection	The school building has boundary wall and government security guard is available 24 hours therefore the IDP families did not face any protection issues
Health	No health services were available
Cooking	No kitchen arrangements and the families need not cook food as sufficient food was provided either by government or NGOS
Registration	The IDP families were registered by the revenue department
Privacy	There was sufficient space to accommodate 20 families ensuring privacy

5.6 Technical Recommendations

Based on the physical inspection of the school buildings, experiences shared by the IDPs that used the school buildings as camps during emergency, the management of schools, SMCs and IS member organizations and international humanitarian requirements the retrofitting of all the safer schools is required. The technical retrofitting requirements per school are detailed below.

School Code	Recommendation(s)
A	<ul style="list-style-type: none"> - Reinforcement of boundary walls through overlapping RCC wall with 2 ft foundation, 3 ft high and 1.5 ft width on both sides - Earth-filling inside the open area up to the street road level and raising of main gate up to 3 ft from street

	<p>road to resist rain and flood water flowing inside the school (compression with precision till 99.9% of soil saturation dries up)</p> <ul style="list-style-type: none"> - Proper drainage construction to drain out rainwater collected inside the building premises - Raise spare ground space with earth-filing and brick flooring to be utilized for temporary shelter (tents) if the number of IDPs exceeds the available covered area space - Repair of the main building structure with technical precision (cracks in walls, erosion of foundation, plinth and roof and settlement of floor) - Reinstall damaged hand pump raising the platform 4 ft higher than the street road level (if open space is also to be utilized for temporary shelter, then install more hand pumps as per Minimum Sphere Standards - The platform of the hand pump must have proper apron with proper drainage line and must be accessible from the main building structure even if the open ground is flooded up to 2.5 ft - At least four pour flush latrines (more as per Sphere Standards if space for more IDPs is arranged) of 5 x 5 x7 cft raised up to 4 ft the street road level with proper outlet and drainage - The latrine must have water availability either constructing overhead storage tank (to be filled through installing electric motor as electricity facility is available in the school) or arranging easy accessibility of latrines to the hand pumps through raised brick pavement - The latrines must be accessible from the main building structure through raised brick pavement up to 2.5 ft - Latrines must be separate for women and men and located at the sites where the women do not concern intrusion into their privacy - At least two kitchen spaces closer enough to the main building structure should be constructed (easily accessible from the main building structure, raised up to 4 ft and safe against sun, chill and rain - Brick pavement from the main gate to the main building structure must be constructed as ground will become marshy during rains and it may be risk to walk on - For all the above recommendation, Sphere and other international standards applicable to camp management must be referred to
B	<ul style="list-style-type: none"> - Earth-filing of open area up to 1.5 ft compression with precision till 99.9% saturation of soil dries down - Raise the main gate 1.5 ft and construct 2 ft raised brick pavement from the main gate to the main building structure (level raised from the outside road) - Laboratory testing of underground aquifer (underground water is brackish) whether it could be used for drinking and cooking purposes if not it may serve the washing purpose for either hand pump or electric motor or both should be installed so that the latrines be made functional - As per the local communities, underground water some 1,500 ft away from the school building is used by the people for drinking (most probably it is seepage water as irrigation water course flows past), after proper laboratory testing of water (if fit for drinking) HP through lead-pipeline technique should be installed - At least one kitchen space closer enough to the main building structure should be constructed (easily accessible from the main building structure, raised up to 3 ft and safe against sun, chill and rain (the number may increase if the uncovered area is also to be for temporary shelters to increase the camp space)
C	<ul style="list-style-type: none"> - Construction of boundary wall (300 ft in length, 1.5 ft in width and 7 ft in height) in compliance with the National and International Building Codes and also as per the recommended general building code in Chapter xx of this report - Boundary wall is non-load bearing structure and cannot hardly withstand horizontal pressure of flood water, therefore it should be constructed with technical recommendation for School A - The building is constructed at depression approx. 4 ft below the road level, after the construction of boundary wall there should be earth-filing in the ground up to the plinth level of the main building structure (compression with precision till 99.9% of soil saturation dries up)

	<ul style="list-style-type: none"> - At least two pour flush latrines with twin pit of size 5 x 5 x7 cft raised up to 2 ft road level - The latrine must have water availability / accessibility to the hand pumps through raised brick pavement - The latrines must be accessible from the main building structure through raised brick pavement up to 2.5 ft - Latrines must be separate for women and men and located at the sites where the women do not concern intrusion into their privacy - As per the local communities, underground water some 2,000 ft away from the school building is used by the people for drinking (most probably it is seepage water as irrigation water course flows past), after proper laboratory testing of water (if fit for drinking) HP through lead-pipeline technique should be installed - The school building is constructed approx. 200 ft away from the link road and during the rains and floods accessibility to it has been and will be an issue; brick pavement raised up to the road level should be constructed
D	<ul style="list-style-type: none"> - To be inserted
E	<ul style="list-style-type: none"> - The school plot is spread over approx. 6 acres with total approx. 475 sq m covered area and the rest is open ground that can be used for tent city accommodating approx. 4,000 individuals - The boundary wall collapsed during the flood 2010 and has been reconstructed but there is technical construction flaw i.e. Technically non-load bearing walls must have columns at every 10 ft distance along its length but the newly constructed wall lacks that. Retrofitting of the wall is recommended with RCC overlap up to three ft on both sides - The ground is below the outside road level and needs earth-filling to at least bring to the road level (very expensive as the ground area is nearly 5.5 acres). - At least ten flush latrines with twin pit of size 5 x 5 x7 cft raised up to 2 ft road level - The latrine must have water availability / accessibility to the hand pumps (if overhead tank is not possible) through raised brick pavement - The latrines must be accessible from the main building structure through raised brick pavement up to 2.5 ft - Latrines must be separate for women and men and located at the sites where the women do not concern intrusion into their privacy - Overhead tank with 1000 gallon capacity for drinking and other purposes or 3 raised hand pumps easily accessible from latrines and main building - Main gate / entrance of the school should be raised up to 2 ft to resist water enter the building from the outside road - If the open ground is also to be utilized for camp purpose then tents and material for temporary VIP latrines should be arranged and managed (depending on the number of people to be accommodated and as per the Sphere Standards) - As per the Sphere Standards, around 240 individuals can be accommodated inside the existing building
F	<ul style="list-style-type: none"> - The school plot is spread over approx. 6.75 acres with total approx. 1,120 sq m covered area and the rest is open ground that can be used for tent city accommodating approx. 4,200 individuals - The boundary wall should be retrofitted with RCC wall up to three ft high otherwise its foundation may be damaged due to its exposure to water (flood/rain) - The ground is below the outside road level and needs earth-filling to at least bring to the road level (very expensive as the ground area is nearly 6 acres). - At least fourteen flush latrines with twin pit of size 5 x 5 x7 cft raised up to 2 ft road level - The latrine must have water availability / accessibility to the hand pumps (if the existing overhead tank is not repaired) through raised brick pavement - The latrines must be accessible from the main building structure through raised brick pavement up to 2.5 ft - Latrines must be separate for women and men and located at the sites where the women do not concern

	<p>intrusion into their privacy</p> <ul style="list-style-type: none"> - Reinstall existing hand pumps by raising the platform up to 3 ft easily accessible from latrines and main building - Main gate / entrance of the school should be raised up to 2 ft to resist water enter the building from the outside road - If the open ground is also to be utilized for camp purpose then tents and material for temporary VIP latrines should be arranged and managed (depending on the number of people to be accommodated and as per the Sphere Standards) - As per the Sphere Standards, around 320 individuals can be accommodated inside the existing building
G	<ul style="list-style-type: none"> - The school plot is spread over approx. 1,153 sq m with total approx. 178 sq m covered area and the rest is open ground that can be used for tent city accommodating approx. 200 individuals - The boundary wall should be retrofitted with RCC wall up to three ft high otherwise its foundation may be damaged due to its exposure to water (flood/rain) - The ground is below the outside road level and needs earth-filling to at least bring to the road level. - Reinstall existing hand pump by raising the platform up to 3 ft easily accessible from latrines and main building - Main gate / entrance of the school should be raised up to 2 ft to resist water enter the building from the outside road - If the open ground is also to be utilized for camp purpose then tents and material for temporary VIP latrines should be arranged and managed (depending on the number of people to be accommodated and as per the Sphere Standards) - As per the Sphere Standards, around 320 individuals can be accommodated inside the existing building (during the flood 2010, around 100 individuals stayed in the school).
H	<ul style="list-style-type: none"> - The school plot is spread over approx. 1,590 sq m with total approx. 170 sq m covered area and the rest is open ground that can be used for tent city accommodating approx. 198 individuals - The boundary wall should be retrofitted with RCC wall up to three ft high otherwise its foundation may be damaged due to its exposure to water (flood/rain) - The ground is below the outside road level and needs earth-filling to at least bring to the road level (very expensive as the ground area is nearly 6 acres). - Reinstall existing by raising the platform up to 3 ft easily accessible from latrines and main building - Main gate / entrance of the school should be raised up to 2 ft to resist water enter the building from the outside road - If the open ground is also to be utilized for camp purpose then tents and material for temporary VIP latrines should be arranged and managed (depending on the number of people to be accommodated and as per the Sphere Standards) - As per the Sphere Standards, around 50 individuals can be accommodated inside the existing building (during the flood 2010, around 100 individuals stayed in the school)
I	<ul style="list-style-type: none"> - 2,670 sq m covered area can accommodate 110 families or 765 individuals (during flood 2010, 159 families stayed in the school (the covered area to be used for camp purpose otherwise there is huge covered area) - The existing 20 pour flush latrines need be repaired and properly operated and maintained. 20 latrines are sufficient for 110 families in case of acute emergency (5.5 families per latrine) and if not much acute emergency then at least 17 more pour flush latrines should be constructed (3 families per latrine) - The school building structures are scattered as blocks, therefore it is advisable to arrange water and sanitation points separate for each block that may help ensure protection and privacy issues are under control - The entire school building cannot be utilized as camp, lot of furniture, IT equipment, laboratory equipment

	<p>etc is there that also need space. But some of the old structures not in good position used as camp during the flood 2010 are not recommended for camp purpose in future and if necessary to be utilized they need critical repair.</p> <ul style="list-style-type: none"> - If the open ground is also to be utilized for camp purpose then tents and material for temporary VIP latrines should be arranged and managed (depending on the number of people to be accommodated and as per the Sphere Standards)
J	<ul style="list-style-type: none"> - 3,700 sq m covered area can accommodate 150 families or 1,050 individuals (the covered area to be used for camp purpose otherwise there is huge covered area) - The existing 14 pour flush latrines need be repaired and properly operated and maintained and construct 7 more latrines. 21 latrines are sufficient for 150 families in case of acute emergency (5.5 families per latrine) and if not much acute emergency then at least 36 more pour flush latrines should be constructed (3 families per latrine) - The school building structures are scattered as blocks, therefore it is advisable to arrange water and sanitation points separate for each block that may help ensure protection and privacy issues are under control - If the open ground is also to be utilized for camp purpose then tents and material for temporary VIP latrines should be arranged and managed (depending on the number of people to be accommodated and as per the Sphere Standards)

Chapter 6 Building Code for Hazard Prone Areas

6.1 Brief Synopsis

A building code is a set of rules that specifies the minimum acceptable level of safety for constructed objects such as buildings. The first building codes can be traced back to early 1800 BC. The Babylonian emperor Hammurabi enforced what was known as the Code of Hammurabi. This code was very strict and stated that, *“If a builder build a house for someone, and does not construct it properly, and the house which he built falls in and kills its owner, then that builder shall be put to death.”* Building codes have evolved over time to protect the safety of building occupants without the threat of death³⁶. It is a set of standard practice adopted by engineering community for safe design & construction of buildings that is considered as the most effective tool to safeguard the lives and property against major disasters like earthquakes, floods and cyclones.

Building Codes are in place in some of the disaster prone countries and there are others without or with fractional building code, and when there is non-compliance to the codes the buildings become vulnerable to hazards. During the last couple of decades, non-compliance with the codes has tremendously added to disaster losses because the buildings are susceptible to hazards and collapse causing huge life and economic losses.

Different international, national and regional building codes are implemented in different countries. For example in the USA a large number of building codes are complied with designed by ICC such as International Building Code, International Residential Code, International Fire Code, International Plumbing Code, International Mechanical Code, International Fuel Gas Code, International Energy Conservation Code, International Zoning Code, International Green Construction Code and so on. India, Australia, China, the United Kingdom among other countries have different building codes depending the nature, frequency, intensity and scale of hazards, geophysical characteristics (location), exposure level to hazards etc. Pakistan has building code developed in 1986 but never enforced due to various factors (revised and updated after Oct 2005 earthquake and enforced in 2007) and buildings have been constructed either without following any standard building code or following the general construction standards the engineers are taught (college and university syllabus).

6.2 The International Building Code

The International Building Code (IBC) is a model building code developed by the International Code Council (ICC) in the USA. A model building code has no legal status until it is adopted or adapted by government regulation. The IBC provides minimum standards to insure the public safety, health and welfare insofar as they are affected by building construction and to secure safety to life and property from all hazards incident to the occupancy of buildings, structures or premises.

³⁶ The International Building Code (IBC), Benjamin Trombly CMGT 564 – Term Paper August 2, 2006

6.3 The National Building Code of India

The National Building Code of India (NBC), a comprehensive building Code, is a national instrument providing guidelines for regulating the building construction activities across the country. It serves as a Model Code for adoption by all agencies involved in building construction works be they Public Works Departments, other government construction departments, local bodies or private construction agencies. The Code mainly contains administrative regulations, development control rules and general building requirements; fire safety requirements; stipulations regarding materials, structural design and construction (including safety); and building and plumbing services. The Code was first published in 1970 at the instance of Planning Commission and then revised in 1983. Thereafter three major amendments were issued, two in 1987 and the third in 1997. Considering a series of further developments in the field of building construction including the lessons learnt in the aftermath of number of natural calamities like devastating earthquakes and super cyclones witnessed by the country, a Project for comprehensive revision of NBC was taken up under the aegis of National Building Code Sectional Committee, CED 46 of BIS and its 18 expert Panels; involving as many as 400 experts. As a culmination of the Project, the revised NBC has now been brought out as National Building Code of India 2005 (NBC 2005)³⁷. ***The salient features of the revised NBC include the changes especially in regard to further enhancing the response to meet the challenges posed by natural calamities and reflecting the state-of-the-art and contemporary applicable international practices.***

6.4 Building Code of Pakistan

Pakistan Building Code was first published in 1986 by Ministry of Housing and Works, Govt. of Pakistan. It was to be used as a reference by the engineers; however, it was not enforced as a mandatory requirement. After the 8 October 2005 earthquake, Ministry of Housing and Works Government of Pakistan decided to revise and update the Building Code. Within the overall scope of development of the Building Code, priority was assigned to the preparation of provisions for seismic design of buildings. Seismic Building Code of Pakistan 2007 (SBC-07) has therefore been developed by carrying out the following tasks:

Task – I: Seismic hazard analysis

Task – II: Formulation of design criteria and requirements for seismic design of buildings

Seismic hazard analysis was based on exhaustive collection of data and information about the history and sources of earthquakes in and around the country. The analysis of this data resulted in a rationalized seismic hazard map for the country. The chapters on various aspects of seismic design have been compiled with the following objectives:

- i- All the commonly used types of building construction in Pakistan should be covered.
- ii- The requirements should be based on international codes and standards that are currently being used in an informal way by many structural engineers in the country.
- iii- The code should be cognizant of, and oriented towards emerging trends and practices in the developed countries. It should provide a basis from which revisions and modifications, in the coming years can turn it into a truly Pakistan – specific, yet state-of-the-art code.
- iv- To the extent possible, the document should be self-contained, requiring minimum dependence on other references.

³⁷ National Building Code of India 2005 (NBC 2005)

The underlying philosophy of any seismic building code is to prevent complete collapse of buildings during major earthquakes. Structural damage is prevented during small earthquakes, while it is considered acceptable during large earthquakes. A balance between safety and economy thus forms the basis of the code. SBC-07 specifies minimum requirements for seismic safety of buildings. It has to be applied and used by engineers, in conjunction with the fundamental understanding of the concepts of structural, geotechnical and earthquake engineering. The ultimate responsibility for the safety and economy of the building design lies with the designer. Countrywide implementation of SBC-07 will go a long way in reducing the seismic risk in Pakistan³⁸.

The Ministry of Housing & Works (MOHW) Government of Pakistan (GoP) assigned the task of developing the Seismic Provisions to the National Engineering Services Pakistan (Pvt.) Limited (NESPAK). NESPAK submitted various drafts for scrutiny to an Experts Committee formed by the MOHW. NESPAK worked in close collaboration with International Code Council (ICC), USA. The final draft was sent to the Pakistan Engineering Council (PEC) for vetting. PEC formed a "Core Group" of individuals drawn from across the country, representing various stakeholders. It was this Core Group that held intimate deliberations with experts from NESPAK and gave final shape to the document.

According to the section 1.2.4 of SBC-07, ***"Requirements to be applied to structures which are outside the scope of these provisions, shall be specifically determined by the Departments/Autonomous Organizations supervising the construction and such structures shall be designed to those provisions until their specifications are prepared by the Competent Authority"***. It clearly implies that building code addresses

³⁸ Seismic Building Code of Pakistan 2007 (SBC-07)

ESTABLISHMENT OF SINDH BUILDING CONTROL AUTHORITY

In pre-independence days, the Municipal Corporation had the sole responsibility of regulating the building activity in municipal limits of Karachi. The Bombay Town Planning Act 1915 and Cantonment Board Act 1924 provided legal basis for exercising building control functions.

The Karachi Development Authority was established in 1957 under the Presidential Order No.5. One of the main functions of the Authority was to undertake town expansion schemes and to accord approval to building plans in its housing schemes. In 1961, building regulations for various schemes were formulated which were finally enforced.

The functions of Building Control were repeatedly shifted to and from KDA & KMC, in different periods as given below:

- In 1950, Karachi Improvement Trust was created, to approve "Housing Schemes" and to formulate "Town expansion schemes".
- In 1957, KDA was established through the merger of KIT, Karachi Joint Water Board, and Rehabilitation Department of the Government of Pakistan, Architect Control Department of KMC was added to oversee the building activity in the entire city.
- In 1962, the Architect Control Department for the Municipal Areas was transferred to KMC.
- In 1974, Building Control for some of the KDA Schemes such as North Nazimabad, scheme-2, and F.B. Area was handed over to KMC.
- In 1979, Karachi Building Control Authority was created under Sindh Building Control Ordinance 1979 and both KDA and KMC areas were brought under the jurisdiction of KBCA.

the earthquake related aspects of buildings with no focus multiple hazards. ***(In Pakistan there is no building code specific for construction of school buildings)***

6.5 Issues and Recommendation

- No general building code has been developed and enforced in Pakistan as the SBC-07 is specific for earthquake resilience aspects of buildings and does not provide standards for other natural and human-induced hazards. The SBC-07 should be revised and updated for all the potential hazards Pakistan is prone to. It should also include construction standards for the non-hazard-prone areas of Pakistan
- While developing building code, the DRR specialists should be part of the technical working group assigned for the development of building code
- The officials of government departments met during the assessment have no idea that SBC-07 has been developed and enforced in Pakistan. If the codes, guidelines, policies and regulations are not appropriately shared with those responsible for implementation, it is a question mark that they will ever be implemented. As soon as the building code of Pakistan is revised and updated, it should immediately be disseminated to all concerned that have mandate for designing and construction of government buildings and also made public through various media means
- In Sindh Building Control Authority exists (previously Karachi Building Control Authority limited to regulate construction of buildings in Karachi only) and all five divisions come under its jurisdiction; but its operations are limited to the cities. It should have mandate for cities, towns and rural areas (dehs and villages) especially the hazard prone areas. Each district should have building control authority so that construction of not only public but also private buildings should be regulated as per the building code
- In Punjab there is no existence of building control authority that may make it challenging to regulate building constructions and compliance with the building code (City Development authorities do exist). The setup recommended for Sindh is also recommended for Punjab.

6.6 Recommendations for Building Construction

The recommendations for building construction are meant to and should be considered for designing technical building code for multiple hazards and have been drafted for the hazard-prone areas taken for this assessment and indicate to minimum standards required to be complied with while planning, designing and constructing government school buildings (may be applicable to other buildings and building structures).

6.6.1 Stakeholder Consultation and Coordination

- Before proposing/intending to plan establishment and construction of a government school building, the key stakeholders such as the end-beneficiary communities, education, works and services, building, PHE, revenue and finance and planning departments (where required building control authorities), TMAs, DDMA, elected representatives and local civil society organizations should be consulted for suitability and need of the building and possible responsibilities each key stakeholder will have to undertake
- At district level there should be established building control authorities or any of the district based department with technical expertise should be assigned the mandate. All the departments/bodies with building, roads, PHE and other infrastructure construction

mandate/authority should seek approval from building control authorities or the department mandated with before initiating the construction work and the P & D departments at provincial level should process PCs accordingly.

- PCs should explicitly mention the role and responsibility of different stakeholders (government departments concerned) for R & D and O & M and duly be notified once the scheme is approved. The concerned government departments should be bound to budget R & D and O & M expenses for the government school schemes.

6.6.2 Site Selection

- Selection of site for construction of a school building should be based on:
 - Baseline assessment for availability of government school within 1.5 km radius and the number of school going age children (currently not attending any school)
 - Soil testing and technical recommendations
 - Geological and hydrological surveys
 - Land depression and elevation assessment
 - Temperature, humidity, wind current and direction assessment
 - Hazard and vulnerability assessments
 - Accessibility to the site (building if constructed) especially during emergencies
 - Availability of and accessibility to safe drinking water
 - Proximity to mountains/hills, river and river distributaries, delta and coast and outfall drain like LBOD
 - Availability of and accessibility to basic civic facilities such as electricity, natural gas, basic medication
 - Land entitlement in case the land/plot to be donated by community (as usual case)

6.6.3 Building Design

- The design should be prepared after detailed technical feasibility (including potential for enrolment for at least 10 years so that the space required for accommodating the children could be determined)
- It should take in all engineering aspects i.e. civil, public health, architecture, mechanical and electrical
- DRR specialist(s) should be part of the designing team
- It should take in the hazard and vulnerability aspects like earthquake, riverine and flash floods, cyclone, rains, and water-logging (capillary action)
- It should take in seasonal and weather aspects like summer and winter temperature variations, wind flows and directions, humidity etc
- The selected areas are flood-prone, therefore the design of school buildings should take in all factors for 50-100 year flood i.e. the flood event may exceed the defined flood event, the flood water velocities, the depth of submersion of building or a portion, flood level, foundation material due to excessive scour, mudslide and landslip and debris impact loading, hydrostatic and hydrodynamic actions, wave actions from wind
- The differences between flood characteristics, flood loads and flood effects in riverine and coastal areas in terms of wave effects, depth, duration, direction of flow and debris should be considered while preparing design
- Specific building code should be worked out for fire hazard and the code be considered while preparing the design

- For cyclone-prone areas like Thatta and Badin, the design must take in cyclone resistance factors especially storm surge and wind loading considerations
- The design should take in non-structural issues that are mainly concerned with the protection of utilities such as electrical, plumbing, and heating, ventilation, and other mechanical services
- The design should comply with SBC-07 (all the selected district fall in A-2 seismic zone) and Building Energy Code of Pakistan 1990
- The design should be prepared before costing exercise and the budget should be as per the requirement of design and costing in BOQs (the budget may vary place to place even though the design is common)
- The design should include the material to be utilized with clear technical specifications for all the hazards the building will be prone to

6.6.4 Construction Technicalities and Quality

- The building code for multiple hazard prone areas should include different construction technicalities (for example for school building in Layyah may have four construction approaches flood-resistant (dammed), raised floor/footing structure, flood resilient and combination of raised floor and flood resilient)
- For selection of contractors and awarding contracts of school buildings, the selection criteria it should include technical expertise of the contractor and his/her skilled labor for construction of building as per the specific building code and design
- The masons and other technical personnel engaged for construction should be extensively trained in the building code and building design
- The building code should include minimum quality indicators for site selection, designing, material and construction process, and drinking water sources and water quality
- The construction in the selected districts should ensure safety factor-2 of building construction
- The building code should include retrofitting standards as recommended in chapter # of this report

6.6.5 Essential Facilities

- The school buildings should have essential facilities such as safe drinking water, sanitation, cooking spaces, lighting and gas (where possible) and plumbing
- The essential facilities should suffice the needs of the children and teachers keeping in view the population growth for at least 10 years (during both the normal as well as emergencies)
- The essential facilities should comply with the site selection, design and quality aspects as recommended for the main building structure
- The essential facilities should meet Sphere Standards especially during the emergencies

6.6.6 Cross-cutting Considerations

- **Protection and Gender:** The site selection and design should take in protection (safety and security) aspects especially for girl students and female teachers. The site should be selected such that the students and teachers feel safe inside the building and on the way to the school. The building should have boundary wall strong enough to withhold the impact of identified potential hazards. The latrines should be constructed such that the girls and female teachers should feel no privacy issues. The building location, design and construction should meet the requirements of people with especial needs (if the school building is to be utilized as IDP camp)

- **Environment:** The building construction process should not meddle with the environment and after the completion of the construction work, minimum tree plantation and other options should be explored that enrich the natural environment inside and surrounding the school premises.
- **No-harm Approach:** The site selection, design and construction process should not cause harm for the adjacent communities (for example it should not be constructed in the natural way of flood or rain water as the building will resist it that may cause flooding in the surrounding area).
- **Climate Change:** The site selection, designing and construction should take in climate change aspects as due to the climate change the frequency, intensity and scale of weather-based disasters may fluctuate.
- **Capacity Building:** The personnel of all the concerned government departments should be imparted extensive trainings on building code(s) so that the school buildings constructed in future and those to be retrofitted should be either disaster resistant and/or resilient. The government contractors, masons and other technical labor and communities should also be trained on minimum standards of site selection, designing and construction.
- **Monitoring:** A comprehensive monitoring mechanism and indicators should be developed to ensure the building code(s) are strictly complied with while site selection, designing, budgeting, material selection, construction and DRR aspects.

Chapter 7 Inter-departmental Coordination

7.1 Introduction

It was learnt during the discussions and dialogues with the officials of different government departments that each department works in isolation as far as the planning, designing and implementation phase of development schemes is concerned. Administratively the departments have well defined mandates, roles and responsibilities; and cannot exaggerate from their authorities. The Chapter 3 of this report can be referred to for better understanding of inter-departmental coordination that exists and gaps there in.

7.2 Inter-departmental Coordination

DDMA: DDMA in all the subject districts do exist and are functional couple of months before the monsoon and during the monsoon and emergencies if any. The composition of DDMA as per the Presidential Ordinance 2006 and guidelines of NDMA in these districts is a question mark. A single person recruited as PDMA representative (to assist the DDMA for coordination) and deployed at DC/DCO office is declared as DDMA coordination focal point and ADC-II/DDO-C represents the district administration during the coordination and cluster meetings, sets response and recovery priorities and finalizes geographical coverage for relief and recovery in different sectors. DDMA or to be more closer the DC/DCO office has and gets funds from the provincial and federal governments as relief fund to be utilized to relieve the sufferings of the disaster affected people. The fund is utilized by the DC/DCO office and its subordinate offices such as DDO/SDM/AC and Mukhtiarkar/Tehsildar of revenue department but not channelized to education, health, PHE and other departments for carrying out relevant relief activities as per their mandates.

Education Department—ED: The education department at the district level does not have special resources to be utilized during the emergencies other than the human resource and that is a rare case story. The key role this department plays is to, receiving instructions from the DC/DCO office, and notify to the administration of certain schools to be utilized as relief/IDP camps. In case of Punjab and especially in district Layyah, the administration of schools utilized as camps designated focal points for camp management, coordination and liaising with the DDMA and clusters' whereas in other areas especially in Sindh (Badin and Thatta districts) there were no designated focal points for this purpose. The administration of safer schools shared after the IDPs vacated the schools once the emergency situation ended no official of the department visited the schools and never responded to the requests for rehabilitation of classrooms, water and sanitation facilities and other damages that happened during the camp period. The focal points of ED did participate in and chair the education cluster meetings, facilitated UNICEF, Plan International, IC member organizations and other I/NGOs, that had funds for education sector (mostly for temporary schools), in terms of prioritization and selection of schools/sites for the implementation of their projects. It was learnt during the risk assessment that the ED in all the subject districts did not undertake any preparedness and pre-planning efforts for both safer and hazard prone schools. All the schools sampled for this assessment affected either during the floods 2010 and/or 2011 and are at risk for future disasters, but the ED has not initiated the process to rehabilitate the damages and planned any measures to reduce the risks of future disasters.

PHED: During emergencies, PHED is focal department for WASH cluster (not regular in Thatta and Badin districts where mostly WASH focal organizations chair the meetings) limited to host and chair meetings

in all the subject districts. In case of safer and disaster affected schools, no role/efforts of the department was reported.

TMA: The TMAs in all the subject districts have had fractional engagement for relief activities and are limited to the cities and towns. They usually do not participate in coordination and cluster meetings.

Finance and Planning Department—FPD: The FPD is engaged during the preparation of contingency plans for budgeting, only.

7.3 Recommendations

- The concept and philosophy of interdepartmental coordination should be made clear through interdepartmental meetings that it does not mean only meetings but more than that
- Each district should have interdepartmental coordination strategy and mechanism in place to be followed during emergencies and while designing school buildings
- During the emergencies, TMA and PHED should be responsible for WASH related interventions in the school camps (provision of water for multiple purposes, sanitation facilities and management of the same, cleaning and other related activities in compliance with the Sphere Standards)
- In cluster meetings the stakeholders related to the specific cluster participate. It would be advisable that focal points from all the clusters participate in all cluster meetings; as that may help improve interdepartmental coordination and response

Annexure

Annex-A PCs Defined³⁹

PC-I, II, III, IV & V Proformae

1.49 In Pakistan, the present method for planning, processing and reporting on development projects is based on the "Rules of Procedure for Economic Council", Planning Commission and Planning Sub-Commissions, issued by the former Ministry of Economic Affairs, Government of Pakistan in September, 1952. In addition to laying down an effective organization for planning, five (5) proformae (Revised in 1995) were prescribed for preparation and implementation of development schemes (Annexure-II). Two of these deal with submission of project proposals (PC-I and PC-II), one is concerned with the progress of ongoing projects (PCIII) and two, ie PC-IV and PC-V are to be filled in after completion of a project. All of these have been discussed in the ensuing paras.

PC-I Proforma

1.50 PC-I is the basic form on which all projects/schemes are required to be drawn up. It was introduced in its simple form in 1952 and substantially revised in July, 1961. This was a composite form and was used for all sectors. But as the time passed on, bigger and complex projects had to be prepared which required quite detailed information for pre-investment appraisal. PC-I form, therefore, was continuously made more elaborate and 12 separate forms suitable for particular sectors were introduced in July, 1974. In 1995, a Task Force headed by Deputy Chairman, Planning Commission was set-up to review the project planning process from identification to approval as well as PC-I and II proformae to improve project quality. The Task Force reviewed existing 12 PC-Is and observed that formats of existing PC-Is are though quite comprehensive but still require some improvements. Accordingly, the Task Force agreed that existing PC-Is should continue with some modifications/improvements to cover environmental aspect, social sector benefits, risk analysis and incorporation of detailed financial statements. As many as 14 forms, in all, were designed for various sectors. The guide-lines devised by the Task Force for filling in PC-Is and II proformae are at Annexure-III. These guide-lines should be strictly followed while preparing PC-Is/II projects.

1.51 The PC-I form comprises four parts. Part 'A' is the "Project Digest", containing eight questions which are more or less common to all sectoral PC-Is forms. These require mainly information on: (i) name of project, (ii) authorities responsible for sponsoring and executing of the project, (iii) completion period, (iv) a summary of cost in detail and (v) objectives of the project. Part 'B' entitled "Project Description and Financing", forms the core of the PC-I. The precise nature and form of the questions varies from sector to sector. The principal information asked for includes: (i) location, (ii) market analysis, (iii) general description and justification, (iv) operating or recurrent cost estimates, (v) technical description, (vi) capital cost estimates, (vii) unit costs, sectoral benefits, cash flow, financing arrangements, foreign exchange component, risk analysis, beneficiaries participation etc. Part 'C' deals with "Project Requirements". The information sought in this part includes: (i) manpower requirements during implementation, (ii) physical and other facilities required and (iii) materials, supplies and equipment. Part 'D' deals with environmental aspects. It includes information required in respect of (i) impact assessment undertaken separately in case of water, sewerage and solid waste and (ii) recommendations along with the measures to be taken to control environmental pollution.

³⁹ Planning Commission: Manual for Development Projects, Pakistan

Low Cost PC-I Proforma

1.52 A separate PC-I form for the small development projects costing up to Rs 1.00 million (non-recurring) should be used in respect of all the sectors, instead of comprehensive PC-I form for each sector.

PC-II Proforma

1.53 PC-II is required for conducting surveys and feasibility studies, in respect of larger projects, intended to get full justification for undertaking the project before large resources are tied up with them.

PC-III Proforma

1.54 PC-III form is designed to furnish information on the progress of on-going projects on quarterly basis and is required to be submitted by the executing agencies/departments within 20 days of the closing of each quarter. This form gives financial as well as physical progress of the schemes with information on any bottlenecks experienced during the execution of a project.

PC-IV & V Proformae

1.55 PC-IV form is required to be submitted at the time when the project is adjudged to be complete while the PC-V form is to be furnished on an annual basis for a period of five years by the agencies responsible for operation and maintenance of the projects.

1.56 Sectoral PC-I proformae, Low Cost PC-I form and PC-II, III, IV and V forms, currently in use, are given in Annexure-II.

Umbrella PC-I

1.57 Sometimes a Federal Ministry is required to prepare a PC-I having provincial components to be financed through a joint loan by a donor agency. Such a PC-I is called an Umbrella PC-I and could fall in any one sector of the economy. Since some interprovincial coordination is also required, the preparation of the Umbrella PC-I is, sometimes, delayed just because of non-submission of PC-I by a certain province(s).

This holds up the entire project.

Therefore, proper coordination between the Federal Ministries and the Provincial Governments is required. In such cases, the Federal Ministry can prepare the Umbrella PC-I on the basis of the appraisal report of the project which contains all the necessary information/data in respect of each provincial component. However, if there is delay in submission of PC-I by any province and the Federal Ministry finds it difficult to prepare the Umbrella PC-I, then the matter is to be reported to the CDWP in which the provincial representatives participate and can be advised to expedite. Moreover, efforts should be made to negotiate aid separately for each province

Particularly in social sectors like primary education, population and rural health projects etc., where project implementation is exclusively the responsibility of the Provincial Governments.

References

- <http://srl.geoscienceworld.org/content/78/6/601.figures-only>
- Sphere Minimum Standards
- UN-Habitat Recommended Construction Guidelines
- Building Energy Code of Pakistan 1990
- Approaches to DRR (Concern)
- Guidelines for Reducing Flood Losses (UN)
- Manual for Development Projects (Planning Commission Pakistan)
- Reducing Flood Risk through Building Code Reinforcement (Oklahoma Flood Plain Managers Association)
- Risk Factors and Social Vulnerability (Department of Geography, Kent State University USA)
- Sindh Public Procurement Act 2009
- PPPRA and PPPRA Rules 2009
- The Role of Land Planning in Flood Management (World Meteorological Department 2007)
- NDMA and PDMA's reports of past emergencies
- DDMA contingency plans (all five target districts)
- Composite Schedule of Rates Sindh and Punjab
- Planning Commission Proformas, Pakistan
- Seismic Building Code of Pakistan 2007 (SBC-07)
- National Building Code of India 2005 (NBC 2005)
- The International Building Code (IBC), Benjamin Trombly CMGT 564 – Term Paper August 2, 2006