DISASTER RESILIENCE OF CHILDREN IN HAZARD PRONE AREAS: A CASE STUDY OF PESHAWAR, PAKISTAN

A thesis submitted in partial fulfillment of the

requirements for the degree of

Master of Science

in

Urban and Regional Planning

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This is to certify that the

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has been accepted towards the partial fulfillment

of the requirements for the degree of

Master of Science in Urban and Regional Planning

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Certified that final copy of MS thesis written by **Mr. Ihtisham Ul Haq Khan Niazi** (Registration No 00000276209) of **SCEE/NIT/URP** (School/College/Institute) has been vetted by undersigned, found complete in all respects as per NUST Statutes / Regulations, is free of plagiarism, errors, and mistakes and is accepted as partial fulfillment for award of MS/MPhil degree. It is further certified that necessary amendments as pointed out by GEC members of the scholar have also been incorporated in the said thesis.

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Date: _____

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(Ihtisham Ul Haq Khan Niazi)

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LIST OF ABBREVIATIONS AND TERMS

ACC	Adaptations for Climate Change
ADHD	Attention Deficit Hyperactivity Disorder
BRIC	Baseline Resilience Index for Communities
CCA	Climate Change Adaptation
CDCRF	Climate-related Disaster Community Resilience Framework
CDRI	Climate Disaster Resilience Index
CPDRAF	Children Psychological Disaster Resilience Assessment Framework
CRI	Climate Risk Index
CRI	Community Resilience Index
DDMP	District Disaster Management Plan
DROP	Disaster Resilience of Place
DRR	Disaster Risk Reduction
DRIFT	Disaster Resilience Integrated Framework for Transformation
DDMA	District Disaster Management Authority
EM-DAT	Emergency Events Database
ERI	Economic Resilience Index
GCC	Gender and Child Cell
IPCC	Intergovernmental Panel on Climate Change
IRI	Institutional Resilience Index

MCDRAF	Multidimensional Children Disaster Resilience Assessment Framework
MCDRI	Multidimensional Children Disaster Resilience Index
MHVRA	Multi Hazard Vulnerability and Risk Assessment
NDMA	National Disaster Management Authority
NDMC	National Disaster Management Commission
NDMP	National Disaster Management Plan
PDMA	Provincial Disaster Management Authorities
PDMC	Provincial Disaster Management Commission
PHRI	Physical Resilience Index
PRI	Psychological Resilience Index
PTC	Parent Teacher Council
PSSF	Pakistan School Safety Framework
RRI	Rural Resilience Index
SDMA	State Disaster Management Authority
S-FRESI	Spatialized Urban Flood Resilience Index
SRI	Social Resilience Index
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Emergency Fund

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ABSTRACT

Even though children are the least resilient to disasters, they are mostly ignored in disaster research and policymaking. This study assesses the institutional performance in the context of children disaster risk management and also proposes a Multidimensional Children Disaster Resilience Assessment Framework by considering the social, economic, physical, institutional, and psychological dimensions. To quantitatively measure the psychological dimension, a Children Psychological Disaster Resilience Assessment Framework was devised by incorporating four components namely- mental health, life stressor, attitude, and awareness. A household questionnaire survey, with children as primary respondents, in the presence of their parents, was conducted in four communities of Peshawar, Pakistan. The selected areas had different urban and rural characteristics, planned and unplanned developmental characteristics, and were exposed to flood and earthquake hazards. The proposed framework was validated by constructing the Multidimensional Children Disaster Resilience Index. The result shows significant variations amongst all the five dimensions of resilience among the four areas. It is evident that children's disaster resilience does not explicitly depend on the characteristics of children themselves, but more accurately, it is an amalgamation of - on one hand - social, economic, institutional, physical, and psychological dimensions, and - on the other hand - the characteristics of an individual child, household, community, and urban and regional characteristics. Furthermore, a Performance scale was devised that shows average institutional performance, representing need for improvement in institutional performance especially in disaster mitigation. The proposed framework highlights the perspectives on children's disaster resilience. It also emphasizes the need for disaster resilience from household to regional level in an integrated and holistic manner. The framework and the methodology have the potential to assist in quantifying children's resilience and identify precise dimensions that can be enhanced through appropriate disaster risk reduction strategies.

Keywords: Resilience assessment, Children disaster risk reduction, Children disaster resilience, Multidimensional children disaster resilience assessment framework (MCDRAF), Multidimensional children disaster resilience index

(MCDRI), Psychological resilience assessment, Psychological disaster preparedness, Children psychological disaster resilience assessment framework (CPDRAF), Children psychological disaster resilience index (CPDRI)

Chapter 1

1. INTRODUCTION

This chapter discuss the reasons that lead to the selection of the research topic. Starting with the problem statement, the research questions and research objectives have been stated on which this research will be based. Then, the scope of the research has been defined. Moreover, it includes the justification of this research study and the chapters that makeup the thesis.

1.1 PROBLEM STATEMENT

The rate of occurrence and severity of disasters are increasing globally, as shown in Figure 1.1, and they are becoming more threatening and destructive (Ainuddin & Routray, 2012). Children are one of the most affected group by the adverse effects of these disasters (Gender and Child Cell, 2017b; Lawler, 2011) because of their age and their unique physical, psychological and growth characteristics, that reduces their capability to deal with and survive in case of disaster (Peek, 2008). Children suffer from a wide range of psychological issues after experiencing a disaster, which can last for a long period of time, if proper mitigation measures are not taken (Kar, 2009; Makwana, 2019). In spite of the fact that children are more psychologically vulnerable, the post disaster psychological manifestations in children are mostly ignored by the parents and professionals (Kar, 2009; Kar et al., 2007; Nisha et al., 2014; Sharma & Kar, 2019).

Disasters can affect the future growth and development of children negatively and affect them differently than adults. Losing one's livelihood in a disaster can lead to extreme poverty, early school leaving, malnutrition and health problems. Discontinuation of school by disaster impacted children can lead to early marriages, especially for girls, which put them in a vicious circle of poverty. Similarly, out-of-school children are more exposed to the risk of violence and abuse and other criminal activities (Gender and Child Cell, 2017a). This can slow down community development and make the whole community more vulnerable to natural hazards.

Therefore, this study will assess the disaster resilience of children in the context of flood and earthquake, which are the most common natural hazards triggering disasters in Pakistan; assess the institutional performance in the context of disaster resilience of children and suggest a framework for children's disaster resilience assessment.

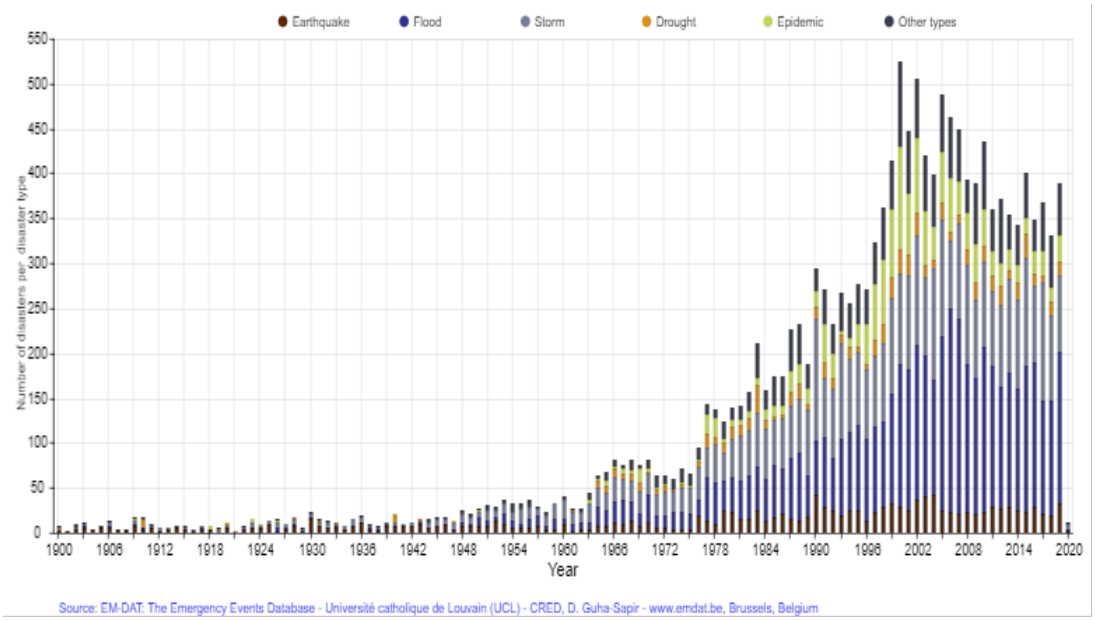


Figure 1. 1 Frequency of Disasters 1900-2019

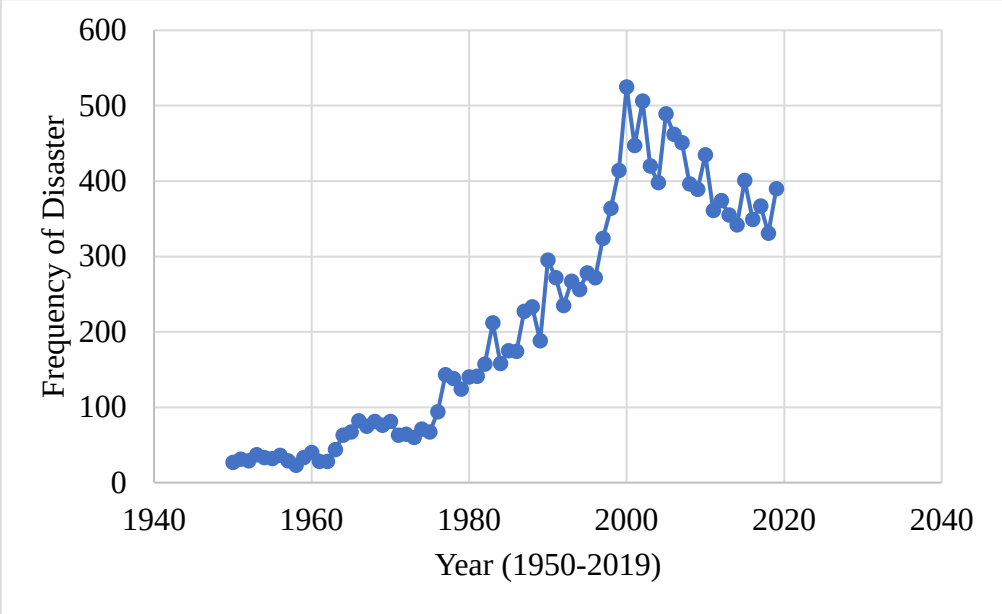


Figure 1. 2 Frequency of Disasters, accessed on 4/22/2020

1.2 RESEARCH QUESTIONS

1. What are the various models and indicators of disaster resilience used worldwide?
2. How to assess the children's disaster resilience?
3. How to assess the psychological resilience of children to disaster?
4. What are the key institutional measures for effective disaster resilience of children in Pakistan?
5. What could be a practical framework for the assessment of disaster resilience of children?
6. What are the measures required for effective disaster resilience of children?

1.3 RESEARCH OBJECTIVES

1. To assess the disaster resilience of children.
2. To assess the psychological resilience of children to disasters.
3. To assess institutional performance in the context of disaster resilience of children.
4. To suggest a framework for children's disaster resilience assessment.
5. To suggest measures for effective disaster resilience of children.

1.4 SCOPE

This research will access the disaster resilience of children. and institutional performance in the context of disaster resilience of children, so that adequate measure could be taken for effective children disaster management at national, provincial and district level. This study will be helpful for the identification and adaptation of such steps that will make children an asset in case of disaster mitigation and for resilient development. This research will offer invaluable information to policy makers for improved insight into key issues regarding children disaster resilience in Pakistan. In this context, it will also help, at federal level, National Disaster Management Authority (NDMA); at provincial level, Provincial Disaster Management Authorities (PDMAs); at district level, District Disaster Management

Authorities (DDMAs), and other relevant organization. The outcomes of this study can be incorporated into Pakistan School Safety Framework (PSSF) 2017 and National Disaster Risk Reduction Policy 2013. In the context of Urban and Regional Planning, effective policies for children disaster resilience will result in resilient development, which is prerequisite for sustainable development.

1.5 JUSTIFICATION

The Long-Term Climate Risk Index (CRI) (1998-2017) has ranked Pakistan as the 8th most vulnerable nation to climate change, globally. The frequency of disasters is rising in Pakistan, as shown in Figure 1.3.

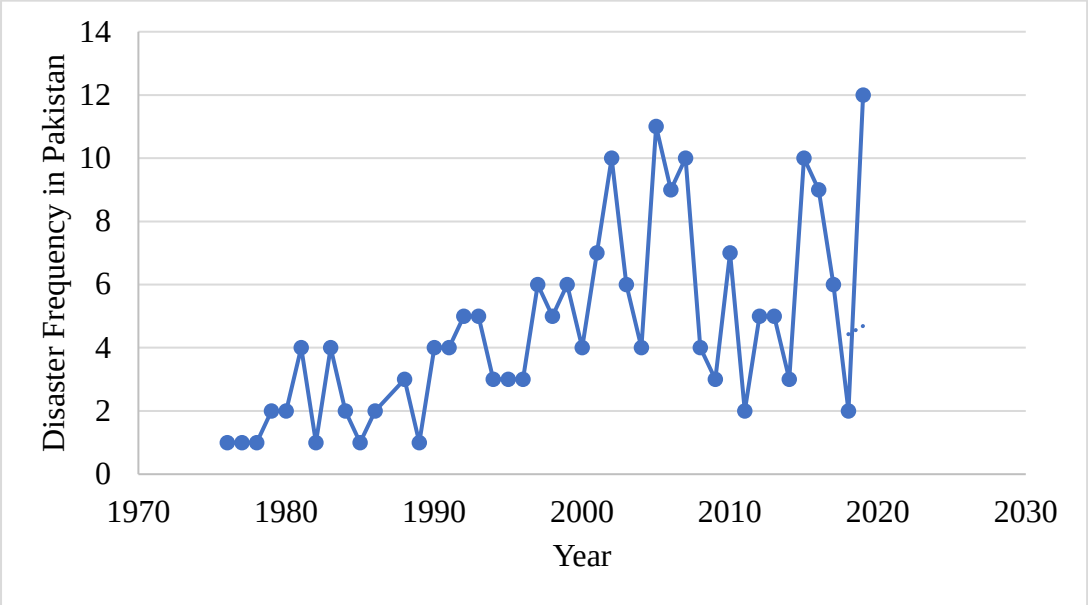


Figure 1. 3 Frequency of disasters in Pakistan

(Source EM-DAT, accessed on 22 April 2020, From 1976-2019)

In Pakistan 43.4 percent of population is under 15 year and 48.75 percent is below 18 years of age (Pakistan Bureau of Statistics, 2019). In October 2005 earthquake, in Pakistan more than 18,000 school age children were killed (about 23%, of the total deaths) and more than 20,000 children endured severe injuries (NDMA, 2012). The 2005 earthquake resulted in the destruction of 7,489 schools in Pakistan. Similarly, more than 10,000 schools were destroyed in the 2010 floods in Pakistan (Gender and Child Cell, 2017b). According to the Emergency Events Database (EM-DAT) from

1975 to 2019 Flood and Earthquake are the worst kind of natural hazards, resulting in the largest number and scale of disasters in Pakistan. Therefore, the effective disaster resilience of children, especially in case of the flood and earthquake hazard is essential for resilient development and successful implementation of 2030 Agenda for Sustainable Development. Thus, it is imperative to assess the disaster resilience of children and institutional performance to ensure children disaster resilience in Pakistan.

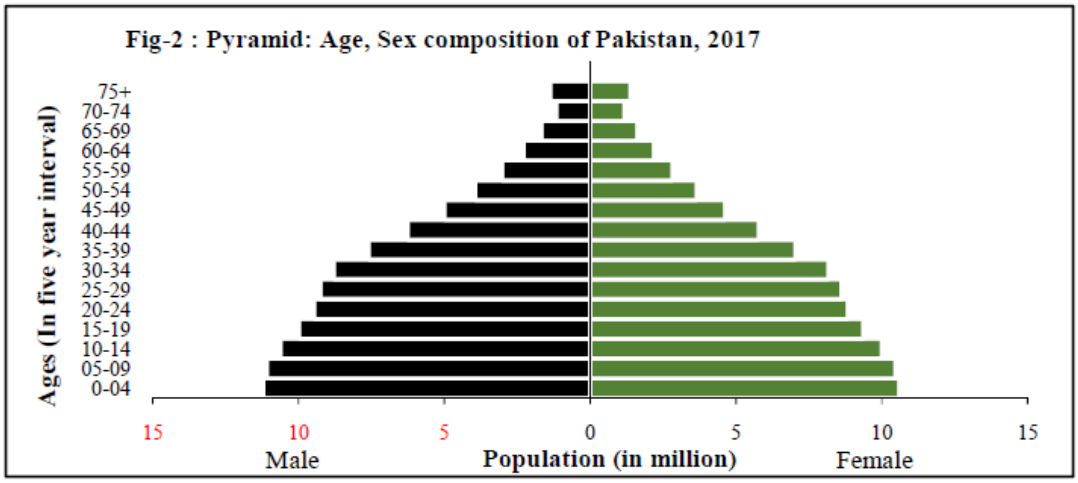


Figure 1. 4 Pakistan Population Pyramid

(Source: http://www.finance.gov.pk/survey/chapters_17/12-Population.pdf)

1.6 CHILDREN DISASTER RESILIENCE AND URBAN PLANNING

Both resilience and sustainability are to reduce the adverse impacts of disasters by comprehensive planning encompassing disaster mitigation, response and recovery strategies (Tobin, 1999). Effective and research-based policies for children disaster resilience will result in resilient development, which is prerequisite for sustainable development and successful implementation of 2030 Agenda for Sustainable Development.

1.7 RESEARCH/THESIS ORGANIZATION

Chapter 1 provides general introduction to disaster resilience of children, problem statements, research objectives, research questions, scope, and justification of this

research. Chapter 2 presents the literature review in the light of the research study topic and research objectives. Chapter 3 is the research methodology. It sheds lights on the entire process of the research, selecting the study design, sample size, selection of instrument for data collection and data analysis techniques. Chapter 4 includes profile of the respondents. Chapter 5 consider children DRR while Chapter 6 discuss psychological resilience of children to disaster. Chapter 7 consists of the institutional component of children DRR. Chapter 8 present the result while 9 includes conclusion and future research. At the end, references for the research study are provided along with Research Questionnaire and Interview Guide as annexures.

Chapter 2

2. LITERATURE REVIEW

This chapter discuss evolution of the concept of resilience and the use of resilience in disaster sciences along with brief introduction of various models/frameworks of disaster resilience assessment. The need for specialized disaster resilience framework for children keeping in view the available literature is also discussed in this chapter. Also, this chapter discuss the system of disaster governance in Pakistan along with the various stakeholders that are responsible for disaster management.

2.1 DISASTER RISK REDUCTION (DRR)

According to UNDRR, disaster is any harmful event that exceeds the capabilities of the affected communities to cope with it and cause widespread losses and disruption in the functioning of the society. Disasters are caused because of the condition of vulnerability, exposure to hazard and insufficient coping capacity. The adverse impacts of disaster include life losses, injuries, mental distresses, disruption of services, property damages and economic and environmental degradation. (UNDRR, 2017).

The Intergovernmental Panel on Climate Change (IPCC) describe disaster as a disruption in the smooth operation of a community due to a hazard intermingling with vulnerable social conditions, resulting in extensive damages that may need external assistance for recovery. DRR is a policy objective as well as a strategic measure used for foreseeing future disaster risk; reducing exposure, hazard, or vulnerability; and enhancing disaster resilience (Lavell et al., 2012).

The concept of DRR mean the practice of diminishing disaster risks through decreased hazard exposure, reduced vulnerability, effective land and the environmental management, and enhanced disaster preparedness. DRR is local, regional and global phenomena. The different legislations and frameworks adopted for DRR are shown in Figure 2.1.

In 2005, *Hyogo Framework for Action (2005-2015)* was adopted with the aim of reducing disaster damages to human and their society, economy and environment.

In 2015, *Sendai Framework for Disaster Risk Reduction 2015-2030* was adopted, with the following four Priority Areas are:

1. To understand the risk of disasters.
2. To improve disaster risk governance to handle disaster risk.
3. To invest in DRR for resilience.
4. To improve disaster preparedness for good response and to "Build Back Better" in recovery, rehabilitation, and reconstruction.

2.2 CLIMATE CHANGE ADAPTATION (CAA)

Climate change is any change or variation in climate that persist for a longer period of time, typically more than a decade. Climate change may occur due to natural or anthropogenic causes (Lavell et al., 2012). Adaptation is adjustment to actual or expected climatic change and their impacts, by undertaking such changes to take advantage of opportunities linked with climate change and reducing vulnerability to climate related changes (Smit & Pilifosova, 2003). Adaptive capacity is the capacity to adapt to the effects of changes in climate (Smit & Pilifosova, 2003).

The frequency and severity of disasters are increasing with climate change as one of the main reason behind it. Children are particularly vulnerable to the diverse impacts of climate change ranging from direct physical effects to impacts on their education, psychology and nutrition (Lawler, 2011).

2.3 CHILDREN IN DISASTERS

Children are one of the most affected group by the adverse effects of these disasters (Gender and Child Cell, 2017b; Lawler, 2011) because of their age and their unique physical, psychological and growth characteristics, that reduces their capability to deal with and survive in case of disaster (Peek, 2008). In Pakistan, around 43.4 percent of the population is under 15-year old, and 48.75 percent is below 18 years of age (Pakistan Bureau of Statistics, 2019). According to the Long-Term Climate Risk Index (1998-2017), the country is ranked as the 8th most vulnerable nation to

climate change globally. According to the Emergency Events Database (EM-DAT), from 1975 to 2019, floods and earthquakes were the worst kinds of natural hazards, resulting in the largest number and scale of disasters in the country. In October 2005 earthquake, over 19,000 school-age children were killed, and more than 20,000 children endured serious injuries (Gender and Child Cell, 2017b). The 2005 earthquake also destroyed 7,489 schools in the country. Similarly, more than 10,000 schools were destroyed in the 2010 floods (Gender and Child Cell, 2017b). Disasters can affect the future growth and development of children negatively and affect them differently than adults. Losing one's livelihood in a disaster can lead to extreme poverty, early school leaving, malnutrition and health problems. Discontinuation of school by disaster impacted children can lead to early marriages, especially for girls, which put them in a vicious circle of poverty. Similarly, out-of-school children are more exposed to the risk of violence and abuse and other criminal activities (Gender and Child Cell, 2017a). This can slow down community development and make the whole community more vulnerable to natural hazards.

During disasters Children feel isolated and are more scared and worried. Failure to invest in quick recovery of affected areas result in severe post disaster stresses which impair children’s emotional, intellectual and physical development. Disasters damage school buildings which result in children falling behind in their studies and consequently more children are likely to drop out of primary and middle school and are less likely to opt for a higher education degree. Disasters have a ripple effect on the children future. They effect their educational attainment, earnings, health, and may eventually lead them to criminal activities.

2.4 RESILIENCE

2.4.1 Concept of Resilience

Different conceptualization of the term resilience across the literature has been given by different disciplines, scholars, and institutions (Ainuddin & Routray, 2012; Cai et al., 2018). However, the existing literature agrees that the notion of resilience has originated from the field of ecology (Mayunga, 2007). Similarly, etymologically, the available literature agrees on the origination of the term resilience from the Latin language. However, according to some authors, the term resilience was created on

the model of Latin ‘‘resilientem’’ which means to rebound or to recoil (Ainuddin & Routray, 2012). In contrast, some research stated that the term resilience has its Latin root “resiliere” which means “to jump back” (Klein et al., 2003; Mayunga, 2007; Paton & Johnston, 2006). According to Mayunga (2007), the term resilience was for the first time defined for an ecosystem by Holling (1973) as the measure of an ecosystem's ability to absorb changes and still persist. Since the work of Holling (1973), the notion of resilience has progressively achieved acknowledgement, and now it is regularly used in numerous fields, including disaster studies. (Mayunga, 2007).

2.4.2 Resilience in DRR

There are divergent views of the use of the word resilience in disaster science. According to Toseroni et al. (2016), the first documented usage of the word resilience in disaster studies dates back to 1854, where it was used to describe the recovery actions after the Shimoda earthquake in Japan. Holling provided an important connection between resilience and ecology, when in 1995 defined resilience as system’s ability to absorb disturbance before any change in the system itself (Toseroni et al., 2016). Timmerman (1981) is most probably the first to use resilience in the context of disasters by defining it as the system’s capacity to absorb a hazardous event and recover from it (Klein et al., 2003; Mayunga, 2007). After Timmerman (1981) numerous definitions have been developed to express disaster resilience. However, there is a lack of agreement on a common definition of disaster resilience amongst researchers and practitioners (Mayunga, 2007). There is a difference in the degree of resilience possessed by individuals and communities, which also significantly varies with time. This represents major challenges that limit the consensus on the definition of resilience (Mayunga, 2007; McEntire et al., 2002). Keeping in view the numerous interpretations and usages to which the term resilience has been subjected has resulted in misunderstanding and confusion (Toseroni et al., 2016).

2.4.3 Definitions of Resilience

There is abundant literature available on the broad field of resilience, however there is a lack of an agreed upon definition of resilience. Different fields have

operationalized the concept of resilience according to their understandings. There is no clarity about whether resilience is a broad overall concept or specified to a particular type of hazard. Only a few resilience assessment studies focus on the validation of indices (Cai et al., 2018)**.** A list of some of the various definitions of resilience related to disaster science is given in Table 2.1.

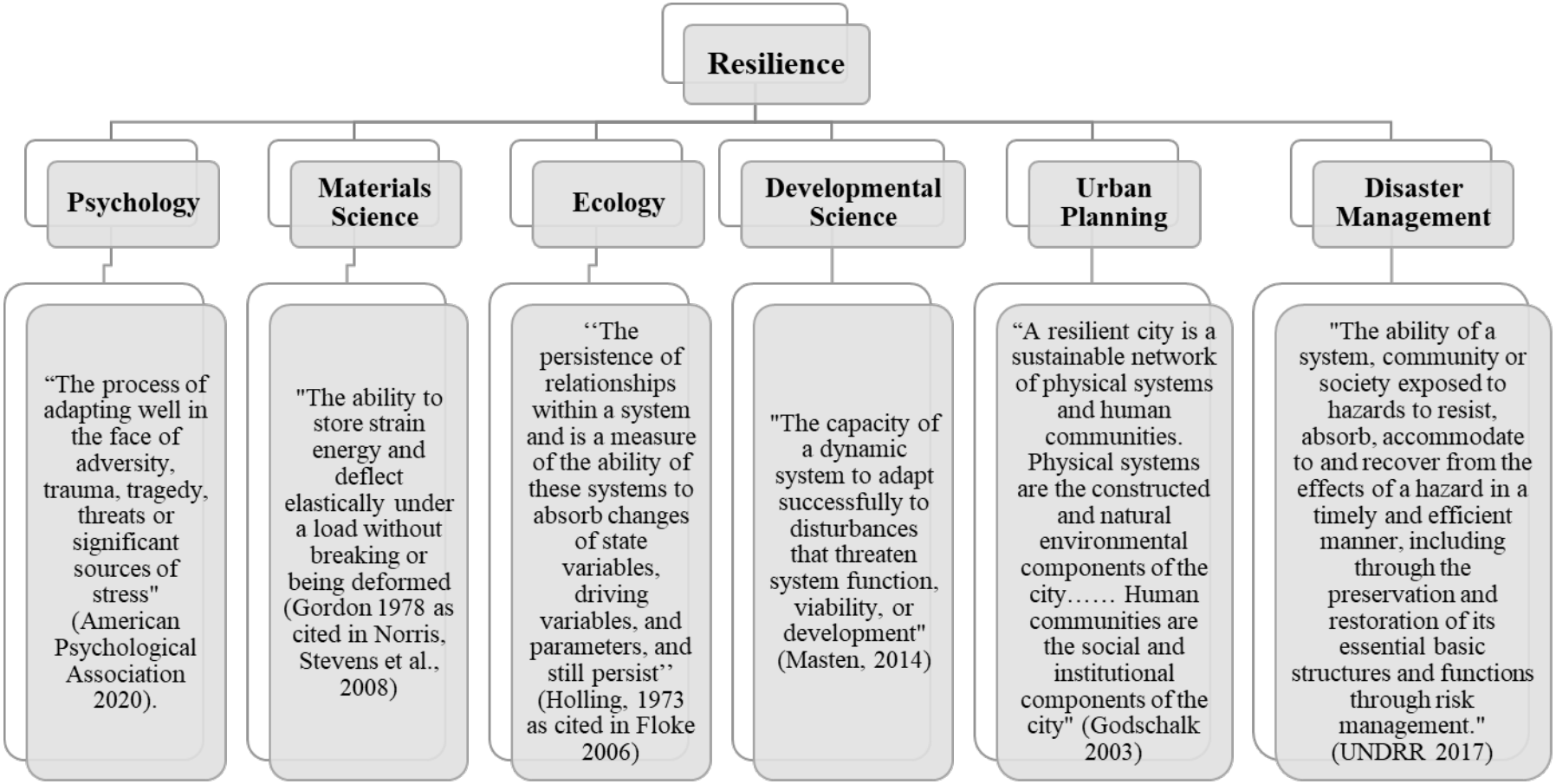


Figure 2. 1 Definitions of resilience in some of the various fields.

Table 2. 1 Definitions of Resilience

Author	Definition
Holling, (1973)	Defined resilience in the field of ecology as the abilities of relationships to persist within a system and absorb any change
Timmerman, (1981)	Defined resilience as measure of system capacity to absorb and recover from any harmful hazard
Wildavsky, (1988)	Defined resilience as the capacity to cope with any unanticipated threats that manifest themselves and learning to bounce back
EMA, (1998)	Defined resilience as measure of the rate of system recovery from failures
Tobin, (1999)	Defined sustainable and resilient societies as those societies organize structurally to minimize disaster impacts as well as having the ability to make speedy recovery
Adger, (2000)	Defined social resilience as ability to cope with any external stress arising due to political, social and environmental changes. Also, defined ecological resilience as ecosystem characteristics to maintain itself in case of facing any disturbance
Paton & Johnston, (2001)	Defined resilience as ability of rebounding effectively from any adversity as well as strengthening due to such adversity
Alwang et al., (2001)	Defined resilience as ability to take advantage of opportunities as well as withstand and recuperate from harmful shocks

Pelling, (2003)	Defined resilience as ability to adapt to or to cope with harmful stress
Paton & Johnston, (2006)	Defined resilience as measure of adaption to new reality and capitalize on the new opportunities that are presented
Maguire & Hagan, (2007)	Defined social resilience as communities and social groups capacity to recover from and responded to adverse crises
Norris et al., (2008)	Defined community resilience as a network of adaptive capacities to adopt after experiencing an adversity
Vugrin et al., (2010)	Defined system resilience as ability of a system to minimize the magnitude and duration of any divergence from target performance levels of the system in case of an adversity
Ainuddin & Routray, (2012)	In case of earthquake hazard, defined resilience as community ability to rebound, recover from, respond to, and absorb the impacts of earthquake and cope with it
CARRI, (2013)	Defined community resilience as capability of risk anticipation in case of an adverse change, limiting its impacts, rebounding by survival, by adaptability to change and by growth and evolution in response to the change
Masten, (2014)	Defined resilience as a dynamic system capacity of adaptation to disturbance that disturb system function and threat its viability and development
Cox & Hamlen, (2015)	Defined community disaster resilience as capability to anticipate and reduce vulnerabilities and risk, and

	increase adaptiveness and the potential for learning in face of a disaster
(UNDRR, 2017)	Defined resilience as ability to resist, absorb, adapt to and recover from hazard in timely manner through risk management by conservation and restoration of essential structures and functions
Miguez & Veról, (2017) as cited in Bertilsson et al., (2019)	Defined resilience as capacity of system to resist beyond designed criteria and structurally recover and reestablish function when submitted to stresses
American Psychological Association, (2020)	American Psychological Association defined resilience as a successful adaption process in face of trauma, adversity or any source of significant stress

2.4.4 Disaster Resilience Frameworks/Models

There are different disciplinary views, definitions, conceptual framework and approaches to resolve the causes of resilience and its assessment. Some of the different resilience assessment models include:

2.4.4.1 Disaster Resilience Integrated Framework for Transformation (DRIFT)

In DRIFT, Manyena et al., (2019) manifest capacity as a prime element to assess the concept of resilience. This study presented resilience as a capacity to deal with destabilizing event and use five different types of capacities including adaptive, preventive, anticipative, absorptive, and transformative capacity to operationalize resilience.

2.4.4.2 Spatialized Urban Flood Resilience Index (S-FRESI)

Bertilsson et al., (2019) presented a multi criteria index to integrate flood resilience to urban planning. The Spatialized Urban Flood Resilience Index (S-FRESI) uses the indicator of depth of water for hazard, household density for exposure, flooded

residences to total residences ratio for susceptibility, ratio of monetary losses to annual income for material recovery, and water presence and their depth with respect to time for duration effect.

2.4.4.3 The Household Resilience Assessment

Shah et al., (2018) used social, physical, economic and institutional dimensions to assess disaster resilience in Khyber Pakhtunkhwa province of Pakistan, that were affected by 2010 flood, by employing household survey for data collection.

2.4.4.4 Holistic Community Resilience Assessment Method

In 2016, Toseroni et al., (2016) proposed holistic community resilience assessment method to measure disaster community resilience using social, economic, environmental, infrastructure and institutional components.

2.4.4.5 Rural Resilience Index (RRI)

Cox & Hamlen (2015) proposed rural resilience index (RRI), consisting of various domains and dimensions for disaster resilience assessment of rural and remote communities.

2.4.4.6 Community Resilience Index (CRI)

Ainuddin & Routray (2012) measured the community resilience using physical, institutional, economic, and social components of an earthquake-prone area in Balochistan, Pakistan.

2.4.4.7 Climate-related Disaster Community Resilience Framework (CDCRF)

In 2012, Joerin et al. (2012) proposed a framework and an updated version of the climate disaster resilience index. The framework uses a household survey to identify the resilience of communities at the household or micro-level using physical, social, and economic aspects.

2.4.4.8 Climate Disaster Resilience Index (CDRI)

Joerin & Shaw (2011) proposed a climate disaster risk index (CDRI) for resilience assessment on a city scale. They presented CDRI in the form of a 5x5 matrix with the social, institutional, economic, physical, and natural dimensions of resilience.

2.4.4.9 Baseline Resilience Index for Communities (BRIC)

Cutter et al., (2010) proposed BRIC and use the components of social, infrastructural, institutional, economic and community capital for measuring and monitoring the disaster resilience of places.

2.4.4.10 PEOPLES Resilience Framework

The PEOPLES Resilience Framework was proposed by Renschler et al. (2010) for the assessment of community disaster resilience at various scales.

2.4.4.11 Framework for Assessing the Resilience of Infrastructure and Economic Systems

Vugrin et al. (2010) presented a three-part framework for assessing and evaluating infrastructure system resilience consisting of system resilience definition, a method for quantification of the cost of resilience, and a qualitative assessment approaching for the analysis of resilience that influences the characteristics of the system.

2.4.4.12 MCEER's Framework for Disaster Resilience

MCEER's (2008) concept enhances seismic resilience through reduced failure probabilities of critical infrastructure, including water supply, electric power, and hospitals, and reduced failure effects and recovery time. MCEER (2008) considered four properties of robustness, redundancy, resourcefulness, and rapidity to be fundamental for disaster resilience, and this framework also incorporates the social, economic, technical, and organizational dimensions of resilience.

2.4.4.13 Disaster Resilience of Place (DROP) Model

Cutter et al. (2008) proposed that the impact of a disaster is the cumulative effect of antecedent conditions, event characteristics, and coping responses moderated by the

absorptive capacity of the community in their Disaster Resilience of Place (DROP) model.

2.4.4.14 Capital Based Approach

To assess disaster resilience at the community level, Mayunga (2007) used a capital-based methodology that consisted of social capital, economic capital, human capital, natural capital, and physical capital. For the comparative assessment of disaster resilience at the local and community level.

2.4.4.15 Resilient Cities Initiative

Godschalk, (2003) defined resilient city as a sustainable nexus of physical systems and human communities. He proposed a resilient cities initiative that not only focus on the physical resilience but also on the social and institutional component to reduce disaster risk and develop resilient cities.

2.4.4.16 A Framework to Quantitatively Assess and Enhance the Seismic Resilience of Communities

Bruneau et al. (2003), in their framework of seismic resilience assessment, used the four dimension of community resilience consisting of technical, organizational, social, and economic dimension along with the three complementary measures of resilience: “reduced failure probabilities”, “reduced consequences from failures” and “reduced time to recovery”.

2.4.4.17 A Conceptual Framework for Analysis of Sustainability and Resilience

Tobin (1999) proposed a framework for analysing resilience and sustainability at community level by integrating mitigation, recovery, and structural-cognitive models.

2.5 NEED FOR SPECIALIZED DISASTER RESILIENCE FRAMEWORK FOR CHILDREN

Vulnerable social groups, such as the elderly, children, or the economically disadvantaged, may have fewer resources available to cope with disaster (Maguire

& Hagan, 2007). Building resilience in children requires an understanding of the factors which are affecting this generation in terms of disaster risk (Lawler, 2011). There are clear links between the problems related to disaster risk reduction and those relating to adaptations for climate change (ACC) and there is a pressing need for an integrated and holistic vision within the conceptual and practical approach to DRR and ACC. As most of the already existing frameworks are focusing on community level resister resilience approaches without integrating the specialized needs of children. Keeping in view the specialty of the needs of children there is a clear need of disaster resilience framework for children that not only integrate DDR and CAA but also take into consideration the social, economic, psychological, physical and institutional dimension along the child self-characteristics and the characteristic of household and community that has a direct and indirect effects on child disaster resilience. This concept is shown in Figure 2.2.

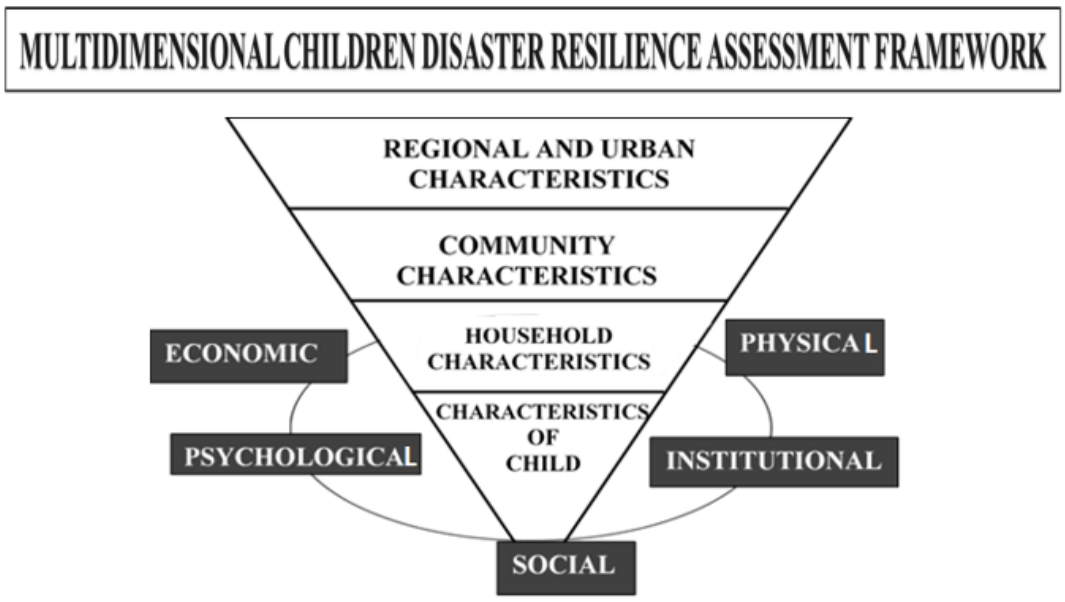


Figure 2. 2 Concept of Child Disaster Resilience Framework

2.6 DISASTER GOVERNANCE IN PAKISTAN

2.6.1 Administration Division of Pakistan

The disaster governance setup of Pakistan is strongly influenced by the administrative division of Pakistan. Therefore, for the effective study of the disaster governance in Pakistan, the understanding of the administrative division of Pakistan is prerequisite.

From an administrative point of view Pakistan is divided into a federal capital Islamabad, four provinces of Balochistan, Khyber Pakhtunkhwa, Punjab and Sindh, and the state of Azad Jammu and Kashmir, and Gilgit Baltistan as shown in Figure 2.3.

Figure 2. 3 Map showing administrative division of Pakistan

(Note: The Pakistan's official Map is available on http://www.surveyofpakistan.gov.pk)

Each Province of Pakistan including the regions of Gilgit Baltistan and the Jammu and Kashmir are divided into Divisions. Each Division is further divided into several Districts.

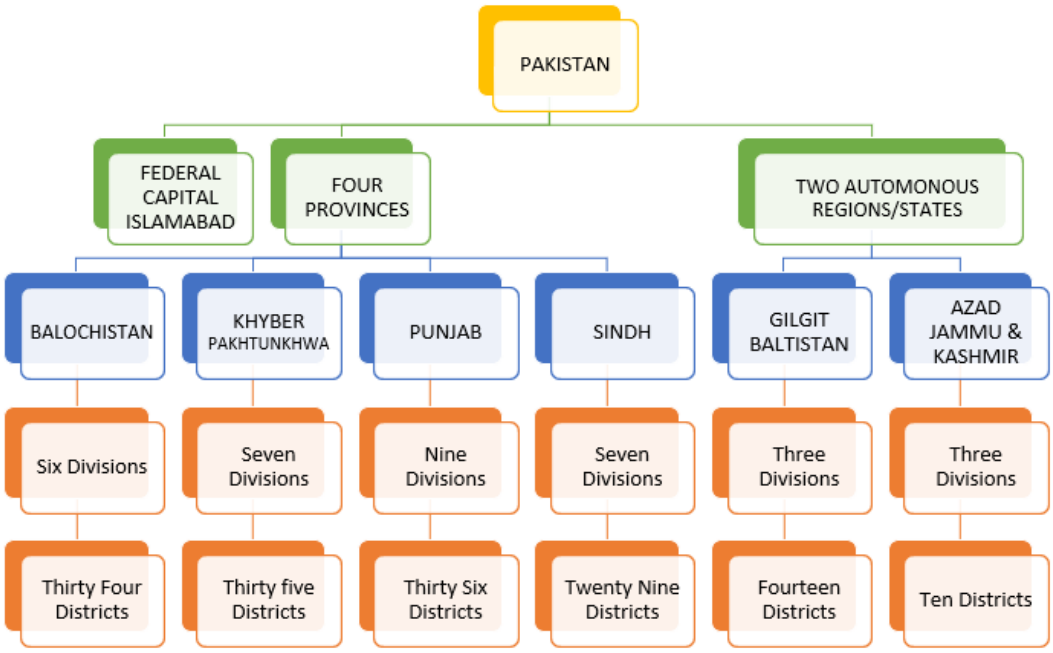


Figure 2. 4 Administrative division of Pakistan

2.6.2 System of Disaster Governance in Pakistan

In Pakistan National Disaster Management Act, 2010 is the key legislation that deals with the disaster governance in Pakistan. The disaster governance setup of Pakistan consists of the following key organizations.

2.6.2.1 National Disaster Management Commission (NDMC)

NDMC is the elite disaster governance body responsible for laying down policies and guidelines and approving national disaster management plans. The Prime Minister of Pakistan is the Chairman of NDMC.

2.6.2.2 National Disaster Management Authority (NDMA)

NDMA is the executive arm of NDMC. It is the lead agency at the Federal level to deal with the whole spectrum of Disaster Management activities. In case of a disaster, all the relevant stakeholders including federal and provincial government

departments, military, NGOs and various international organization work through NDMA.

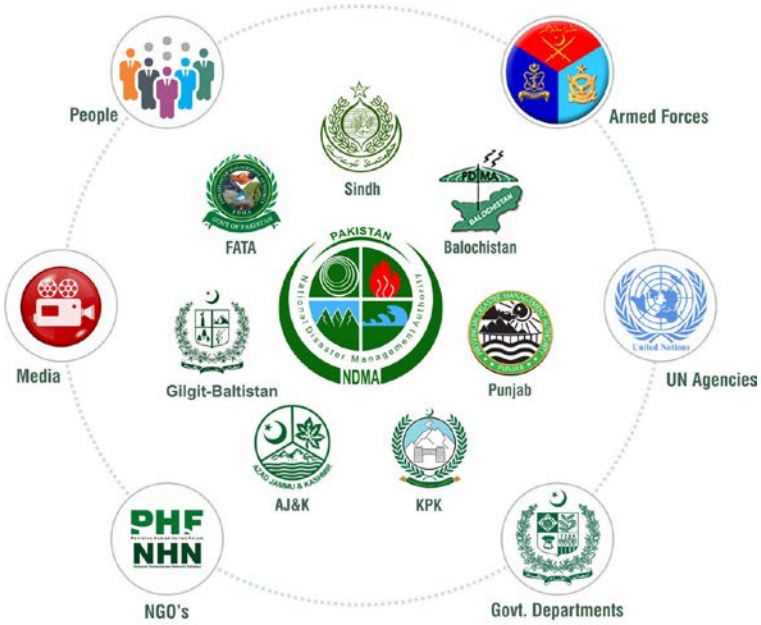


Figure 2. 5 Disaster management stakeholders at Federal level

(Source: http://www.ndma.gov.pk/pics/Stackholders.jpg)

2.6.6.3 Provincial Disaster Management Commission (PDMC)

At provincial level PDMC has the same functions and responsibilities as that of NDMC at federal level. The Chief Minister of the province is the chairperson of the PDMC. The Chief Minister of each province is also the member of NDMC.

2.6.2.4 Provincial Disaster Management Authority (PDMA)

Each province has its own PDMA. The PDMA act as an executive arm of PDMC and are responsible for implementing policies and plans for Disaster Management in the Province.

In addition to four disaster management authorities on provincial level in Pakistan, the State of Azad Jammu and Kashmir and Gilgit Baltistan has its own disaster management authorities as shown in Figure 2.6.

Figure 2. 6 Disaster Management Authorities at Federal and Provincial levels

2.6.2.5 District Disaster Management Authority (DDMA)

According to National Disaster Management Authority Act, 2010 DDMA is responsible for disaster management planning, coordinating and implementing at district level under the guidelines of NDMA and PDMA.

DDMAs are called District Disaster Management Units (DDMUs) in Khyber Pakhtunkhwa Province under the Khyber Pakhtunkhwa Province amended National Disaster Management Act 2012.

2.6.3 Disaster Governance in Khyber Pakhtunkhwa

2.6.3.1 Provincial Disaster Management Authority (PDMA) Khyber Pakhtunkhwa

PDMA Khyber Pakhtunkhwa is the lead disaster management authority of Khyber Pakhtunkhwa responsible for enhanced disaster preparedness and management within the province. Its responsibility includes the entire spectrum of disasters arising from natural hazards or human actions. The PDMA performs its functions in conjunction with the NDMA and various stakeholders at federal and provincial level. Their details are shown in Figure 2.7.

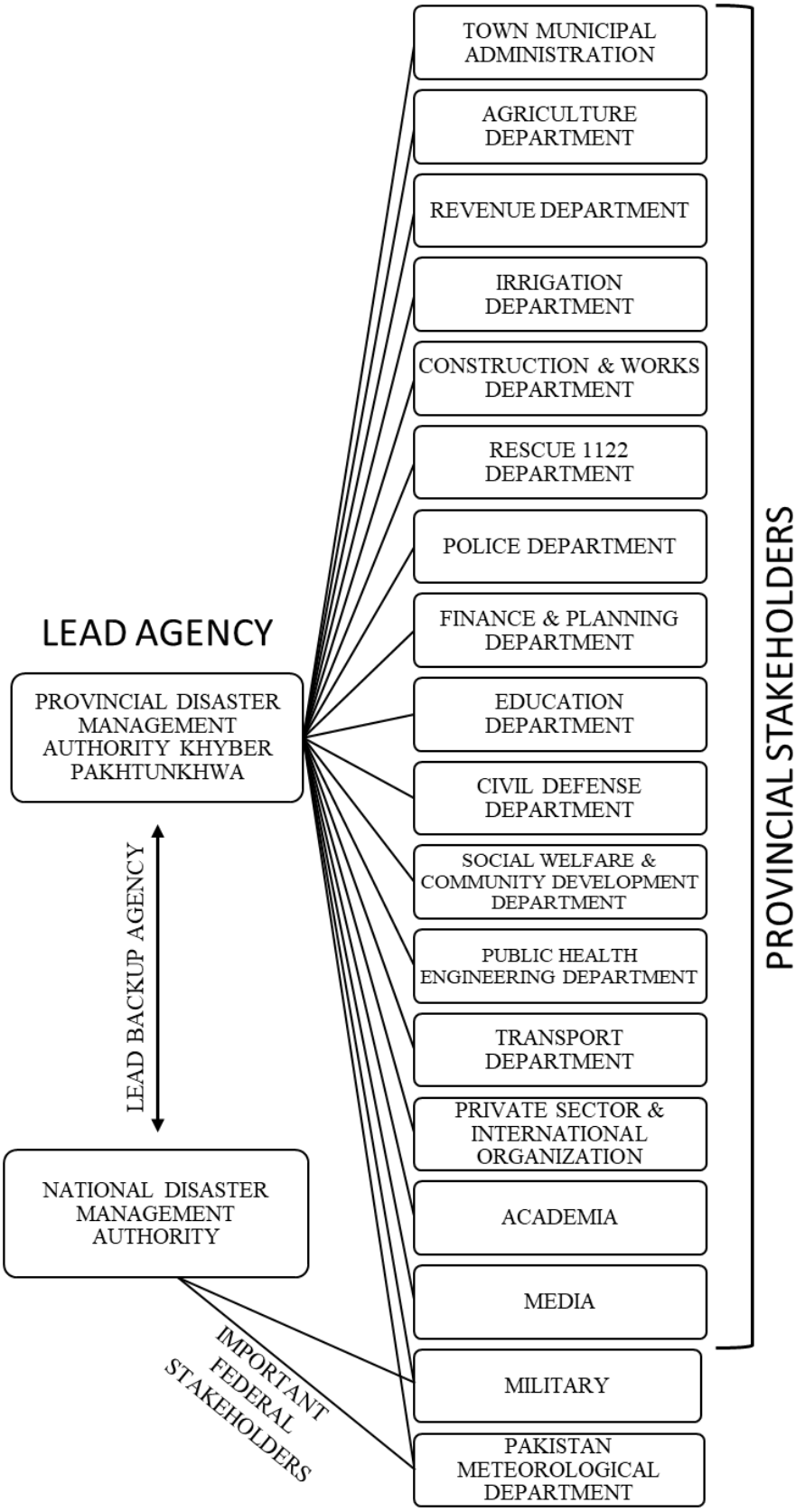


Figure 2. 7 Provincial disaster management stakeholders in Khyber Pakhtunkhwa

2.6.3.2 District Disaster Management Unit (DDMU)

In Khyber Pakhtunkhwa at district level, DDMU is responsible for disaster management. The Provincial Government of Khyber Pakhtunkhwa has notified DDMUs in all the districts of Khyber Pakhtunkhwa Province.

The Administrative Head of the district is the Chairperson of the DDMU. The Deputy Commissioner act as a co-ordination officer and the District Disaster Management Officer (DDMO) act as an executive officer of the DDMU. The DDMU also consist of the head of the district Police Department, Health Department, Education Department, Communication and Works Department and such other district level officers. The DDMU is responsible for district level Disaster Management Plan, local risk assessment and coordination for the implementation of such plans. DDMU is responsible for actions and guidance of the local Disaster Management Committees. The detail of such committees is shown in Figure 2.8.

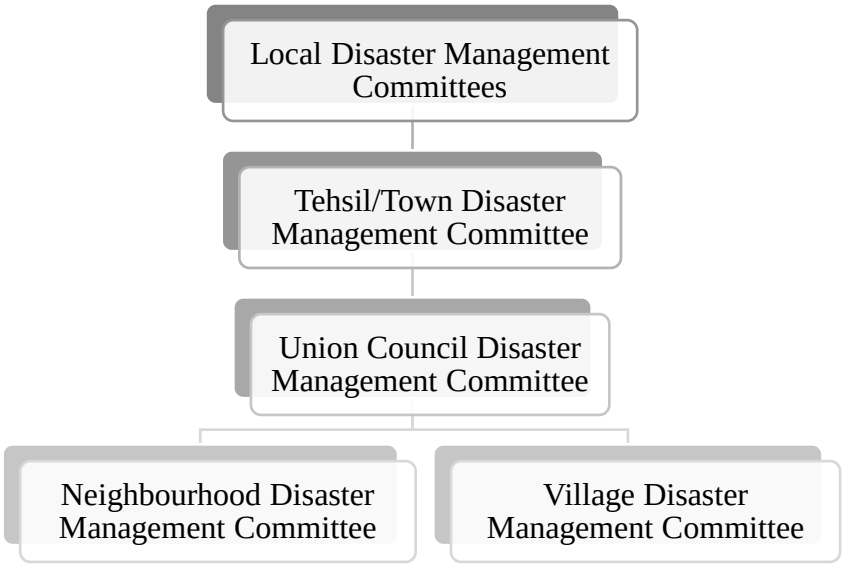


Figure 2. 8 Disaster management structure at District level in Khyber Pakhtunkhwa

2.6.3.3 Stakeholders

The various provincial departments that act as an important stakeholder in the disaster management along with their role and responsibilities before disaster, during disaster and after disaster are given in Table 2.2.

Table 2. 2 Disaster Management Stakeholders at Provincial level

Stakeholder	**Assigned Role and Responsibility**		
	Before Disaster	**During Disaster**	**After Disaster**
Rescue 1122 Department	Support DDMU in district level planning and training of First Aid, Search and Rescue and firefighting	Carry out relief operations (search & rescue, firefighting, first aid, etc.) along with other stakeholders	Carry out detail capacity assessment and successful incorporate the lesson learned from the disaster
Transport Department	Identify points of congestion, carry out assessment to relocate critical infrastructure from vulnerable areas and assist DDMU in highway safety and related rules and laws	Provide technical assistance on transport issues	Carry out long term planning and implementation of hazard free transportation infrastructure
Public Health Engineering Department	Prepare contingency plans and carry out repair and maintenance activities in the command areas	Prepare damage assessment report	Rehabilitation of damage infrastructure

Communication and Works Department	Develop guidelines for safer construction and loss and damage assessment and incorporate disaster risk assessment in the planning process of government infrastructure	Monitor public infrastructure condition specially roads and bridges and coordinate with other departments	Prepare damage assessment report along with budget requirement for rehabilitation and reconstruction
Social Welfare & Community Development Department	Promote awareness about disaster risk and disaster preparedness and prepare plan to provide shelter specially to children and women during disaster	Provide shelter to women and unaccompanied children and operate 1121 helpline for children protection during disasters	Work for re-unification of missing unaccompanied children, rehabilitation of families and provide psychosocial support
Police Department	Support district administration in dissemination of disaster warnings and evacuation of vulnerable communities	Ensure that law and order is maintained during disaster and control traffic	Keep law and order situation and ensure public security
Civil Defense Department	Create disaster awareness and	Render First Aid, perform search	Perform capacity assessment and

	conduct drills, exercises and trainings of individuals, communities and organization in First Aid, fire safety and emergency rescue	and rescue operations, conduct evacuation from damaged building and work for restoration of essential services	gap identification activities
Finance & Planning Department	Provide resources according to the district contingency plans	Explore options for required resources and budget determination and funds allocation for DRR activities	Provide finical resources to other departments
Education Department	Conduct MHVRA for all education facilities. In collaboration with other stakeholder, to identify safe evacuation route and shelter location in school, formulate DRR plan and Crisis Response Plan for Education Facilities and to arrange for teachers and	Organize volunteers teachers and student to aid in the search and rescue operations and provide temporary shelters in school buildings for displace population during disaster	Rehabilitation and restoration of damaged educational facilities and planning and providing short-term aid after disaster to make sure continuousness of education and learning

	students frequent disaster response and evacuation drills		
Health Department	To formulate a disaster Health Risk Managing Plan for the entire community and undertake MHVRA for health facilities	Mobilize disaster emergence health teams and set up medical camps and deployed mobile health facilites. Health sector rapid damages/ losses and demand assessment and prepare reports in case of disaster	Conducting detail damages and losses assessment and rehabilitating and reopening closed medical facilities
Revenue Department	To ensure revenue officials are deployed in case of disaster emergence and ensure regular liaison with the DM committees at neighborhood and village level	Record keeping of incoming relief items, developing mechanis for the distribution of relief items and begin delivering aid to the population effected by disaster	Undertaking detail damages assessment and supporting DDMO and DDMU staff in formulating detail report and identify prioterized areas for intervention
Irrigation Department	Formulation and maintenance of flood safety systems,	Organisation and operationalization of Flood Control Cell and	Damage assessment and rehabilitation of irrigation network.

	monitoring discharge rates in the major water bodies, prepare departmental contingency plan before onset of Monsoon and identify vulnerable points of irrigation canals & headworks. Also put together safety material to be used during disaster emergency such as sandbags, stones, machinery, human resources and other material as required keeping in view the potentionl disaster	dissemination of flood situation reports among the stakeholders.	
Agriculture Department	Preserve stock of vaccination, fodder and seeds etc for disaster emergency and train farmers in disaster risk and	Conduct damages and need assessment in agriculture sector and provide feed and fodder for surviving livestock	Make report of agriculture sector damages and needs, vaccination of livestock, provision of seeds, maintenance of water sources

	disaster preparedness		
Town Municipal Administration	Identify evacuation/shelter places, organization of drills/exercises on regular bases and prepare contingency plan for disaster for the TMA. Also to establish stockpiles of disaster relief materials	Make coordination with village and neighbourhood council in case of disaster related emergency and report cases of most vulnerable population such as handicapped, destitute and socially excluded groups to district government to streamline their special needs	Clear streets and take debris from street and houses, promote cleanliness and giving correct and detail information valuable for making detail damages and needs assessment reports to the PDMA/DDMA etc
Private Sector (NGOs, and Pakistan Red Crescent Society, etc.)	Conduct MHVRA at union council levels, prepare district disaster management plan in coordination with DDMU and conduct drills and trainings.	Facilitate local authorities in disaster relief operations.	Provide emergency livelihood support to affected communities, mobilize them for early recovery and promote community based disaster risk management.
Media	Inform communities	Monitor relief activities, act as watchdog to	Gather information as much as possible

	about any impeding hazard.	identify gaps and appreciate the good work.	and continue to monitor rehabilitation activities.
Academia	Provide support by conducting MHVRA and research in DRR and CCA.	Advise and support on technical issues and mobilize volunteers.	Support in recovery, rehabilitation and in implementing build back better approach.

2.6.4 Children Disaster Governance

2.6.4.1 Federal Level

NDMA has established Gender and Child Cell (GCC) in 2010, with the purpose of integration the needs and concerns of of children and marginalized segment of the community in humanitarian aid, disaster management and DRR initiatives and prioritizing and mainstreaming them in such efforts.

2.6.4.2 Provincial and State Level

Similarly, the GCC has also been established at the state and province level. The GCC at PDMA Khyber Pakhtunkhwa was established in August 2013. The PDMA Balochistan, PDMA Punjab, PDMA Sindh and the State Disaster Management Authority (SDMA) Azad Jammu & Kashmir has notified the establishment of GCC in their respective departments on 25th May 2012, 31st May 2012, 25th May 2012 and 26th July 2012 respectively with the objective of working in collaboration with all the relevant stakeholders to ensure that gender and child concerns are prioritized and mainstreamed in all disaster management initiatives in their respective areas of jurisdiction.

2.6.4.3 District Level

The DDMAs/DDMUs at district level in coordination with other stakeholders are responsible for prioritizing and mainstreaming children needs and concerns in all the disaster management initiatives.

2.6.5 Children Disaster Governance in Peshawar

2.6.5.1 District Disaster Management Unit (DDMU) Peshawar

The DDMU Peshawar is the key department responsible for the disaster management of children in Peshawar. The main responsibilities of DDMU Peshawar in the context of children's disaster management are:

- To ensure that NDMA and PDMA guidelines regarding children in disaster prevention, mitigation, preparedness and response are followed by all departments of the district.
- To ensure children are focused in District Disaster Management Plan.
- To organize DRR related training for student and work for community awareness in the district.
- To set up multi hazard early warning system and disseminate information to public.
- To identify buildings and places for relief camps.

2.6.5.2 Stakeholders in Children Disaster Governance of Peshawar

The key stakeholders in the children's disaster governance in district Peshawar are:

2.6.5.2.1 Social Welfare & Community Development Department

The main responsibilities of Social Welfare and Community Development Department in the context of children disaster resilience are:

- To create awareness among the staff members of the department about the distinct vulnerabilities and capacities of children and women in disasters.
- Encourage participation of vulnerable groups including children.
- To ensure that in post disaster phase the requirements of children and women survivors are addressed in disaster relief rehabilitation and reconstruction.

- To create awareness regarding children safety and rights and to plan and provide shelter to the affected children.
- To enable the use of children emergency helpline 1121 during disaster and its provision to missing unaccompanied children.
- Support the district government and other relevant organization for re-unification of missing children with their families, women, PWDs, rehabilitation of families and the psychosocial support provision to disaster affected comunities.

2.6.5.2.2 Civil Defense Department

The main responsibilities of Civil Defense Development Department in the context of children disaster resilience are:

- Give safety training to community such as First Aid, fire safety and rescue training.
- Develop emergency evacuation plan.
- Create community awareness on public safety.
- Carryout search & rescue operations as soon as the disaster occur.
- Work on the implementation of the National Assembly resolution about the insertion of civil defense training for the students for 9th & 10th class in conjunction with other relevant stakeholders.

2.6.5.2.3 Rescue 1122 Department

The main responsibilities of Rescue 1122 Department in the context of children disaster resilience are:

- Carryout emergency relief operations in coordination with district government such as search & rescue, firefighting, first aid, etc.
- Give training to departments and communities in basic DRM, First Aid, Search and Rescue, and firefighting etc.
- Help DDMU in various simulation exercises in communities.

2.6.5.2.4 Education Department

The main responsibilities of Education Department in the context of children disaster resilience are:

- Conduct MHVRA for all education facilities.
- To share hazards and disaster risk related information with teachers and students at all levels (primary & secondary schools, colleges).
- To include DRR into school curriculum.
- To arrange disaster drills and prepare DRR plan Education Facilities during the non-disaster phase.
- Impart DRR related knowledge by engaging students through Girls Guide, Scout Teams, Parent Teacher Council (PTC) and undertake trainings on disaster emergency response management for students, teachers and parents.
- Identify safe places in school that can be use as emergency shelter in case of disaster emergency.
- Build capacities of teachers so that they are able to implement the disaster emergence response plan in their respective educational facility.
- Perform nonstructural activities such as disaster preparedness, trainings, drills, awareness campaign and celebration of commemoration day in the schools.

2.6.5.2.5 Town Municipal Administration

The main responsibilities of Town Municipal Administration Department in the context of children disaster resilience are:

- Integrate DRR in short term and long-term development planes and prepare Master Plan while keeping in view the local disaster risks.
- To identify possible evacuation routes and emergency shelter location to be used during disaster.
- Ensure that the MHVRA have been done and maps to be used during disaster has been prepared and dissimated to all relevant persons and organisations.

Chapter 3

3. METHODOLOGY

This chapter describes in brief the research design, types of data collection, sample size, methodology to conduct the research and different types of data analysis techniques to attain the objectives. Figure 3.1 explains the entire procedure.

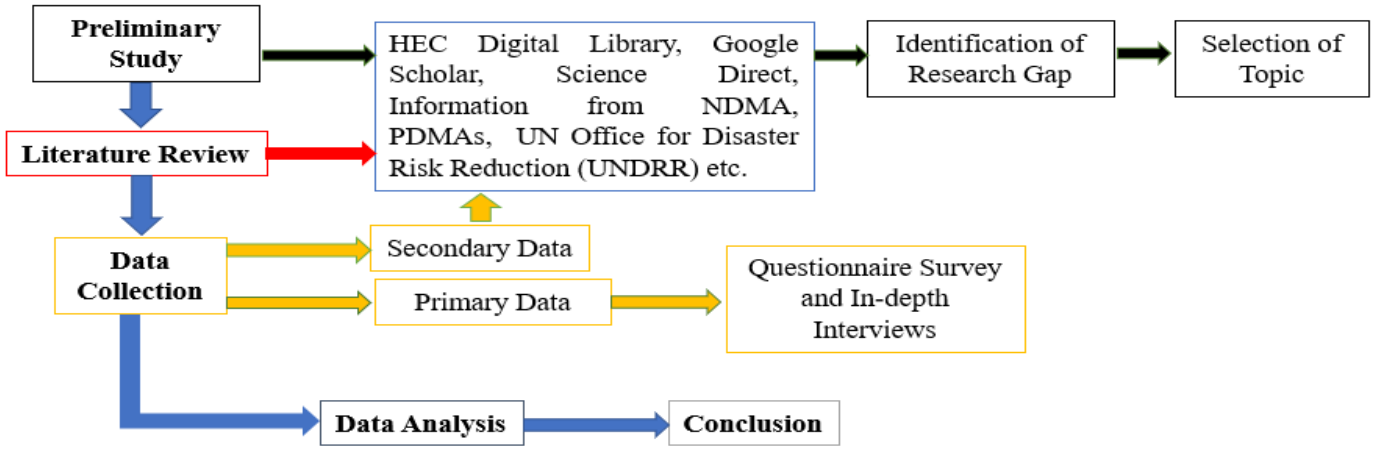


Figure 3. 1 Research Methodology

3.1 RESEARCH DESIGN

Mixed method research design is used for the current study. The research adopted multi-dimensional design strategy that involves a variety of approaches (qualitative and quantitative). These approaches include questionnaire survey technique and in-depth interviews.

3.1.1 Exploratory Research

Exploratory research is used for preliminary investigation of problem, and it help to identify issues, that can be the focus for future research. Exploratory research was carried out to explore the problem of disaster resilience of children and in depth understanding of various factors associated with it. It was done by reviewing available literature, in-depth interviews and focus group discussion.

3.1.2 Descriptive Research

Descriptive research is used to describe the nature and status of anything by presenting the available facts. Descriptive research was carried out using the questionnaire survey to measure the opinions of relevant stakeholders.

3.1.3 Historical Research

Historical research is used for critical inquiry into past events to reach insights about them. Historical research was used for the selection of study location and the hazard types, that are earthquakes and floods, included in this study by reviewing available literature and reports on disaster occurred in the past.

3.1.4 Qualitative Research

Qualitative research is used to collect data through open-ended questionnaires and conversational communication techniques. In this research the literature review, in-depth interviews and focus group discussion are based on this research method

3.1.5 Quantitative Research

Quantitative research consists of inquiry of phenomena by collecting quantifiable data and performing statistical techniques to generalizing it across groups of individuals or to describe a phenomenon. In this study the index-based approach for

data analysis obtained through questionnaires, which are based on indicators used this research method.

3.2 STUDY AREA

According to the Emergency Events Database (EM-DAT), accessed on 1st January 2020, flood and earthquake are the most common natural hazards triggering disasters in Pakistan. According to EM-DAT from 2000-2019 and from 1975-2019 flood and earthquake are the most disastrous natural hazards in case of Pakistan as shown in Table 3.1 and Table 3.2 respectively.

Table 3. 1 Ranking of Disasters in Pakistan from 2000-2019

Time Period (Year)	**2000-2019**			
Ranking	**Catagory**			
	Deaths	**Affected Population**	**Econoic Losses**	**No. of Events**
1	Earthquake	Flood	Flood	Flood
2	Flood	Earthquake	Earthquake	Earthquake
3	Extreme Temperature	Drought	Storm	Landslide

Table 3. 2 Ranking of Disasters in Pakistan from 1975-2019

Time Period (Year)	**1975-2019**			
Ranking	**Catagory**			
	Deaths	**Affected Population**	**Econoic Losses**	**No. of Events**
1	Earthquake	Flood	Flood	Flood
2	Flood	Earthquake	Earthquake	Earthquake
3	Extreme Temperature	Drought	Storm	Storm

Peshawar is the most populace, and the capital city of Khyber Pakhtunkhwa Province was selected as a study area. The city is categorized as a very high-risk area, having the highest level of risk for earthquake and flood, and ranks at 26 out of the 145 districts of Pakistan (National Disaster Management Authority, 2012). Peshawar is prone to a number of natural and human induced hazards. If human caused hazards like refugees and internally displaced persons influx, terrorism, and fires would have been counted while estimating these risk indices for NDMP, Peshawar would have ranked in the category of top three vulnerable districts of Pakistan (*District Disaster Management Plan (DDMP) Peshawar*, 2017).

3.2.1 Peshawar Flood Zoning

Peshawar is one of the most affected district in 2010 flood. During this flood Kabul river and Budni Nalla devested 16 union councials of the district, destroying 33,867 housing, killing 46 people and injuring more than 68 persons.

Similarly, in 2012 flood resulted in the death of three precious lives and a total of 217 houses were damaged. In 2014 due to flood 13 people were drowned and 54 were injured. The same went on for 2015 when due to torrential rains and flash floods 224 houses were partially damaged, 19 fully collapsed and 7 persons lost their lives due.

In Peshawar district, the flood plain mainly lies between Kabul River and Budni Nala from Warsak in the Northwest towards Southeast in the upper Northern half of the district. Over the last few years urban flooding has intensified in Peshawar, mainly due to poor drainage system in such areas. The District administration consider encroachment on Budni Nala as tha main reason of urban flooding, because almost all the drainage from Peshawar outfall into the Budni Nala which eventually run into the Kabul River.

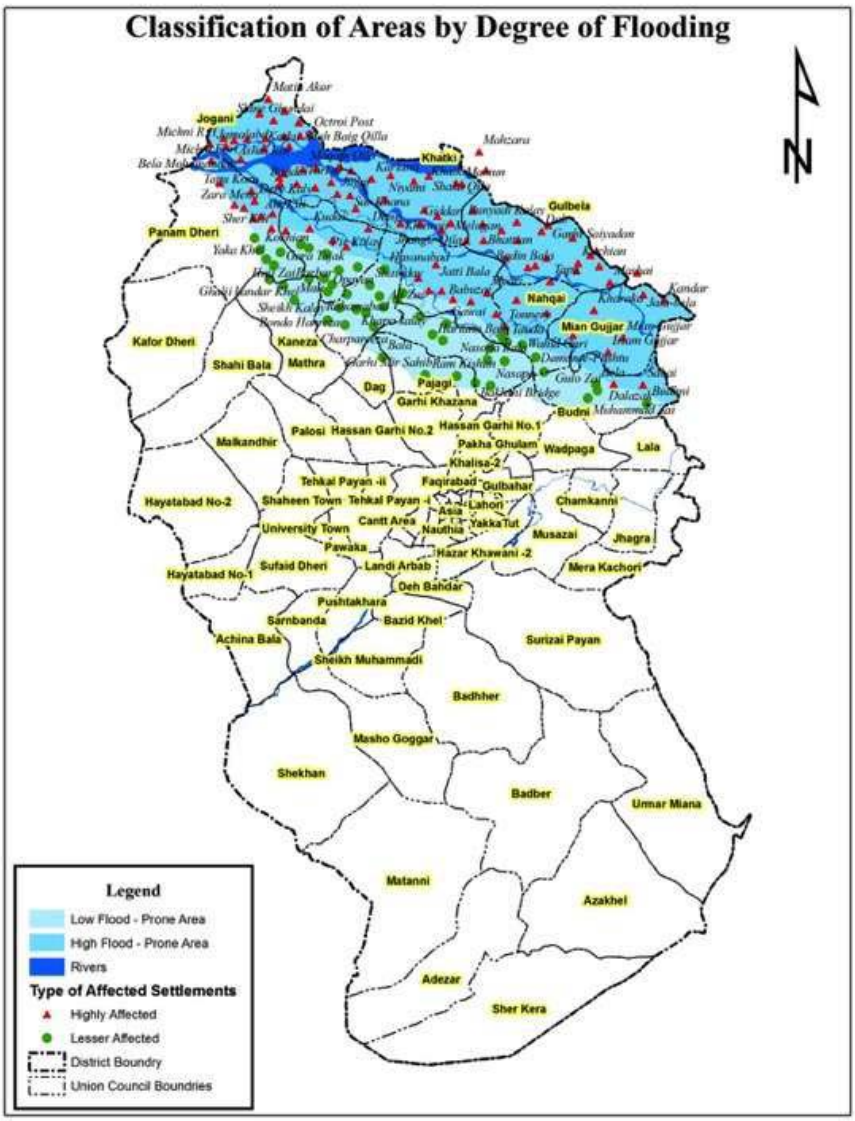


Figure 3. 2 Peshawar: Classification of area by degree of flooding

(Source: District Disaster Management Plan, Peshawar)

3.2.2 Peshawar Earthquake Zoning

According to the Building Code of Pakistan (Seismic Provisions 2007), Peshawar lies in zone 2B, whereas according to the District Disaster Management Plan Peshawar (2017), the northern parts of Peshawar are in Zone 3, and the southern regions are in Zone 2B.

3.2.3 Areas Selection for Sampling

A Focus Group discussion was held to select areas for data collection in the city of Peshawar. The areas finally selected for data collection are shown in Figure 3.3 with their general charateristics in Table 3.3.

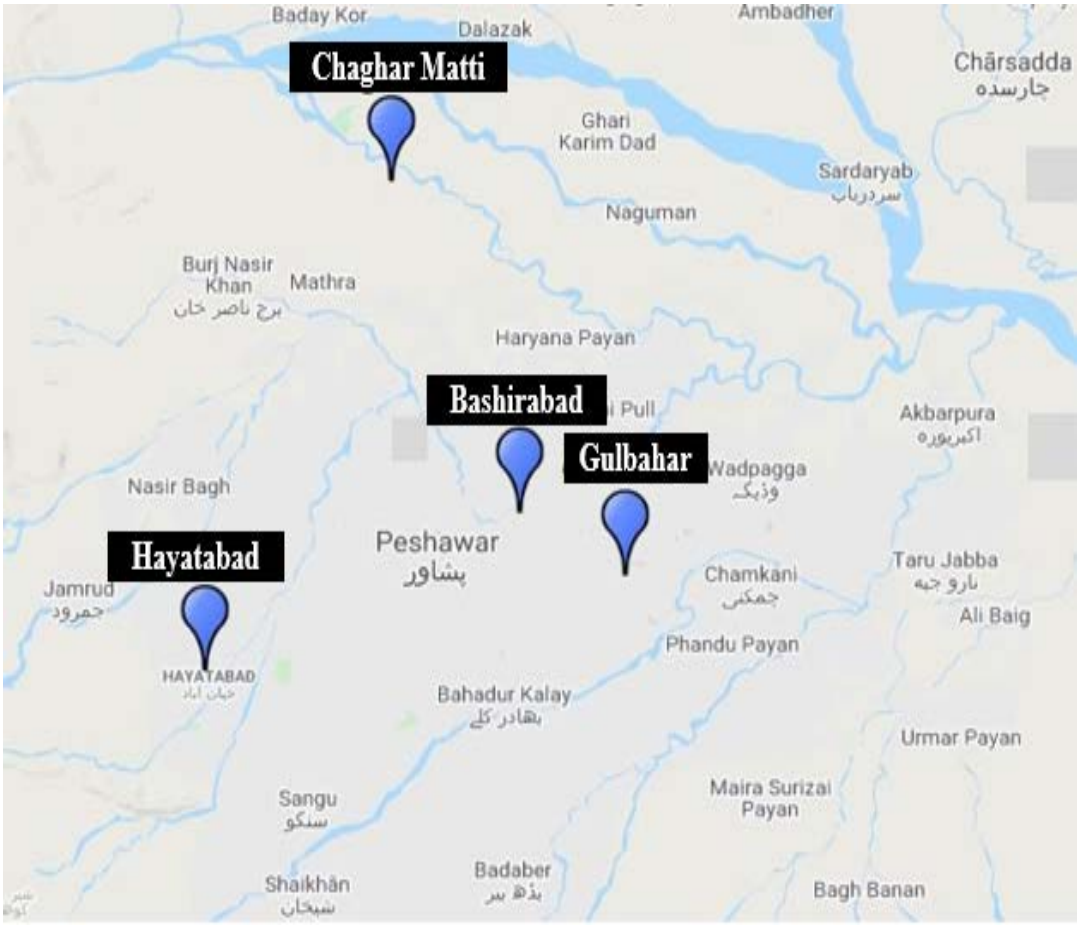


Figure 3. 3 Areas of Peshawar Selected for Data Collection

Table 3. 3 General characteristics of Study areas

Data Collection Area of Peshawar	General Characteristics
Bashir Abad and adjacent areas	Both urban and rural characteristics, unplanned, high flood prone, low to middle income area.
Chagharmatti	Village Council, unplanned, high flood prone, low income area.
Hayatabad	Planned, low flood prone, high income area.

Gulbahar	Neighbourhood Council, unplanned, low flood prone, middle income area.

3.3 DATA COLLECTION

The current study adopts literature review, questionnaire survey technique, and in-depth interviews as its main method of data collection.

3.3.1 Primary Data

Primary data was collected using questionnaire survey and in-depth interviews.

- A Questionnaire was prepared to conduct questionnaire survey.
- For in-depth interviews, Semi Structured Interview technique was used. It provides reliable and comparable qualitative data. It also provides the opportunity for identifying new ways of seeing the topic at hand and enable the interviewees to share their views and understanding in their own terms. The Interview Guide was prepared that consisted of a set of predetermined questions based upon the key measures required to be undertaken by the institutions in each of the four thematic areas of of disaster management cycle namely - Preparedness, Response, Recovery and Mitigation. Keeping in view the natural flow of the conversation few questions that were not planned in advance and arose spontaneously were also asked.

3.3.2 Sample Size for questionnaire survey

The minimum sample size was determined in two steps. In the first step total number of children in Peshawar in 2019 was estimated from the data of the Fifth Housing and Population Census Pakistan, 1998 obtained from the KP Bureau of Statistics. In the second step Solvin's formula was used to find the sample size.

The Table provide the year wise population of Peshawar based on the Fifth Housing and Population Census Pakistan, 1998 obtained from the KP Bureau of Statistics.

Table 3. 4 Population of Peshawar by Single Year Age and by Sex

AGE	TOTAL			RURAL			URBAN		
	BOTH SEXES	**MALE**	**FEMALE**	**BOTH SEXES**	**MALE**	**FEMALE**	**BOTH SEXES**	**MALE**	**FEMALE**
ALL AGES	2,026,851	1,065,188	961,663	1,044,035	543,287	500,748	982,816	521,901	460,915
0	48,981	24,853	24,128	27,055	13,513	13,542	21,926	11,340	10,586
1	54,186	27,898	26,288	30,032	15,453	14,579	24,154	12,445	11,709
2	72,172	37,040	35,132	40,921	21,170	19,751	31,251	15,870	15,381
3	69,859	35,512	34,347	38,798	19,645	19,153	31,061	15,867	15,194
4	73,150	38,016	35,134	41,516	21,563	19,953	31,634	16,453	15,181
5	70,648	37,069	33,579	39,139	20,666	18,473	31,509	16,403	15,106
6	72,614	37,419	35,195	41,193	21,314	19,879	31,421	16,105	15,316

7	62,711	32,747	29,964	33,660	17,779	15,881	29,051	14,968	14,083
8	77,742	40,644	37,098	44,327	23,309	21,018	33,415	17,335	16,080
9	48,560	25,551	23,009	25,373	13,385	11,988	23,187	12,166	11,021
10	75,596	39,964	35,632	41,926	22,167	19,759	33,670	17,797	15,873
11	42,493	22,437	20,056	20,781	11,061	9,720	21,712	11,376	10,336
12	66,845	35,347	31,498	35,431	18,854	16,577	31,414	16,493	14,921
13	46,484	24,039	22,445	22,964	11,982	10,982	23,520	12,057	11,463
14	51,675	26,416	25,259	26,802	13,608	13,194	24,873	12,808	12,065
15	43,436	22,569	20,867	21,780	11,361	10,419	21,656	11,208	10,448
16	44,975	23,069	21,906	22,741	11,503	11,238	22,234	11,566	10,668
17	32,169	17,075	15,094	14,341	7,633	6,708	17,828	9,442	8,386
18	69,141	35,405	33,736	37,455	19,036	18,419	31,686	16,369	15,317

Total	1,123,437	583,070	540,367	606,235	315,002	291,233	517,202	268,068	249,134

Step 1: To estimate the total number of children in Peshawar exponential growth and continuously exponential growth formula was separately used, as shown below.

According to exponential growth formula:

- Total Population of Peshawar in 1998 =2026851
- Total Population of Peshawar in 2017 =4269079
- Growth Factor = 1.039985
- Growth Rate = 0.039985 =3.9985%
- Now, Children in 1998 in Peshawar = 1123437
- Children in 2019 in Peshawar = 2559277

According to continuously exponential growth formula:

- Total Population of Peshawar in 1998 =2026851
- Total Population of Peshawar in 2017 =4269079
- Continuous growth rate = 0.03547 =3.547 %
- Now, Children in 1998 in Peshawar = 1123437
- Children in 2019 in Peshawar = 2366147

Step 2: To estimate sample size Slovin's formula was used, as shown below

Sample size: $n = N / (1+Ne^2)$.

Where N= Population, e= margin of error

Using the confidence level of 95%, e=5%=0.05

Therefore,

Sample size using estimation based on exponential growth formula

$$n = 2559277 / (1+2559277(0.05)^2) = 399.38$$

Sample size using estimation based on continuously exponential growth formula

$$n = 2366147 / (1+2366147(0.05)^2) = 399.93$$

Therefore, the sample size of 400 was chosen for questionnaire survey using Solvin's formula from both the estimations based on the data of the Fifth Housing and Population Census Pakistan, 1998.

3.3.2.1 Questionnaire Design

Questionnaire prepared for this study consist of five major sections. A pilot study was conducted. The questionnaire was finalized based on feedbacks received from the pilot study.

3.3.3 Secondary Data

The secondary data collection consisted of reviewing existing literature using online scientific databases and viewing the online publications of various disaster related national and international organizations.

3.3.3.1 Indicators Selection

Indicators were used to assess each of the five dimensions of children disaster resilience—social, economic, physical/infrastructural, institutional, and psychological resilience. After an extensive literature review, indicators were chosen, mostly from flood and earthquake hazard studies, and scrutinized while keeping in view the local conditions and adjusted accordingly for the five dimensions of children disaster resilience.

3.4 DATA ANALYSIS

To assess data collected, an Index based approach is adopted for data collected through questionnaire survey and content analysis technique is used for data collected through Semi-Structured Interviews. For data analysis, descriptive and inferential statistics were used. ANOVA was used to determine if the difference among the means of all the four study areas is significant or not. For comparative

analysis within each dimension, the mean values obtained for children were subsequently divided into four equal classes, categorized to represent very low, low, moderate, and high level of resilience.

3.4.1 Index Based Approach

Indices are employed in various fields of study to measure different concepts that cannot be assessed by any single indicator, such as human development and quality of life, including disaster studies (Shah et al. 2018). In disaster studies, the indices provide useful and productive feedback to disaster management institutions and policymakers (Ainuddin & Routray, 2012). To get the values of indicators within range, a normalization process was employed (Nelson et al., 2010; Shah et al., 2018), and a subjective method was used to assign values to the indicators (Cutter et al., 2010; Shah et al., 2018; Vincent, 2007). Indices can summarize complex data into a single value called an index, thus serving as a powerful tool (Cutter et al., 2008; Shah et al., 2018).

3.4.2 Formulation of Multidimensional Children Disaster Resilience Index

To assess the disaster resilience of children, an index-based approach was adopted in this study. Individual indices for five dimensions of social, economic, physical, institutional, and psychological resilience were calculated. Fourteen indicators were used for social resilience, 12 for economic resilience, 11 for physical resilience and 10 for institutional resilience and 29 for psychological resilience. Therefore, the total indicators used in this study sum up to 76. To compute the indices, the original value of all the indicators of each dimension of resilience was transformed to 0–1, where values nearer to 0 indicate low resilience. In contrast, values closer to 1 signify high resilience. With literature support and keeping in view the respondents, children, classes were created to represent the degree of variation in each indicator. The nature of the response of each indicator, depending on its characteristics, was divided into two classes or three classes. The indicators were assigned the value of 0 and 1 in the case of two classes. In case of three classes the indicators were assigned the value of 0, 0.5, and 1 or 0.33, 0.67, and 1. Therefore, the composite index value fell between 0 and 1for each indicator of children's disaster resilience. All the indicators used to

assess resilience and their classes, values, and source of the indicator are listed in Table 5.1.

Different indicators were used to assess each dimension of resilience, and mean values were obtained for all dimensions of children's disaster resilience. To allot values to classes for each indicator, a subjective weighting technique was used. Based on Eq. 1 to Eq. 5, the Social Resilience Index (SRI), Economic Resilience Index (ERI), Physical/ Infrastructural Resilience Index (PHRI), Institutional Resilience Index (IRI), and Psychological Resilience Index (PRI) were calculated, respectively. With equal importance to each of the five dimension, the MCDRI for each child of all four areas was calculated using Eq. 6.

$$\text{SRI} = \sum_{i=1}^{n} \frac{SWi}{n} \quad \text{Eq.1}$$

$$\text{ERI} = \sum_{i=1}^{n} \frac{EWi}{n} \quad \text{Eq.2}$$

$$\text{PHRI} = \sum_{i=1}^{n} \frac{PHWi}{n} \quad \text{Eq.3}$$

$$\text{IRI} = \sum_{i=1}^{n} \frac{IWi}{n} \quad \text{Eq.4}$$

$$\text{PRI} = \sum_{i=1}^{n} \frac{PWi}{n}$$

$$\text{MCDRI} = \frac{SRI+ERI+PHRI+IRI+PRI}{5} \quad \text{Eq.5}$$

Eq.6

Where SW, EW, PHW, IW, and PW represent transformed values assigned to each indicator of social, economic, physical, institutional, and psychological dimensions, respectively. Similarly, n refers to the number of indicators used for calculating each dimension.

3.4.3 Content Analysis

Content analysis is a research instrument used to assess, quantify and analyze qualitative data by determining the presence of certain themes or concepts within given qualitative data. Content analysis is flexible enough to apply to textual, visual, and audio data (Stemler, 2015).

3.4.4 Formulation of Performance Scale

To assess the Institutional Resilience in the context of children disaster resilience, content analysis was performed on data collected through Semi-Structured Interview.

The Interview Guide was prepared that consisted of a set of predetermined questions based upon the key measures required to be undertaken by the institutions in each of the four thematic areas of Preparedness, Response, Recovery and Mitigation. A Performance Scale was developed based upon the interviewees' response, a score of '1' was assigned if institutions have completely undertaken the required measure to ensure disaster resilience, '0.5' if somewhat undertaken and '0' if institutions have not undertaken the required measure to achieve resilience.

Chapter 4

4. PROFILE OF RESPONDENTS

This chapter describes in brief the various characteristics of respondents such as age, gender, household size, average monthly income, and so-forth.

4.1 TOTAL NUMBER OF RESPONDENTS

There were total of 440 respondents, that participated in questionnaire survey. For the purpose of this study 110 respondents were selected from each of the 4 study areas as shown in Table 4.1.

Table 4. 1 Number of Respondents by Study area

Study Area	Number of Respondent
Chaghar Matti, Peshawar	110
Bashirabad, Peshawar	110
Gulbahar, Peshawar	110
Hayatabad, Peshawar	110
Total	440

4.2 SEX

Out of 440 respondents, 290 were male and 110 were female. The male respondents were 84, 68, 63, and 75, whereas the female respondents were 26, 42, 47, and 35 in Chaghar Matti, Bashirabad, Gulbahar and Hayatabad respectively as shown in Figure 4.1.

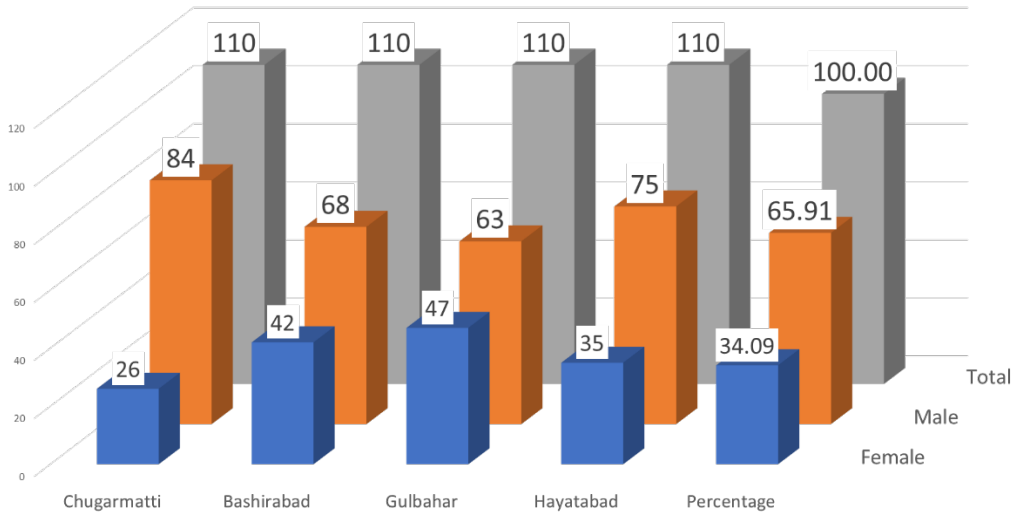


Figure 4. 1 Respondents by Sex

4.3 AGE

All the respondents were 7 years of age or above and up to 18 years of age. However, only few respondents were 7 years old. Most of the respondents were older than 7 years. Table 4.2 and Figure 4.2 shows age wise distribution of respondents.

Table 4. 2 Age wise distribution of Respondents

Age (years)	Frequency	Cumulative %
7	16	3.64%
8	30	10.45%
9	30	17.27%
10	29	23.86%
11	37	32.27%
12	39	41.14%
13	57	54.09%
14	52	65.91%
15	54	78.18%
16	46	88.64%
17	29	95.23%

18	21	100.00%
Total	440	100.00%

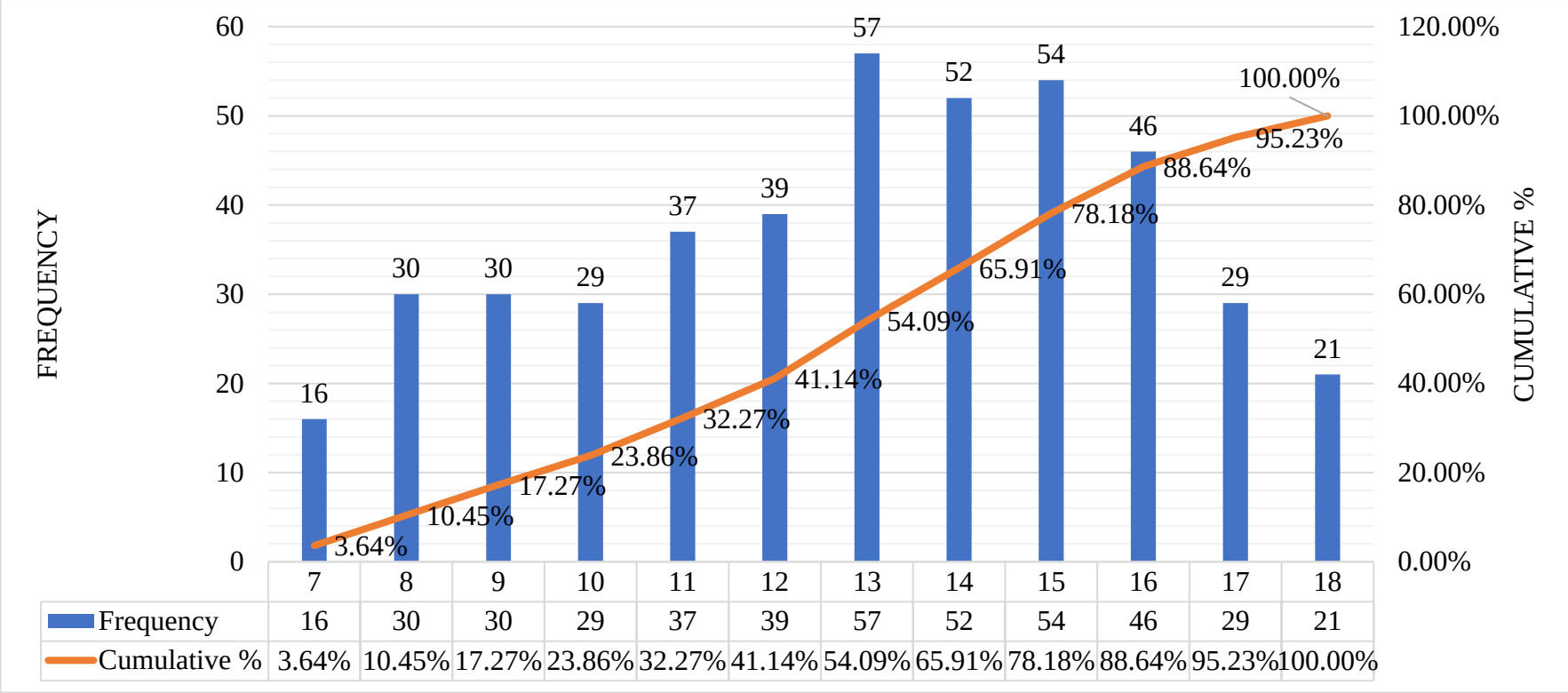


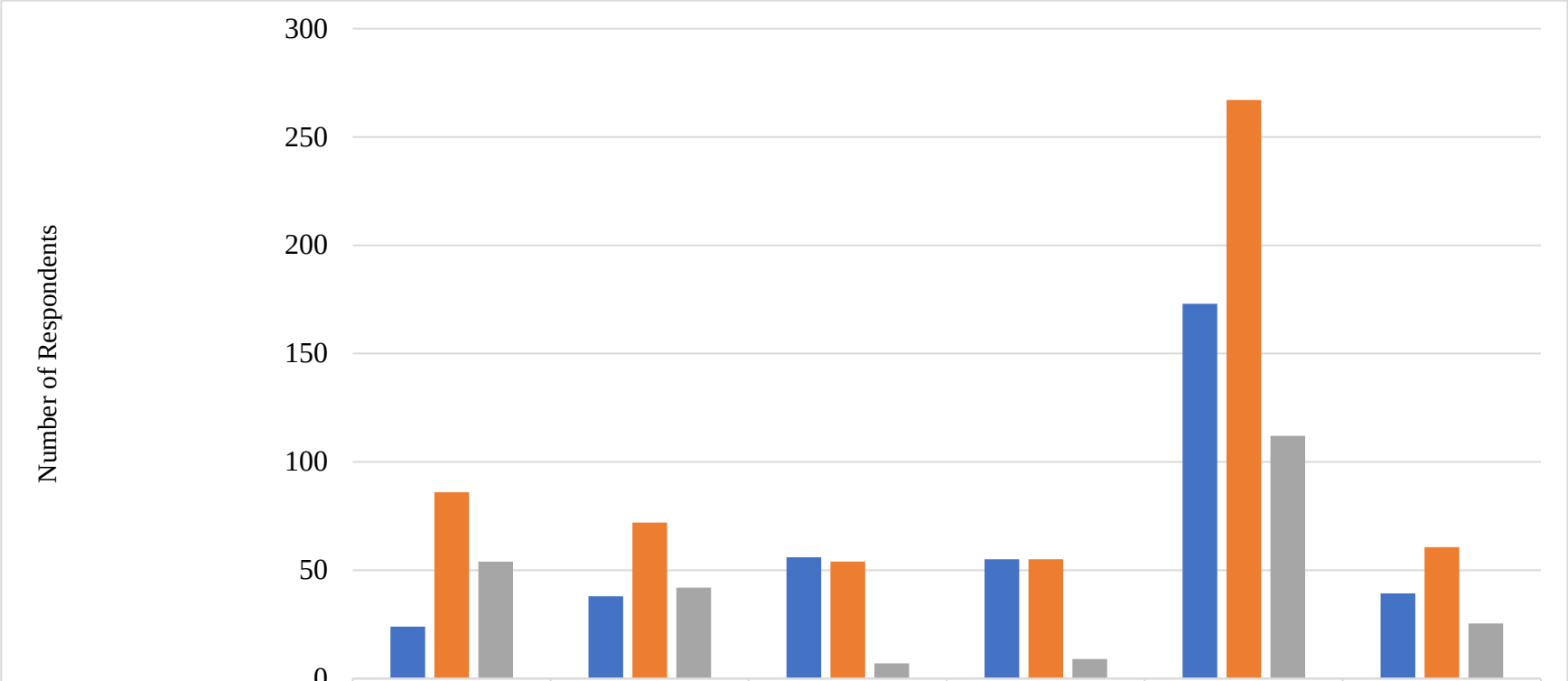
Figure 4. 2 Age wise distribution of respondents

4.4 DISASTER EXPERIENCE

Most of the respondents have experienced disasters (59.77%) whereas only 25.45% of the respondents were actually affected by the disaster, their detail is given in Table 4.3 and Figure 4.3.

Table 4. 3 Disaster Experience of Respondents

Study Area	Chaghar Matti	Bashirabad	Gulbahar	Hayatabad	Total	Percent (%)
No Disaster Experience	24	38	56	55	173	39.32
Experienced Disaster	86	72	54	55	267	60.68
Affected by Disaster (out of those who have experienced disaster)	54	42	7	9	112	25.45



	Chaghar Matti	Bashirabad	Gulbahar	Hayatabad	Total	Percent (%)
No Disaster Experience	24	38	56	55	173	39.32
Experienced Disaster	86	72	54	55	267	60.68
Affected by Disaster	54	42	7	9	112	25.45

Figure 4. 3 Disaster Experience of respondents

4.5 FAMILY INCOME

Most of the respondents from Chaghar Matti belonged to families with lower average monthly family income as compared to other study areas included in this research. Table 4.4 lists the family income of respondents corresponding to each study area.

Table 4. 4 Family income of respondents

Average Monthly Income	Chaghar Matti	Bashirabad	Gulbahar	Hayatabad
<10.000	0	0	0	0
10,000-19,999	34	4	0	0
20,000-39,999	68	28	13	6
40,000-60,000	8	48	42	23
>60,000	0	30	55	81

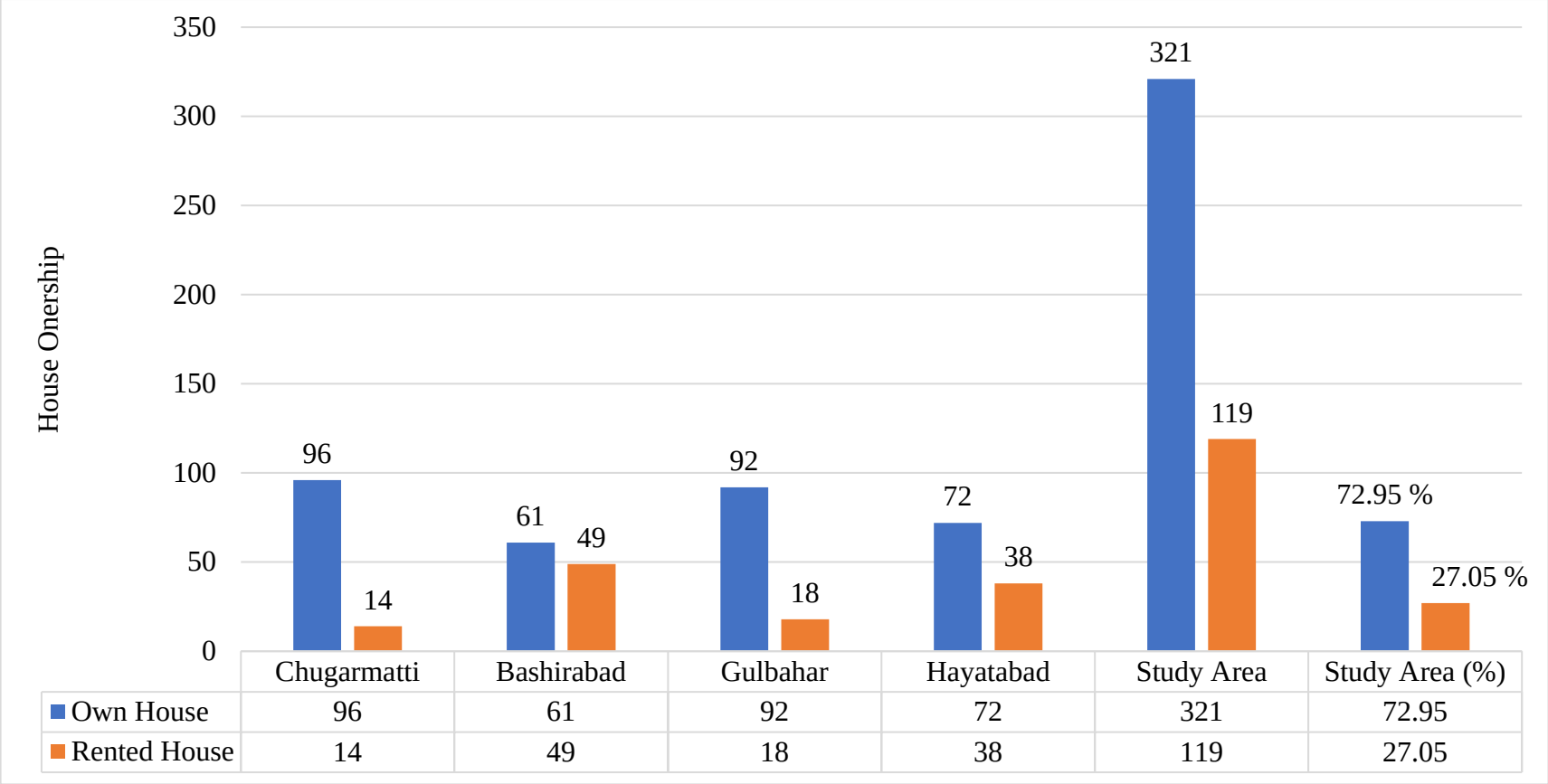
4.6 HOUSE OWNERSHIP

Most of the respondents in Chaghar Matti and Gulbahar were living in the houses they own, where as in Bashirabad most people were living in rented houses as compared to other three study areas, as Shown in Figure 4.4 and Table 4.5.

Table 4. 5 House ownership of Respondents

House Ownership	Chaghar Matti	Bashirabad	Gulbahar	Hayatabad	Study Area
Family owns the House	96	61	92	72	321
Family living in Rented House	14	49	18	38	119

Percent Own Houses	87.27%	55.45%	83.64%	65.45%	72.95%
Percent Rented Houses	12.73%	44.55%	16.36%	34.55%	27.05%



	Chugarmatti	Bashirabad	Gulbahar	Hayatabad	Study Area	Study Area (%)
Own House	96	61	92	72	321	72.95
Rented House	14	49	18	38	119	27.05

Figure 4. 4 House Ownership of Respondents

Chapter 5

5. CHILDREN DISASTER RESILIENCE

This chapter describes in brief the concept of disaster resilience of children, the conceptual framework of children disaster resilience and its various dimensions along with their definitions and indicators.

5.1 DISASTER RESILIENCE OF CHILDREN

Children disaster resilience refers to the capacities of children, households and communities in their specific social, physical, economic, environmental and institutional system, although such systems may vary from place to place, to protect children from the adverse effects of hazards that may arise because of local, regional or global phenomena.

To assess the disaster resilience of children five dimensions of social, economic, physical, institutional, and psychological resilience were used.

5.1.1 Dimensions of Disaster Resilience of Children

For the purpose of this study, while keeping in view the context of children's disaster resilience, each of the five dimension is defined as follows:

5.1.1.1 Social Resilience

Social resilience refers to the social capacities of children, household and communities in hazard-prone areas to combat hazards that the children are potentially exposed to while reducing the risk of potentially adverse consequences.

5.1.1.2 Economic Resilience

Economic Resilience refers to the economic abilities of households and communities to withstand the disasters and restore after the disaster without having significantly adverse impacts on children, such as loss of education, extreme poverty and child labour.

5.1.1.3 Physical Resilience

Physical resilience refers to the ability of man-made environment to withstand the potential hazards that may have adverse effects on children and their surroundings.

5.1.1.4 Institutional Resilience

Institutional resilience refers to the institutional efforts that have been made by the relevant institutions in pre-disaster, during disaster and post disaster phase to deal with the potential hazards, keeping in view the various aspects of hazards specially their geographical spread, the cause and location of their origins and their potential effects; to safeguard children and their environment from the harmful effects of such hazards.

5.1.1.5 Psychological Resilience

Psychological resilience refers to the mental ability of dealing with disasters without negatively affecting the mental health of the children.

5.2 MULTIDIMENSIONAL CHILDREN DISASTER RESILIENCE ASSESSMENT FRAMEWORK (MCDRAF)

MCDRAF is a multistage and a multidimensional framework. Each child has some self-characteristics, and he/she is also a part of a household, a community, and a wider geographic region. Therefore, MCDRAF is divided into four interconnected stages. The first stage shows that disaster resilience of children is dependent upon each child self-characteristics, the second stage shows that it also depends on the children's household characteristics. Similarly, the third stage represent the community characteristics and the fourth stage shows the overall regional characteristics that influence disaster resilience of children.

These four stages were adopted because disaster resilience of children is not explicitly dependent upon the self-characteristics of each child, such as mental or physical abilities, disaster awareness, and attitude towards the adaptation of precautionary measures etc. But it is significantly influenced by the household characteristics such as household head education level (Ainuddin & Routray, 2012; Armaş, 2008, 2012; Gwimbi, 2007; Rana & Routray, 2018b; Shah et al., 2018) ,

presence of other children specially below 15 years of age (Ainuddin & Routray, 2012; Cutter et al., 2010; Phung et al., 2016; Shah et al., 2018; Tobin, 1999), household preparedness for disaster (Joerin et al., 2012; Shah et al., 2018), livelihood options of household Routray, 2012; Joerin & Shaw, 2011; Shah et al., 2018), household monthly income (Ainuddin & Routray, 2012; Phung et al., 2016; Shah et al., 2018) along with the local community conditions such as social capital or trust among neighbours (Ainuddin & Routray, 2012; Cutter et al., 2008; Joerin et al., 2012; Neil Adger, 1999; Norris et al., 2008; Shah et al., 2018) and child participation in community level disaster safety planning (Gender and Child Cell, 2017b; Joerin & Shaw, 2011; Twigg, 2007), proximity of the community to source of potential hazard (Rana & Routray, 2018b; Thouret et al., 2014) such as river in case of flood or fault line in case of earthquake, along with city wide or regional factors, mostly institutional in nature, such as availability of credit facility to families for restoration after disaster (Twigg, 2007) and disaster early warning systems (Gain et al., 2015; Rana & Routray, 2018b; Twigg, 2007). Therefore, by ignoring the household, community and urban and regional characteristics, and only considering children self-characteristics, disaster resilience assessment of children is not possible. Thus, this study provides a holistic approach to children's disaster resilience assessment. Disaster can adversely impact children either physically or mentally or both. These adverse impacts can only be effectively mitigated with multidimensional approach to disaster resilience of children. Therefore, dimensional wise the MCDRAF consist of five distinct dimensions namely - social, economic, physical, institutional, and psychological dimension. These five dimensions were chosen to incorporate all the factors, found in literature review, that influence disaster resilience of children. Even though the various factors can be grouped as indicators representing a particular dimension, they cannot be precisely classified into the four stages of MCDRAF. Because of the fact that a particular indicator may represent more than one stage. For example, the indicator "child is going to any educational institute or not" may represent that on individual level education enhances individual ability and resilience to deal with disasters. Therefore, out of school children will not receive any counselling regarding disasters and will be less resilient. Similarly, it also shows the lack of ability at household and community levels to make proper arrangement for

their children education. But merely based on this fact, the importance of the four stages of MCDRAF cannot be ignored, as the lack of resilience in any stage can have drastic impacts on the disaster resilience of children.

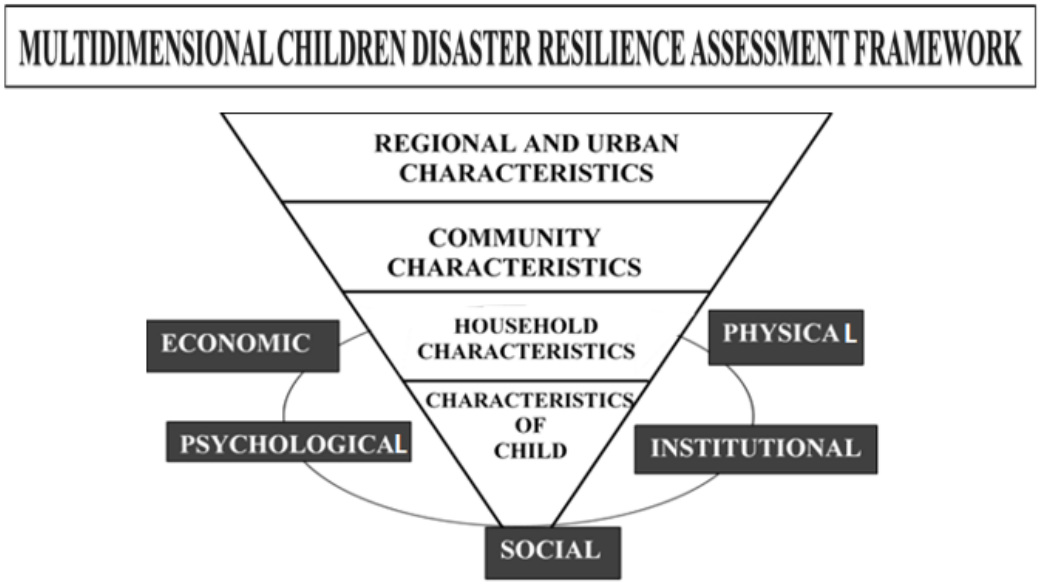


Figure 5. 1 The multidimensional children disaster resilience assessment framework (MCDRAF)

Therefore, for the purpose of this studies, a total of 76 indicators representing the four stages of MCDRAF are categorized across the five distinct dimensions of MCDRAF. Thus, making MCDRAF an integrated framework of children disaster resilience assessment.

5.2.1 Indicators

To assess the disaster resilience of children five dimensions of social, economic, physical, psychological, and institutional resilience were used, as identified in literature review. Indicators were used to assess each of the five dimensions of children disaster resilience. After an extensive literature review, indicators were chosen, mostly from flood and earthquake hazard studies, and scrutinized while keeping in view the local conditions and adjusted accordingly for the five dimensions of children's disaster resilience. The indicators for the social, economic, physical, and institutional dimensions are listed in Table 5.1.

Table 5. 1 Indicators, classes, and transformed values of Children Disaster Resilience

S. No.	Indicator	Explanation	Classes	Transformed value	References
Social Resilience					
1	Child below 15 years of age in the family	Constraints of mobility during earthquake/flood and evacuation	>2 2 1 0	0.25 0.5 0.75 1	(Ainuddin & Routray, 2012; Cutter et al., 2010; Phung et al., 2016; Shah et al., 2018; Tobin, 1999)
2	Child is going to any educational institute or not	Education enhances individual ability and resilience to deal with disasters. Out of school children will not receive any counselling regarding disasters and will be less resilient	No Yes	0 1	(Ainuddin & Routray, 2012; Gwimbi, 2007; Shah et al., 2017, 2018)
3	Child national language competency/ Child can communicate in the national language	Those children who can communicate in the national language will be more resilient. In disaster relief operations, local institutions and national institutions take part	Not at all Somewhat Very well	0 0.5 1	(Cutter et al., 2010; Morrow, 2008)
4	Child with disability	Children with disabilities are more vulnerable as compared to fit children. So, any disability will decrease children's resilience	Yes No	0 1	(Ainuddin & Routray, 2012; Shah et al., 2017, 2018)

5	Child having three meals per day	Children not regularly having three meals per day show less household resilience	Regularly Very often Sometime	1 0.67 0.33	(Dhraief et al., 2019; Thabane, 2015)
6	Child disaster experience	Children having disaster experience will be able to anticipate problems and challenges, that may arise because of disaster	No Yes	0 1	(Birkmann et al., 2013; Rana & Routray, 2018b; Shah et al., 2018)
7	Household head's education level	A lower level of formal schooling of the household head can reduce the family's resilience because of limited understandability of disaster safety guidelines, early warning systems, and information and communication technologies	No Schooling Primary Middle High College and above	0.2 0.4 0.6 0.8 1	(Ainuddin & Routray, 2012; Armaş, 2008, 2012; Gwimbi, 2007; Rana & Routray, 2018b; Shah et al., 2018)
8	Household prepared for disaster (disaster supply kit)	Preparation for disasters increases the resilience of households Families having disaster supply kits containing necessary items such as water, non-perishable food, flashlight, first aid kit, necessary drugs and medications, etc., are more resilient to disasters	No Yes	0 1	(Baker & Cormier, 2013; Joerin et al., 2012; Shah et al., 2018)
9	Social capital: community trust during a disaster	A community will be more resilient to disaster if a household	No Yes	0 1	(Adger, 1999; Ainuddin & Routray, 2012; Cutter et al.,

		trusts its neighbours with their children			2008; Joerin et al., 2012; Norris et al., 2008; Shah et al., 2018)
10	Disaster-related issues are discussed in the family with children	When disaster-related issues are discussed in the family with children, they are more resilient	No Yes	0 1	(Ronan et al., 2015)
11	Child knows his home address	If child know his home address and family member phone number	No Yes	0 1	(Baker & Cormier, 2013)
12	Child knows his Family member's phone number	, he/she can be easily reunited with family after separation during disaster	No Yes	0 1	(Baker & Cormier, 2013)
13	Child knows his/her relative address	Information of any relative address and phone number will be	No Yes	0 1	(HRSA, 2012; Shah et al., 2020)
14	Child knows his/her relative phone number	useful to find next of kin. Similarly, families that have identified a relative to contact that live outside the area, if family become separated during disaster, will be more prepared for disasters and hence more resilient	No Yes	0 1	(HRSA, 2012; Shah et al., 2020)
Economic Resilience					
1	Dependency ratio	Because of limited mobility and more dependency on adults, children will be less resilient to disasters than adults	>1 0.75-1 0.5-0.75 0.25-0.5 <0.25	0.2 0.4 0.6 0.8 1	(Gain et al., 2015; Rana & Routray, 2018b, 2018a)

2	Child labour	Child labour in the family show low economic resilience	No Yes	0 1	(Joerin & Shaw, 2011; Rentschler, 2013)
3	Use of family income	Families that spend income on non-essential things such as recreation show higher resilience than those who spent only on essential items such as food and medicines	No Yes	0 1	(Sulistyaningrum, 2015)
4	Health insurance	Health insurance can facilitate treatment and reduce the impacts during secondary disasters	No Yes	0 1	(Ainuddin & Routray, 2012; Cutter et al., 2010)
5	Female earning member in the family	Families with outgoing female have more mobility, and female may act as an alternate decision-maker for children in case of emergency without waiting for the household head	No Yes	0 1	(Joerin & Shaw, 2011; Shah et al., 2018)
6	Own vehicle: Household with motorized transportation	Children of household with having any means of transportation will be able to evacuate more easily	No Yes	0 1	(Joerin & Shaw, 2011; Shah et al., 2018)
7	Livelihood options of the household	Multiple sources of livelihood will increase resilience because even if one source is cut off, the household can survive on another	0 1 2 >2	0 0.25 0.75 1	(Ainuddin & Routray, 2012; Joerin & Shaw, 2011; Shah et al., 2018)

8	Households save money	When household save money, they are more resilient	No Yes	0 1	(Joerin & Shaw, 2011)
9	House ownership: Household residing in rented houses	The higher the ownership of the housing units, the better will be the quality and maintenance of the houses, hence more resilience against disasters	No	1	(Ainuddin & Routray, 2012; Shah et al., 2018)
10	Households have taken out a loan in the recent past	The household that has taken out a loan recently could be less resilient in case of a disaster emergency	Yes No	0 1	(Rana & Routray, 2018b)
11	Household average monthly income (in PKR)	Higher average monthly income households will be more resilient as compared to lower average monthly income.	<10* 10-20* 20-40* 40-60* >60* (* mean thousand)	0.2 0.4 0.6 0.8 1	(Ainuddin & Routray, 2012; Phung et al., 2016; Shah et al., 2018)
12	Availability of credit facility/ livelihood restoration program to disaster-affected families	Availability of credit facility will increase economic resilience	No Yes	0 1	(Shah et al., 2018; Twigg, 2007)
Physical Resilience					
1	Building Plan	A house following building codes and built after its building plan is	No Yes	0 1	(Ainuddin & Routray, 2012; Godschalk, 2003)

		approved by a concerned institution will be more physically resilient			
2	Location of the house	Nearness to the source of hazard and low elevation houses will be less resilient in case of disaster	Between Levee and riverbank Floodplain Upland	0.33 0.67 1	(Rana & Routray, 2018b; Thouret et al., 2014)
3	Building type	Houses built with limited open space and distance between neighbouring houses will decrease resilience	Combined (row houses) Semidetached (common) Detached (Bungalow)	0.33 0.67 1	(Birkmann et al., 2013; Papathoma-Köhle et al., 2017; Rana & Routray, 2018b)
4	Construction materials of household residence	The type of construction material used will affect the physical resilience of the building	Katcha (Adobe Mud) Pacca (Brick Cement)	0 1	(Papathoma-Köhle et al., 2017; Rana & Routray, 2018b, 2018a; Shah et al., 2018; Thouret et al., 2014)
5	Child access to drinking water	Children with access to basic requirements such as water, electricity, TV, and telephone will be more resilient than those lacking such facilities	No Yes	0 1	(Joerin & Shaw, 2011; Rana & Routray, 2018a)
6	Alternate water capacity		No Yes	0 1	(Joerin & Shaw, 2011)
7	Child access to electricity		No Yes	0 1	(Joerin & Shaw, 2011; Rana & Routray, 2018a)
8	Alternate electric power capacity		No Yes	0 1	(Joerin & Shaw, 2011)

9	Child access to improved sanitation		No Yes	0 1	(Joerin & Shaw, 2011; Rana & Routray, 2018a)
10	Children access to means of communication: TV or Radio		No Yes	0 1	(Joerin & Shaw, 2011; Rana & Routray, 2018a)
11	Children access to means of communication: landline Telephone or mobile phone		No Yes	0 1	(Cutter et al., 2010; Joerin & Shaw, 2011; Rana & Routray, 2018a)
Institutional Resilience					
1	Frequency of disaster awareness programs/drills attended by children	Lower frequency of disaster awareness programs/drills attended by children will reduce the disaster awareness of children, and it also signifies low institutional resilience	0 1 2	0 0.5 1	(Ainuddin & Routray, 2012; Cutter et al., 2008; Gender and Child Cell, 2017b; Rana & Routray, 2018b; Shah et al., 2018, 2020)
2	Child knowledge of disaster emergency protocols	Those children which are unable to understand local emergency procedures will be less resilient, and it also demonstrates the lack of institutions' capabilities	Low Moderate High	0.33 0.67 1	(Ainuddin & Routray, 2012; Rana & Routray, 2018b)
3	Dissemination of disaster safety plan to children with a map of evacuation routes and emergency shelter	Availability of disaster safety plan with children show institutional resilience	No Yes	0 1	(Cutter et al., 2008; Gender and Child Cell, 2017b; Joerin & Shaw, 2011; Rana & Routray, 2018a, 2018b)

4	Children participation: Child viewpoints incorporated in the preparation of local disaster safety plan	Incorporating children views, regarding what affects them, in local disaster safety plan show institutional resilience	No Yes	0 1	(Gender and Child Cell, 2017b; Joerin & Shaw, 2011; Twigg, 2007)
5	Disaster education: DDR and CCA-related education given to children in school/madrasa	Mainstreaming DRR and CCA education into curriculum show institutional resilience	No Yes	0 1	(Joerin & Shaw, 2011)
6	Water, sanitation, and hygiene (WASH training) to children	Water sanitation and hygiene (WASH training) make children more resilient	No Yes	0 1	(Shah et al., 2018)
7	Child can contact local emergency helpline during a disaster	If children know how to contact local emergency/rescue helpline during a disaster, they are more resilient	No Yes	0 1	(Alshehri et al., 2013)
8	Child's level of understanding disaster early warning systems	Children that do not understand the early warning system represents the inability of the institution to convey a proper early warning	Low Moderate High	0.33 0.67 1	(Gain et al., 2015; Rana & Routray, 2018b; Twigg, 2007)
9	Distance to nearest medical facility (in km)	If the distance between medical facility and residence is longer, there will be lower resilience	<1 1-5 5-10 >10	0.25 0.50 0.75 1	(Rana & Routray, 2018b)

10	Rescue services response time (in minutes)	For most of the time disaster rescue in very urgent. Quick resuce response is needed to save vulnerable population and promote resilience	>60 60-30 15-30 <15	0.25 0.5 0.75 1	(Chou & Wu, 2014; Cutter et al., 2010)

5.3 RESULT AND DISCUSSION

5.3.1 Social resilience

The social resilience index of children varies from 0.26 to 0.88 in Chaghar Matti, 0.30 to 0.93 in Bashirabad, 0.36 to 0.96 in Gulbahar, and 0.30 to 0.93 in Hayatabad. The mean value was 0.66 in Chaghar Matti, 0.71 in Bashirabad, 0.71 in Gulbahar, and 0.68 in Hayatabad. Regarding children's overall social resilience, a significant difference (F=2.94, p-value =0.03) was also observed among the four communities.

Indicator wise, in the whole study area, 8.4% of the children were not going to any kind of educational institution, especially in Chaghar Matti were only 82% of the children were going to formal education institutions. Most of the children in Hayatabad (87%), Gulbahar (95%), and Bashirabad (68%) were able to effectively communicate in Urdu, the national language of Pakistan. However, in Chaghar Matti only 34% children were able to communicate in Urdu. In Chaghar Matti (61%) most of the household have undertaken disaster preparedness measures, whereas few households have undertaken any such measures in Bashirabad (48%), Gulbahar (42%), and Hayatabad (36%). Most of the children in Chaghar Matti (78%) have experienced a natural hazard as compared to the other three areas of Bashirabad (65%), Gulbahar (49%) and Hayatabad (50%). The mean score, for all the respondents, of the indicator of household education level was significantly lower in Chaghar Matti (0.38), where most of the household heads were either illiterate or primary or secondary schooled, showing lack of extended education. In comparison, the other three areas of Bashirabad (0.76), Gulbahar (0.82) and Hayatabad (0.88) have higher mean score.

Within the Chaghar Matti community, 1.82% of children were relatively having “very low” social resilience, as compared to 14.55%, 51.82%, and 31.82% of children surveyed showing low, moderate, and high social resilience, respectively. Similarly, within the Bashirabad community, the percentage of relatively very low, low, moderate, and high social resilience among children was 5.46%, 18.18%, 42.73%, and 33.64%, respectively. Likewise, within the Gulbahar locality, the relatively very low, low, moderate, and high social resilience was observed among 8.18%, 25.45%, 41.82%, and 24.55%, respectively. Similarly, within the Hayatabad

vicinity, the percentage of children with very low, moderate, and high social resilience, relatively within the same vicinity, was 9.09%, 24.55%, 31.82%, and 34.55%, respectively, as shown in Table 5.2.

Table 5. 2 Social resilience of children against disasters

Study Area	Classes	Range	No. of Children	%	Cum. %	Descriptive Statistics	
Chaghar Matti	Very Low	≤0.42	2.00	1.82	1.82	Mean	0.66
	Low	0.42-0.57	16.00	14.55	16.36	Standard Deviation	0.12
	Moderate	0.57-0.73	57.00	51.82	68.18	Range	0.62
	High	>0.73	35.00	31.82	100.00	Minimum	0.26
		Total	110.00	100.00		Maximum	0.88
Bashirabad	Very Low	≤0.46	6.00	5.45	5.45	Mean	0.71
	Low	0.47-0.62	20.00	18.18	23.64	Standard Deviation	0.13
	Moderate	0.62-0.78	47.00	42.73	66.36	Range	0.63
	High	>0.78	37.00	33.64	100.00	Minimum	0.30
		Total	110.00	100.00		Maximum	0.93
Gulbahar	Very Low	≤0.51	9.00	8.18	8.18	Mean	0.71
	Low	0.51-0.66	28.00	25.45	33.64	Standard Deviation	0.13
	Moderate	0.66-0.81	46.00	41.82	75.45	Range	0.60
	High	>0.81	27.00	24.55	100.00	Minimum	0.36
		Total	110.00	100.00		Maximum	0.96
Hayatabad	Very Low	≤0.46	10.00	9.09	9.09	Mean	0.68
	Low	0.46-0.62	27.00	24.55	33.64	Standard Deviation	0.16
	Moderate	0.62-0.78	35.00	31.82	65.45	Range	0.63
	High	>0.78	38.00	34.55	100.00	Minimum	0.30
		Total	110.00	100.00		Maximum	0.93
ANOVA	F =	2.94	F crit =	2.63	df=3	p value =	0.03

5.3.2 Economic resilience

The economic resilience index of children varies from 0.22 to 0.67 in Chaghar Matti, 0.14 to 0.93 in Bashirabad, 0.34 to 0.81 in Gulbahar, and 0.36 to 0.96 in Hayatabad. The mean value was 0.43 in Chaghar Matti, 0.54 in Bashirabad, 0.59 in Gulbahar, and 0.71 in Hayatabad. Regarding the overall economic resilience of children, a significant difference (F=106.74, p-value =0.000) was also observed among the four communities.

In the whole study area, 10% of the children have remained engaged in child labour. In Chaghar Matti 18%, Bashirabad 16%, Gulbahar 5% and Hayatabad 2% of the children, included in data collection, have undertaken some kind of work to support

their families financially. Only 3% of the households have female earning members. Out of 440 children surveyed, 119 (27%) were living in rented houses. In Bashirabad 44%, in Hayatabad 35%, in Gulbahar 16% and only 13% of the children in Chaghar Matti were living in rented houses. The mean score, for all the respondents, of the indicator representing children's average monthly household's income was significantly lower in Chaghar Matti (0.55), where 31% of the household have average monthly income less than 20,000 Pakistani Rupees, with only 22% of the household saving money for future needs and 31% of the household have taken out loan in recent past. In comparison, the other three areas of Bashirabad (0.79), Gulbahar (0.888) and Hayatabad (0.94) have higher mean score, showing higher children's household average monthly income, with 52%, 55%, and 83% of the household saving money for future need and 37%, 25% and 14% of the household have taken out loan in recent past, respectively.

Within the Chaghar Matti community, 11.82% of children were relatively having "very low" economic resilience, as compared to 45.45%, 31.82%, and 10.91% of children surveyed showing low, moderate, and high economic resilience, respectively. Similarly, within the Bashirabad community, the percentage of relatively very low, low, moderate, and high economic resilience among children was 4.55%, 49.09%, 39.09%, and 7.27%, respectively. Likewise, within the Gulbahar locality, the relatively very low, low, moderate, and high economic resilience was observed among 9.09%, 36.36%, 40%, and 14.55%, respectively. Similarly, within the Hayatabad vicinity, the percentage of children with very low, moderate, and high economic resilience, relatively within the same vicinity, was 5.45%, 24.55%, 54.55%, and 15.45%, respectively, as shown in Table 5.3.

Table 5. 3 Economic resilience of children against disasters

Study Area	Classes	Range	No. of Children	%	Cum. %	Descriptive Statistics	
Chaghar Matti	Very Low	≤0.33	13.00	11.82	11.82	Mean	0.43
	Low	0.33-0.44	50.00	45.45	57.27	Standard Deviation	0.09
	Moderate	0.44-0.55	35.00	31.82	89.09	Range	0.45
	High	>0.55	12.00	10.91	100.00	Minimum	0.22
		Total				Maximum	0.67
Bashirabad	Very Low	≤0.34	5.00	4.55	4.55	Mean	0.54
	Low	0.34-0.54	54.00	49.09	53.64	Standard Deviation	0.14
	Moderate	0.54-0.73	43.00	39.09	92.73	Range	0.78
	High	>0.73	8.00	7.27	100.00	Minimum	0.14
						Maximum	0.93
Gulbahar	Very Low	≤0.46	10.00	9.09	9.09	Mean	0.59
	Low	0.46-0.58	40.00	36.36	45.45	Standard Deviation	0.11
	Moderate	0.58-0.7	44.00	40.00	85.45	Range	0.47
	High	>0.7	16.00	14.55	100.00	Minimum	0.34
						Maximum	0.81
Hayatabad	Very Low	≤0.51	6.00	5.45	5.45	Mean	0.71
	Low	0.51-0.66	27.00	24.55	30.00	Standard Deviation	0.11
	Moderate	0.66-0.81	60.00	54.55	84.55	Range	0.60
	High	>0.81	17.00	15.45	100.00	Minimum	0.36
						Maximum	0.96
ANOVA	F =	106.74	F crit =	2.63	df=3	p value =	0.000

5.3.3 Physical resilience

Children's physical resilience index varies from 0.36 to 0.97 in Chaghar Matti, 0.33 to 1 in Bashirabad, 0.55 to 0.1 in Gulbahar, and 0.67 to 1 in Hayatabad. The mean value was 0.62 in Chaghar Matti, 0.79 in Bashirabad, 0.84 in Gulbahar, and 0.89 in Hayatabad. Regarding the overall physical resilience of children, a significant difference (F=101.31, p-value =0.000) was also observed among the four communities.

In Hayatabad all the houses building plan are approved by local authority, whereas in Bashirabad and Gulbahar 86% and 93% of the houses building plans were approved by local authority, respectively. However, in the rural area of Chaghar Matti only 13% of the houses building plan were approved by local authority and almost half of the household lived in highly vulnerable floodplains, and some had even built houses inside levees and embankments. In case of building material 50% households in Chaghar Matti and only 18% households in Bashirabad were living in

adobe houses. In terms of infrastructural services, every household had access to electricity and almost every household (95%) had access to clean drinking water. But provision of improved sanitation varied among communities, with 24% of the children's household lacking access to improved sanitation and 11% household lacking access to toilets in Chaghar Matti which can decrease the resilience of already exposed communities. In Hayatabad, Gulbahar, Bashirabad and Chaghar Matti 90%, 84%, 79% and 62% children have access to mobile or telephone or both and 97%, 95%, 72% and 59% children have access to TV or radio or both, respectively.

Within the Chaghar Matti community, 26.36% of children were relatively having "very low" social resilience, as compared to 43.64%, 20%, and 10% of children surveyed showing low, moderate, and high physical resilience, respectively. Similarly, within the Bashirabad community, the percentage of relatively very low, low, moderate, and high physical resilience among children was 4.55%, 16.36%, 41.82%, and 37.27%, respectively. Likewise, within the Gulbahar locality, the relatively very low, low, moderate, and high physical resilience was observed among 8.18%, 17.27%, 32.73%, and 41.82%. Similarly, within the Hayatabad vicinity, the percentage of children with very low, moderate, and high physical resilience, relatively within the same vicinity, was 3.64%, 20%, 62.73% and 13.64%, respectively, as shown in Table 5.4.

Table 5. 4 Physical Resilience of Children against disasters

Study Area	Classes	Range	No. of Children	%	Cum. %	Descriptive Statistics	
Chaghar Matti	Very Low	≤0.52	29.00	26.36	26.36	Mean	0.62
	Low	0.52-0.67	48.00	43.64	70.00	Standard Deviation	0.14
	Moderate	0.67-0.82	22.00	20.00	90.00	Range	0.61
	High	>0.82	11.00	10.00	100.00	Minimum	0.36
		Total	110.00	100.00		Maximum	0.97
Bashirabad	Very Low	≤0.50	5.00	4.55	4.55	Mean	0.79
	Low	0.50-0.67	18.00	16.36	20.91	Standard Deviation	0.15
	Moderate	0.67-0.83	46.00	41.82	62.73	Range	0.67
	High	>0.83	41.00	37.27	100.00	Minimum	0.33
						Maximum	1.00
Gulbahar	Very Low	≤0.66	9.00	8.18	8.18	Mean	0.84
	Low	0.66-0.78	19.00	17.27	25.45	Standard Deviation	0.11
	Moderate	0.78-0.89	36.00	32.73	58.18	Range	0.45
	High	>0.89	46.00	41.82	100.00	Minimum	0.55

						Maximum	1.00
Hayatabad	Very Low	≤0.75	4.00	3.64	3.64	Mean	0.89
	Low	0.75-0.83	22.00	20.00	23.64	Standard Deviation	0.06
	Moderate	0.83-0.92	69.00	62.73	86.36	Range	0.33
	High	>0.92	15.00	13.64	100.00	Minimum	0.67
						Maximum	1.00
ANOVA	F =	101.31	F crit =	2.63	df=3	p value =	0.000

5.3.4 Institutional resilience

The institutional resilience index of children varies from 0.15 to 0.81 in Chaghar Matti, 0.24 to 0.91 in Bashirabad, 0.26 to 0.89 in Gulbahar, and 0.33 to 0.94 in Hayatabad. The mean value was 0.42 in Chaghar Matti, 0.51 in Bashirabad, 0.55 in Gulbahar, and 0.57 in Hayatabad. Regarding children's overall institutional resilience, a significant difference (F=20.75, p-value =0.000was also observed among the four communities.

Almost all the children lack access to map of evacuation routes with location of emergency shelter. Children were not aware of their local disaster safety plan. Disaster related education has not been integrated into the school curriculum and there is a lack of disaster training pragmas and drills. However, 64% of the children in Chaghar Matti, 62% in Bashirabad, 58% in Gulbahar and 59% in Hayatabad were able to understand the disaster early warning system that is mostly delivered using loudspeaker mounted vehicle and making announcements in mosques in the local languages. There are 15 emergency response stations of Rescue 1122, the local emergency response institution, in Peshawar. However, most of them are located in urban areas and the distance of nearest emergency response station to Chaghar Matti is 11.2 Km and the nearest hospital is 17.1 Km, which reduces their resilience.

Within the Chaghar Matti community, 26.36% of children were relatively having “very low” institutional resilience, as compared to 38.18%, 23.64%, and 11.82% of children surveyed showing low, moderate, and high institutional resilience, respectively. Similarly, within the Bashirabad community, the percentage of relatively very low, low, moderate, and high institutional resilience among children was 20%, 46.36%, 24.55%, and 9.09%, respectively. Likewise, within the Gulbahar locality, the relatively very low, low, moderate, and high institutional resilience was

observed among 19.09%, 29.09%, 41.82%, and 10%, respectively. Similarly, within the Hayatabad vicinity, the percentage of children with very low, moderate, and high institutional resilience, relatively within the same vicinity, was 29.09%, 32.73%, 31.82%, and 6.36%, respectively, as shown in Table 5.5.

Table 5. 5 Institutional resilience of children against disasters

Study Area	**Classes**	**Range**	**No. of Children**	**%**	**Cum. %**	**Descriptive Statistics**	
Chaghar Matti	Very Low	≤0.31	29.00	26.36	26.36	Mean	0.42
	Low	0.31-0.48	42.00	38.18	64.55	Standard Deviation	0.16
	Moderate	0.48-0.65	26.00	23.64	88.18	Range	0.67
	High	>0.65	13.00	11.82	100.00	Minimum	0.15
						Maximum	0.81
Bashirabad	Very Low	≤0.41	22.00	20.00	20.00	Mean	0.51
	Low	0.41-0.57	51.00	46.36	66.36	Standard Deviation	0.15
	Moderate	0.57-0.74	27.00	24.55	90.91	Range	0.67
	High	>0.74	10.00	9.09	100.00	Minimum	0.24
						Maximum	0.91
Gulbahar	Very Low	≤0.42	21.00	19.09	19.09	Mean	0.55
	Low	0.42-0.57	32.00	29.09	48.18	Standard Deviation	0.15
	Moderate	0.57-0.73	46.00	41.82	90.00	Range	0.63
	High	>0.73	11.00	10.00	100.00	Minimum	0.26
						Maximum	0.89
Hayatabad	Very Low	≤0.48	32.00	29.09	29.09	Mean	0.57
	Low	0.48-0.64	36.00	32.73	61.82	Standard Deviation	0.16
	Moderate	0.64-0.79	35.00	31.82	93.64	Range	0.61
	High	>0.79	7.00	6.36	100.00	Minimum	0.33
						Maximum	0.94
ANOVA	F=	20.75	F crit =	2.63	Df = 3	p value =	0.000

Chapter 6

6. PSYCHOLOGICAL RESILIENCE OF CHILDREN TO DISASTERS

This chapter discuss the psychological impacts of disaster on children. It also includes the CPDRAF and its four components along with their indicators.

6.1 PSYCHOLOGICAL RESILIENCE OF CHILDREN TO DISASTERS

Children are affected worldwide by adverse events such as war, terrorism, and natural hazards (Masten & Narayan, 2012). Children suffer from a wide range of psychological issues after experiencing a disaster, which can last for a long period of time, if proper mitigation measures are not taken (Kar, 2009; Makwana, 2019). In spite of the fact that children are more psychologically vulnerable, the post disaster psychological manifestations in children are mostly ignored by the parents and professionals (Kar, 2009; Kar et al., 2007; Nisha et al., 2014; Sharma & Kar, 2019).

Disaster preparedness both physical and psychological are of utmost importance. Such preparedness significantly reduce damages and losses from disaster (Hoffmann & Muttarak, 2017; Makwana, 2019). Disaster psychological preparedness safeguard individuals from damaging psychological effects arising from disasters (Roudini et al., 2017) . However, due to limited awareness of disasters and their adverse mental impacts, psychological preparedness in the context of disasters are often ignored (Roudini et al., 2017).

Despite several attempts, no unanimously agreed upon method of resilience assessment has been formulated (Toseroni et al., 2016)**.** There are different assessment methodologies and operationalization of the concept of disaster resilience. Li et al., (2015) presented psychological resilience framework for children affected by HIV by taking into account children self-characteristics along with family and community resources for promoting psychological resilience among such affected children. There is a lack of an assessment technique that explicitly quantify

children psychological resilience to disasters. This study presents disaster, from psychological point of view, in the context of children, as a “change” and an “awareness”. After experiencing a disaster, children perceived sense of reality and children believe in their self-abilities are changed (Newman, 1976). Similarly, disaster experience by children also lead to early awareness to some harsh truths of life such as death (Newman, 1976). Children vulnerability to mental stresses increases after experiencing disaster if they cannot make the necessary adaptations - as dictated by the ‘change’ and ‘awareness’ - by themselves or with the help of external agents such as health care professionals.

The aim of this study is to devise a conceptual framework; and formulate a method for its application by utilizing an index-based approach, to assess children psychological resilience to disasters and highlight the indicators that must be focused to lessen the consequences of such extreme adversities for children.

6.2 CHILDREN PSYCHOLOGICAL DISASTER RESILIENCE ASSESSMENT FRAMEWORK (CPDRAF)

The proposed framework for the assessment of children psychological resilience to disasters consist of 4 key components namely - mental health, life stressor, attitude, and awareness, as shown in Figure 6.1.

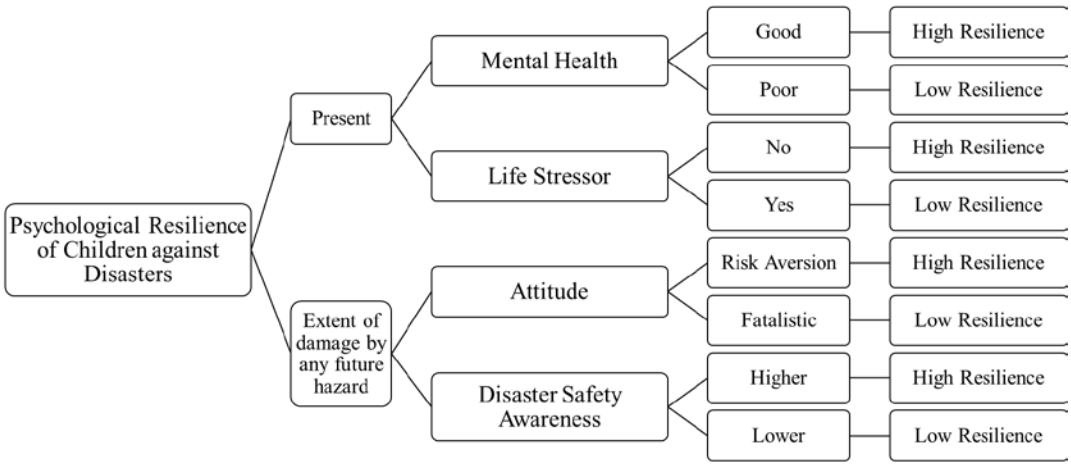


Figure 6. 1 Concept of Psychological Resilience of Children against Disasters

The component of mental health assesses the present mental health of children by taking into account 11 distinct indicators to signify whether the child is exhibiting any manifestation that may be a sign of psychological disorder. The component of life stressor uses 8 indicators to study whether the child is suffering from any tragic condition other than disaster that may affect their mental health adversely and potentially compromise the child future. The components of attitude and awareness uses 5 indicators each. They form the essential component of this framework. Together they are used to signify the disaster preparedness and the extent of future damages that children may suffer from disaster. Collectively all the 4 components complement each other in formulating children psychological disaster resilience assessment framework. All the indicators used to assess psychological resilience and their classes, values, and source of the indicator are listed in Table 6.1.

The life stressor component is used to study the current life stressors present in the lives of children that may negatively affect their mental health. Life stressors usually harm children's psychological health. Poverty may result in a greater risk of psychological issues for children, including attention deficit hyperactivity disorder (ADHD), anxiety, depression, conduct disorder, and low self-esteem (American Psychological Association, 2009). Conflicts among the family members may affect the children even if they are just observing and not directly participating (Hall & Cummings, 1997). Similarly, marital conflicts are associated with greater child emotional insecurity (Kouros et al., 2008). Even though each family and child is unique with varying degrees of emotional, social, and economic resources, yet parental separation and divorce reduce children future abilities and competency in all spheres of life (Anderson, 2014). Children experiencing violence at school are at higher risk of not only developing negative habits such as smoking and alcohol addiction but may also suffer from various physical and mental disorders (Ferrara et al., 2019). Similarly, those children who have undergone lack of care and abuse are at higher risk for several physical health and psychological problems. Such children, even as adults show an increased risk for psychological and medical disorders and lower output in the economic sphere of life (National Research Council, 2014).

Similarly, the mental health of children was also assessed based upon the various symptoms used as indicators. These indicators were primarily derived from the symptoms of ADHD, disruptive behaviour disorder, anxiety, and depression, which are the most commonly diagnosed mental disorders in children (Centers for Disease Control and Prevention, 2020c). The extent and intensity of exposure to the traumatic event is one of the most important predictors of children's post-disaster distress (Lengua et al., 2005; Peek, 2008). Disaster Awareness (AlQahtany & Abubakar, 2020; Klein et al., 2003) and risk aversion attitude (AlQahtany & Abubakar, 2020) can reduce the extent and intensity of exposure to disaster. This study includes the component of disaster awareness and attitude to disaster risk reduction, which can lessen the adverse impacts by any future disaster (Rana & Routray, 2018b), which may consequently lesson the influence of post-disaster mental distress in children.

Table 6. 1 Children's disaster psychological resilience Indicators along with their classes, transformed values and references

S.No.	Indicator	Explanation	Classes	Transformed values	References
Life Stressors					
1	Parents Marital problems (separation or divorce, fighting or arguing)	Life stressors adversely affect child mental health and reduce developmental prospects for children	Yes No	0 1	(Anderson, 2014; Hall & Cummings, 1997; Kouros et al., 2008)
1	Financial issues or poverty in the family		Yes No	0 1	(American Psychological Association, 2009; Evans, 2016)
3	Severe illness or injury		Yes No	0 1	(Caffo & Belaise, 2003)
4	Severe illness or disability of family member		Yes No	0 1	(Caffo & Belaise, 2003)
5	Death of close relative or friend		Yes No	0 1	(Caffo & Belaise, 2003; Peek, 2008)
6	Problems in school (violence, study stress, exam, declining grades, or harassment)		Yes No	0 1	(Ferrara et al., 2019)
7	Sense of fear because of hearing about terrorism and other disasters		Yes No	0 1	(Caffo & Belaise, 2003)
8	Being neglected		Yes No	0 1	(Eckenrode et al., 1993; National Research Council, 2014)
Mental Health					

1	Feeling unsafe, intense fear.	Children lacking signs of psychological issues will be more resilient as compared to children suffering from psychological disorders	Yes No	0 1	(Centers for Disease Control and Prevention, 2020a)
2	Sleep problems (Insomnia, excessive sleeping, nightmares)		Yes No	0 1	(Centers for Disease Control and Prevention, 2020a; National Health Service, 2020)
3	Social withdrawal (Withdrawn from family, friends and previously enjoyed activities)		Yes No	0 1	(Centers for Disease Control and Prevention, 2020a; National Health Service, 2019)
4	Feeling of guilt and worthlessness		Yes No	0 1	(Centers for Disease Control and Prevention, 2020a; National Health Service, 2019)
5	Anti-Social behaviour (lying, cheating, stealing)		Yes No	0 1	(Centers for Disease Control and Prevention, 2020b)
6	Suicidal Tendencies		Yes No	0 1	(Centers for Disease Control and Prevention, 2020a; National Health Service, 2019)
7	Rebellious attitude (often defies adults, refuse to follow rules)		Yes No	0 1	(Centers for Disease Control and Prevention, 2020b)
8	Often angry, resentful, and vindictive		Yes No	0 1	(Centers for Disease Control and Prevention, 2020b; National Health Service, 2020)
9	Restless, hyperactive		Yes No	0 1	(American Psychiatric Association, 2013)
10	Easily distracted, cannot concentrate, short attention span		Yes No	0 1	(American Psychiatric Association, 2013; Centers for Disease Control and Prevention,

					2020a; National Health Service, 2018)
11	Feeling unwell (Often complain of stomachache, headache)		Yes No	0 1	(National Health Service, 2019, 2020)
Attitude					
1	Attributing damage to uncontrollable natural causes rather than controllable human actions, such as preparation and thus believing caused damages are not preventable	Children believing that disasters are not preventable will not undertake safety and precautionary measures	Totally true Somewhat true Not true	0 0.5 1	(AlQahtany & Abubakar, 2020; Alshehri et al., 2013)
2	Show interest in the adaptation of safety measures against disaster	Children showing interest in the adaptation of safety will be more resilient	Not true Somewhat true Totally	0 0.5 1	(AlQahtany & Abubakar, 2020)
3	Willing to follow disaster safety guidelines	Those children who follow safety guidelines will be more resilient relative to those not following the safety guidelines	Not true Somewhat true Totally	0 0.5 1	(Alshehri et al., 2013)
4	Willing to take part in disaster safety trainings and drills	Taking part in disaster safety trainings and drills shows a positive attitude towards disaster safety	Not true Somewhat true Totally	0 0.5 1	(AlQahtany & Abubakar, 2020)

5	Considered disasters as the result of the indignation of God, thus ignoring scientific evidence	Such irrational believes will make children more prone to disasters	True Somewhat true Not true	0 0.5 1	(Alshehri et al., 2013)
Awareness					
1	Awareness of local hazards	Lower awareness level of hazards, safety measures, disaster management institutions protocols, and evacuation routes will decrease children's disaster resilience	Not true Somewhat true True	0.33 0.67 1	(AlQahtany & Abubakar, 2020; Alshehri et al., 2013; Khan et al., 2020)
2	Knowledge of how to deal with local hazards safely		Not true Somewhat true True	0.33 0.67 1	(Alshehri et al., 2013; Khan et al., 2020)
3	Information of local disaster management institutions rescue and evacuation procedures		Not true Somewhat true True	0.33 0.67 1	(Alshehri et al., 2013)
4	Knowledge of evacuation routes, to be used during disaster		Not true Somewhat true True	0.33 0.67 1	(Khan et al., 2020)
5	Disaster experience	Disaster experience will enhance children disaster awareness	No Yes	0 1	(Birkmann et al., 2013; Rana & Routray, 2018b; Shah et al., 2018)

6.3 RESULT AND DISCUSSION

6.3.1 Psychological resilience

The mean value of CPDRAI was 0.79 in Chaghar Matti, 0.82 in Bashirabad, 0.86 in Gulbahar and 0.83 in Hayatabad, with significant difference (F=17.39., p value =0.000) observed among the four communities. In Chaghar Matti the CPDRAI varied from 0.5 to 0.99, with 2.73%, 16.36%, 60% and 20.91% of children surveyed shown relatively very low, low, moderate, and high psychological resilience in Chaghar Matti, respectively. In Bashirabad the CPDRAI varied from 0.60 to 0.98; whereas within the Bashirabad community the percentage of relatively very low, low, moderate and high psychological resilience among children was 1.82%, 25.45%, 40.91% and 31.82% respectively. The CPDRAI varied from 0.7 to 0.98 in Gulbahar, with 8.18%, 30%, 39.09% and 22.73% of children surveyed shown relatively very low, low, moderate, and high psychological resilience in Gulbahar, respectively. Similarly, CPRDAI of children varied from 0.64 to 0.98 in Hayatabad, with the relative percentage of children having very low, low, moderate, and high psychological resilience was 1.82%, 17.27%, 55.45% and 25.45% respectively, as shown in Table 6.2.

The overall mean score for all the 4 communities was 0.89, 0.93, 0.80 and 0.69 for the components of life stressor, mental health, attitude, and awareness respectively. Among all the 4 components the mean score for all the four communities was highest for the mental health component having the value of 0.91 for Chaghar Matti, 0.91 for Bashirabad, 0.94 for Gulbahar and 0.95 for Hayatabad and lowest for the awareness component having the value of 0.7 for Chaghar Matti, 0.68 for Bashirabad, 0.71 for Gulbahar and 0.65 for Hayatabad, as shown in Figure 6.2.

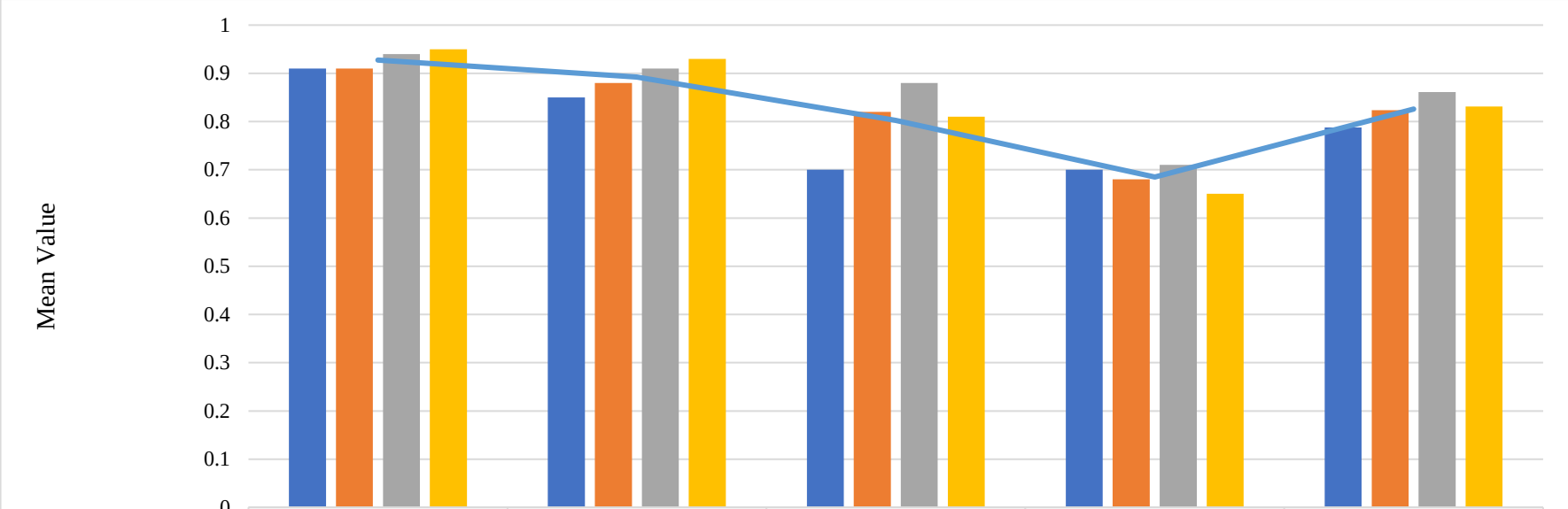
Table 6. 2 Psychological resilience of Children to disasters

Study Area	Classes	Range	No. of Children	%	Cum. %	Descriptive Statistics	
Chaghar Matti	Very Low	≤0.62	3.00	2.73	2.73	Mean	0.79
	Low	0.62-0.75	18.00	16.36	19.09	Standard Deviation	0.09
	Moderate	0.75-0.87	66.00	60.00	79.09	Range	0.49
	High	>0.87	23.00	20.91	100.00	Minimum	0.5
						Maximum	0.99
Bashirabad	Very Low	≤0.7	2.00	1.82	1.82	Mean	0.82

	Low	0.7-0.8	28.00	25.45	27.27	Standard Deviation	0.08
	Moderate	0.8-0.9	45.00	40.91	68.18	Range	0.39
	High	>0.9	35.00	31.82	100.00	Minimum	0.60
						Maximum	0.98
Gulbahar	Very Low	≤0.77	9.00	8.18	8.18	Mean	0.86
	Low	0.77-0.84	33.00	30.00	38.18	Standard Deviation	0.07
	Moderate	0.84-0.91	43.00	39.09	77.27	Range	0.28
	High	>0.91	25.00	22.73	100.00	Minimum	0.7
						Maximum	0.98
Hayatabad	Very Low	≤0.73	2.00	1.82	1.82	Mean	0.83
	Low	0.73-0.82	19.00	17.27	19.09	Standard Deviation	0.07
	Moderate	0.82-0.9	61.00	55.45	74.55	Range	0.35
	High	>0.9	28.00	25.45	100.00	Minimum	0.64
						Maximum	0.98
ANOVA		F=	17.393	F crit =	2.63	df = 3	p value = 0.000

Safizadeh et al., (2009) in their study to assess the awareness and attitude of university students with regard to blood donation, observed a positive and significant relationship between the attitude and awareness. Similarly Moghadam et al., (2017) also determined positive and significant relation between awareness and attitude while determining the level of students awareness, attitude, and interest for their own branch of study.

Even though in numerous studies the relationship between awareness and attitude is statistically significant and positive, the mean score of awareness and attitude especially in Bashirabad having values of 0.68 and 0.82 respectively and in Hayatabad having values of 0.65 and 0.81 respectively suggest that the relationship between attitude and awareness should be determined while considering trust as a moderator variable because during disaster risk and crises communication public is most like to respond to warning if they see the information source as trustworthy (Steelman et al., 2015).



	Mental Health	Life Stressors	Attitude	Awareness	Psychological Resilience
Chaghar Matti	0.91	0.85	0.7	0.7	0.79
Bashirabad	0.91	0.88	0.82	0.68	0.82
Gulbahar	0.94	0.91	0.88	0.71	0.86
Hayatabad	0.95	0.93	0.81	0.65	0.83
Mean	0.93	0.89	0.80	0.69	0.83

Figure 6. 2 Mean Values of CPDRAI and its Components

6.3.2 Children disaster resilience

The resilience index of children varies from 0.39 1to 0.79 in Chaghar Matti, 0.48 to 0.87 in Bashirabad, 0.57 to 0.85 in Gulbahar, and 0.59 to 0.92 in Hayatabad. The mean value was 0.59 in Chaghar Matti, 0.67 in Bashirabad, 0.71 in Gulbahar, and 0.74 in Hayatabad. Regarding children's overall resilience, a significant difference (F=94.89, p-value =0.000) was also observed among the four communities, as shown in Table 6.3.

Within the Chaghar Matti community, 8.18% of children were relatively having "very low" resilience, as compared to 59.09%, 23.64%, and 9.09% of children surveyed showing low, moderate, and high resilience, respectively. Similarly, within the Bashirabad community, the percentage of relatively very low, low, moderate, and high resilience among children was 12.73%, 31.82%, 43.64%, and 11.82%, respectively. Likewise, within the Gulbahar locality, the relatively very low, low, moderate, and high resilience was observed among 16.36%, 29.09%, 42.73%, and 11.82%, respectively. Similarly, within the Hayatabad vicinity, the percentage of children with very low, low, moderate, and high resilience, relatively within the same vicinity, was 19.09%, 40%, 35.45%, and 5.45%, respectively.

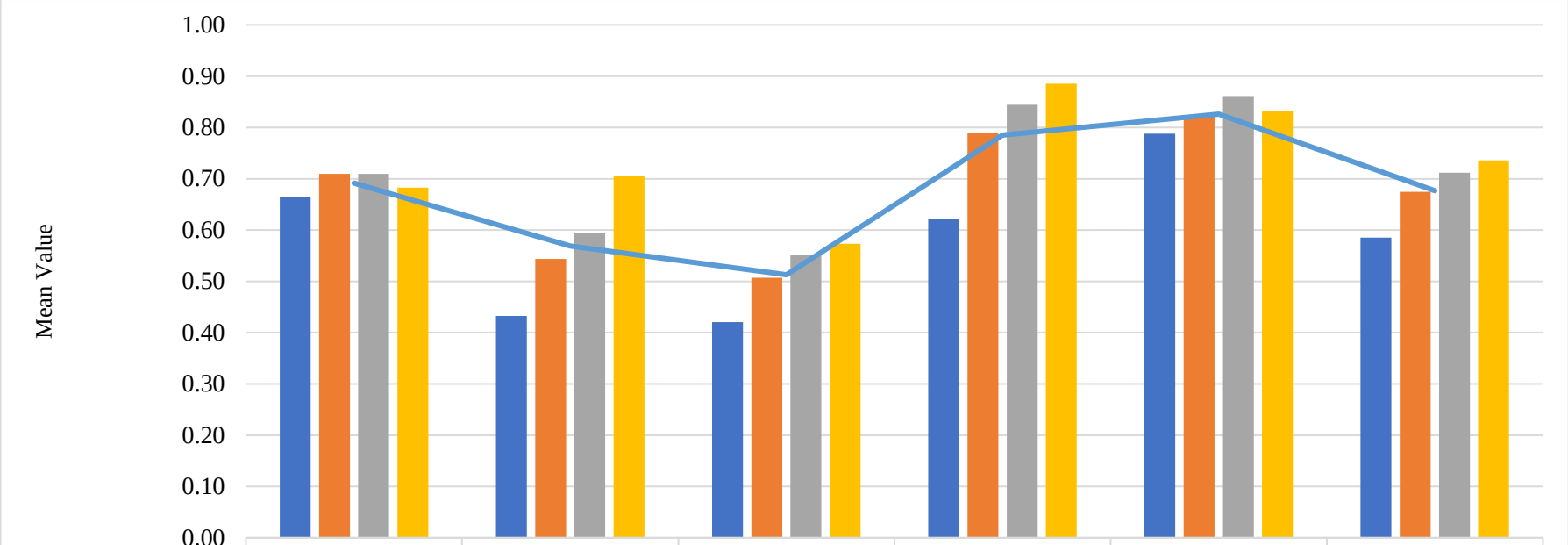
Table 6. 3 Disaster resilience of children

Study Area	Classes	Range	No. of Children	%	Cum. %	Descriptive Statistics	
Chaghar Matti	Very Low	≤0.49	9.00	8.18	8.18	Mean	0.59
	Low	0.49-0.58	65.00	59.09	67.27	Standard Deviation	0.08
	Moderate	0.58-0.68	26.00	23.64	90.91	Range	0.38
	High	>0.68	10.00	9.09	100.00	Minimum	0.39
						Maximum	0.79
Bashirabad	Very Low	≤0.58	14.00	12.73	12.73	Mean	0.67
	Low	0.58-0.67	35.00	31.82	44.55	Standard Deviation	0.08
	Moderate	0.67-0.77	48.00	43.64	88.18	Range	0.38
	High	>0.77	13.00	11.82	100.00	Minimum	0.48
						Maximum	0.87
Gulbahar	Very Low	≤0.64	18.00	16.36	16.36	Mean	0.71
	Low	0.64-0.71	32.00	29.09	45.45	Standard Deviation	0.06
	Moderate	0.71-0.78	47.00	42.73	88.18	Range	0.28
	High	>0.78	13.00	11.82	100.00	Minimum	0.57
						Maximum	0.85
Hayatabad	Very Low	≤0.67	21.00	19.09	19.09	Mean	0.74
	Low	0.67-0.76	44.00	40.00	59.09	Standard Deviation	0.07
	Moderate	0.76-0.84	39.00	35.45	94.55	Range	0.33
	High	>0.84	6.00	5.45	100.00	Minimum	0.59

						Maximum	0.92
ANOVA	F=	94.88	F crit =	2.63	df = 3	p value =	0.000

Area-wise, there is a slight difference in the mean values of social and psychological resilience, relative to the economic, physical and institutional dimensions of children disaster resilience, among the four areas of Chaghar Matti, Bashirabad, Gulbahar, and Hayatabad. The middle-income and unplanned localities of Bashirabad and Gulbahar have approximately the same level of social resilience. Chaghar Matti, in the context of children's social resilience against disasters, is the least resilient area, followed by Hayatabad as the second least resilient region. In terms of children's economic resilience, the planned and high-income area of Hayatabad has the highest mean value, followed by Gulbahar, Bashirabad, and Chaghar Matti in descending order. Physically, the mean value of children's disaster resilience of unplanned rural area of Chaghar Matti is remarkably lower than the other three areas. The planned locality of Hayatabad has the highest mean value for the physical resilience dimension, followed by the areas of Gulbahar and Bashirabad.

The mean score of institutional resilience, in the context of children's disaster resilience, is highest for Hayatabad, second highest for Gulbahar, followed by Bashirabad, and least for Chaghar Matti. In the case of psychological resilience of children against disaster, Gulbahar has the highest mean value, followed by Hayatabad, Bashirabad, and Chaghar Mattia, respectively, in descending order. Overall, the planned, high-income and low flood and earthquake-prone area of Hayatabad is the most resilient region in terms of children's disaster resilience, whereas the unplanned, low-income and high flood and earthquake-prone rural area of Chaghar Matti are the least resilient. Similarly, the mean score of children's disaster resilience of Gulbahar being unplanned, middle-income, and low flood-prone area is higher than unplanned, low to middle-income and high flood-prone area of Bashirabad but lower than Hayatabad, making it the second most resilient region. Figure 6.3 and Figure 6.4 summerize the entire result, showing disaster resilience of children.



	Social	Economic	Institutional	Physical	Psychological	Disaster Resilience
Chaghar Matti	0.66	0.43	0.42	0.62	0.79	0.59
Bashirabad	0.71	0.54	0.51	0.79	0.82	0.67
Gulbahar	0.71	0.59	0.55	0.84	0.86	0.71
Hayatabad	0.68	0.71	0.57	0.89	0.83	0.74
Mean	0.69	0.57	0.51	0.78	0.83	0.68

Figure 6. 3 Disaster Resilience of Children

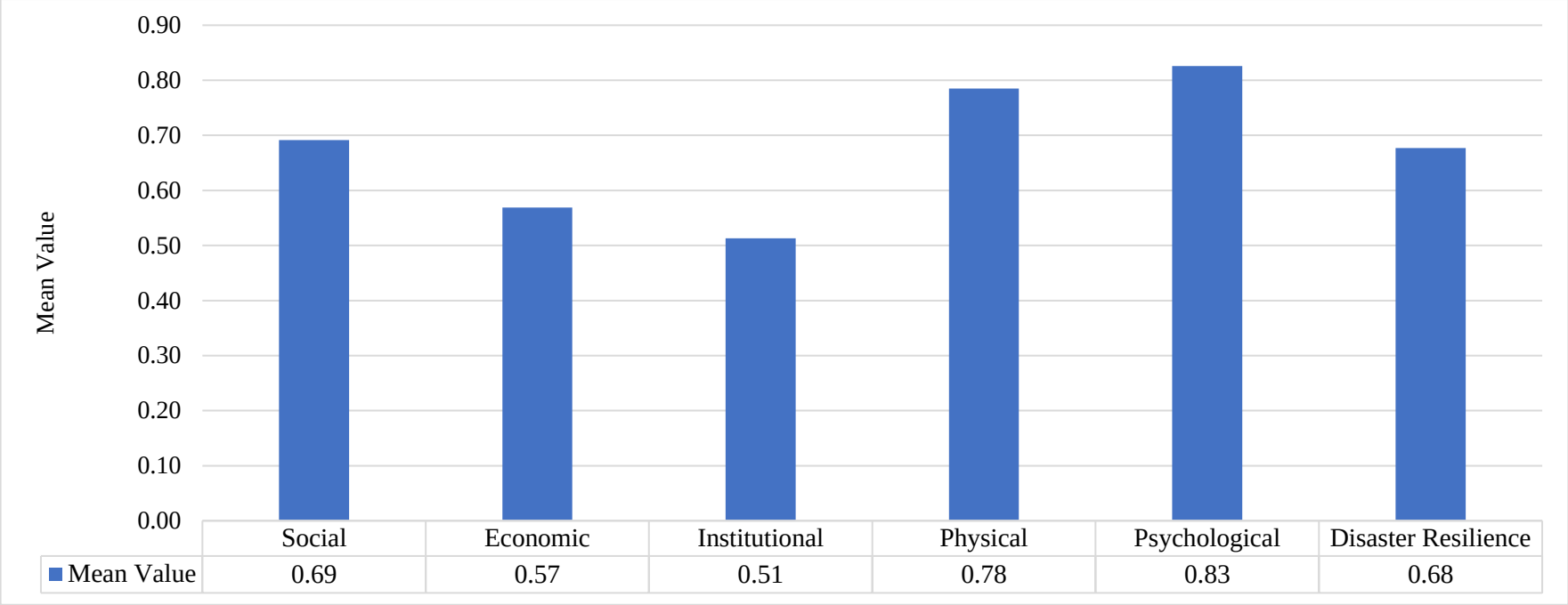


Figure 6. 4 Disaster Resilience of Children across all four study areas

Dimension-wise, for all four areas, the mean score of social, economic, institutional, physical, and psychological resilience of children against disaster shows that children have the highest level of psychological resilience against disaster relative to the other four dimensions, followed by physical resilience and social resilience. Whereas children are least resilient in the institutional dimension.

Chapter 7

7. INSTITUTIONAL PERFORMANCE

This chapter presents various measures, of institutional performance in the context of disaster resilience of children, divided into four main thematic areas based upon the four stages of disaster management cycle.

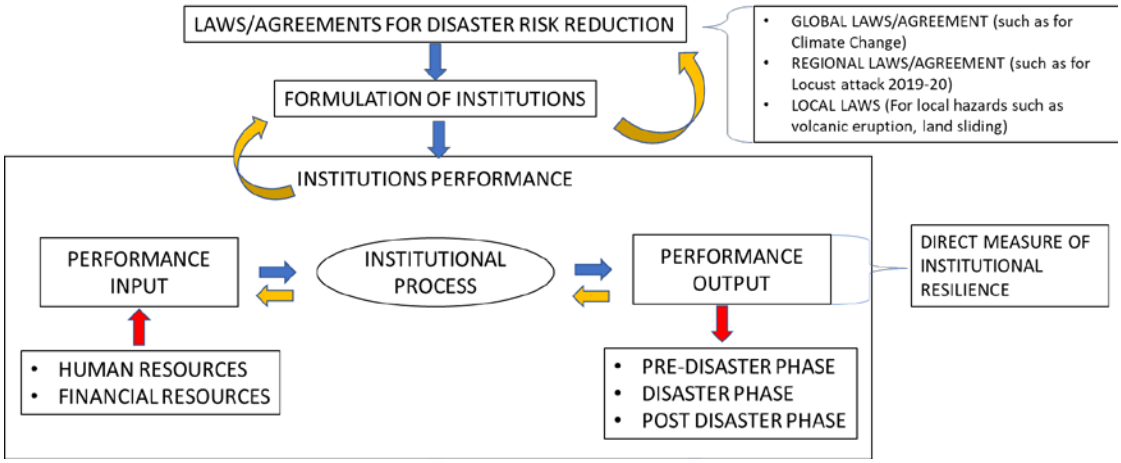


Figure 7. 1 Conceptual framework for Institutional performance assessment

7.1 INSTITUTIONAL DISASTER RESILIENCE PERFORMANCE ASSESSMENT

7.1.1 Institutional Resilience

Institutional resilience in case of children disaster resilience deals with the efforts that have been made by the relevant institutions in pre-disaster, during disaster and post disaster phase to deal with the potential hazards, keeping in view the various aspects of hazards specially their geographical spread, the cause and location of their origins and their potential effects, to safeguard children and their environment from the harmful effects of such hazards. Institutional resilience examines the capacities related to disaster planning, mitigation, and public awareness (Ainuddin & Routray, 2012). Figure 7.1 shows the conceptual framework used for the assessment of institutional performance in the context of disaster resilience of children.

The institutional resilience component is concerned with the efforts that have been made by the relevant disaster management departments to ensure better-quality services through the provision of awareness, recovery, and capacity-building training programs. In the institutional resilience component, we have included hazard reduction programs, flood-warning information, hazard mitigation training, zoning and building code training, flood awareness and management, recovery assistance from the government or NGOs, first aid training, livelihood restoration, and water sanitation and hygiene training (Shah et al., 2018).

7.1.2 Key Measures of Institutional Performance

In the context of disaster resilience of children, the key measures of institutional performance for each stage of disaster management cycle were identified from available literature. The four stages of disaster management cycle are shown in Figure 7.2.

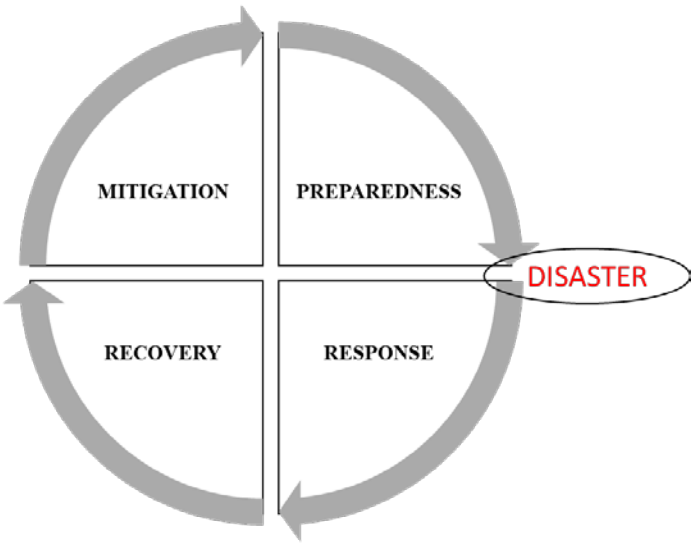


Figure 7. 2 Disaster Management Cycle

7.1.2.1 Mitigation

Mitigations refers to the efforts and action taken to minimize the impacts of any adverse events that may led to a disaster. The key measures required for disaster mitigation are listed in Table 7.1.

Table 7. 1 Disaster Mitigation key measures

Key Measures	Explanation
Disaster Risk Assessment	Perform multi hazard vulnerabilities and risk assessment, develop hazards maps and prioritize risk prone areas and vulnerable population
Integration of Disaster Risk Assessment into Developmental Plans	Land use planning and zoning while keeping the multi hazard context of the area
Incentives Development that reduce the impact of hazard.	New developments should reduce the disaster risk and do not amplify it
Laws/Policies/SOPs to protect children during disaster	Protect children from Physical harm, Sexual and emotional abuse, neglect etc
Laws/Policies/SOPs for children with special needs	To take care of children with special needs such as infants, blind, mute and deaf etc
Public Education	

7.1.2.2 Preparedness

Preparedness refers to the actions taken to prepare for the disasters in such a way that the losses can be minimized. The key measures required for disaster preparedness are listed in Table 7.2.

Table 7. 2 Disaster Preparedness key measures

Key Measures	Explanation
Disaster exercises/trainings/drills	To conduct disaster emergency response and evacuation drills/trainings of relevant stakeholders

	and different segments of community including students and children, including WASH trainings
Preparation and dissemination of Disaster Management Plan	Preparation and dissemination of Disaster Management Plan with special focus on vulnerable groups including children such as emergency protocols for children, school disaster safety plan, And children evacuation plan with location of emergency shelter
Children Participation in Disaster Management	Incorporating children viewpoints, enabling them to assist their families during disaster, disseminate information through intergenerational learning, help in management and relief works when school act as emergency shelters etc
Data collection about children with special needs and below 15 years of age	Such children may have special evacuation and relief requirements
Early warning systems.	Educate children about local early warning system and such information should be disseminated keeping in view the understanding levels of children
Alternative sources of water, electricity and communication	In case of extreme disaster, preparedness measures for provision of water and electricity from alternate sources should be in place along with the availability of alternate communication channels
Information of Buildings	Collection of information about the buildings whose building plans are not approved or situated in hazard prone areas
Children disaster education and awareness	Information of DRR and CCA should be given to children at school. Implementation of awareness programs for non-school going children. Children should be made aware of local emergency protocols and emergency helpline

7.1.2.3 Response

Disaster response is the immediate response to offer assistance against the disasters based upon the disaster management plan. The key measures required for disaster response are listed in Table 7.3.

Table 7. 3 Disaster Response key measures

Key Measures	Explanation
Evacuation of children	Availability and mobilization of equipment's and implementation of such mechanism that enable safe evacuation of children and children with special needs
Search and Rescue of children	The search and rescue team should be aware of the specialized nature of children and children with special needs
Protection of Children	Implementation of such mechanism to protect children from Physical harm, Sexual and emotional abuse, neglect and other kinds of voilence etc. during disaster and in shelter camps
Relief items for children	The relief items should meet the specialized needs of children and families with children specially the infants
Shelter Camp for children	Shelter camp with facilities for unaccompanied children and families with children and children with special needs

7.1.2.4 Recovery

Disaster recovery refers to the process that enable resumption to normal operation with improve coping capacity against any such disaster in the future. The key measures required for disaster recovery are listed in Table 7.4.

Table 7. 4 Disaster Recovery key measures

Key Measures	**Explanation**
Accessible database of missing and unaccompanied children	Availability of accessible database of missing and unaccompanied children to relevant stakeholders and public where required
Family tracking and reunification system	Availability of such system that in immediate tracking of a child's family and their reunification
Safeguard of Kinless children	Availability of such institutional setup that take care of children that become kinless during the disaster
Incentives for families during the recovery from disasters	Incentives for rebuilding houses, livelihood restoration and geographic relocation
Programs for physical and mental recovery	Implementation of programs that provide medical and psychological help to children for their recovery
Implementation of the build back better approach and relocation programs	Keeping in view the impact of possible future hazard the build back better approach should be utilized. The institutions should also implement incentivized relocation program
Provision of credit facility and implementation of livelihood restoration and diversification programs	Such facilities should be provided for early recovery and economic resilience

7.2 RESULT AND DISCUSSION

7.2.1 Mitigations

Table 7.5 tabulate the result of content analysis based upon the interviewees answers in response to key disaster mitigation measures. The interview response has been scored as 0, 0.5, and 1. Where 1 correspond to full achievement, 0.5 correspond to somewhat achievement and 0 correspond to the total lack of the implemention of the key measure by the institutions responsible for disaster mitigation.

Table 7. 5 Mitigation: Content analysis of Interviewees response

Key Measure	**Explanation**	**Interviewees Response Summary**	**Achievement of Key Measure (Based on Interviewees Response)**	**Score**
Multi-Hazard Vulnerability and Risk Assessment (MHVRA)	Perform multi hazard vulnerabilities and risk assessment, develop hazards maps and prioritize risk prone areas and vulnerable population	Disaster risk assessment is lagging and MHVRA has not conducted even for a single educational institution	No	0
Integration of Disaster Risk Assessment into	Land use planning and zoning while keeping the multi	Disaster Risk Assessment has neither conducted nor integrated into	No	0

Developmental Plans	hazard context of the area	the developmental plans of Town 1, Town 2, Town 3 and Town 4 of Peshawar. Even the Building Code of Pakistan - Seismic Provisions-2007 has not incorporated yet		
Incentives Development that reduces the impact of hazard.	New developments should reduce the disaster risk and do not amplify it	The various government departments responsible for monitoring new developments has not taken any initiative to incentives development that reduces the impact of hazard	No	0
Laws/Policies/SOPs to protect children during disaster.	Protect children from Physical harm, Sexual and emotional abuse, neglect etc	Various laws exist on children protection	Yes	1
Laws/Policies/SOPs for children with special needs	To take care of children with special needs	Different types of guidelines have been prepared and	Somewhat	0.5

	such as infants, blind, mute and deaf etc	various policies and rules regarding children with special needs are being developed by various departments. However, comprehensive guidelines and their effective implementation is lacking		
Public Education		Various departments are undertaking public education and awareness campaigns. On one hand people were well aware of Police and Rescue 1122 helplines. On the other hand, the public awareness regarding Bolo Helpline of Social Welfare Department was extremely low	Somewhat	0.5

7.2.2 Preparedness

Table 7.6 tabulate the result of content analysis based upon the interviewees answers in response to key disaster preparedness measures. The interview response has been scored as 0, 0.5, and 1. Where 1 correspond to full achievement, 0.5 correspond to somewhat achievement and 0 correspond to the total lack of the implemention of the key measure by the institutions responsible for disaster preparedness.

Table 7. 6 Preparedness: Content analysis of Interviewees response

Key Measure	**Explanation**	**Interviewees Response Summary**	**Achievement of Key Measure (Based on Interviewees Response)**	**Score**
Disaster exercises/trainings/drills	To conduct disaster emergency response and evacuation drills/trainings of relevant stakeholders and different segments of community including students and children, including	Rescue 1122, Civil Defense, PDMA, School Safety Cell along with other departments are conducting disaster related trainings and exercise. However, only few schools and areas have been covered so far	Somewhat	0.5

	WASH trainings			
Preparation and dissemination of Disaster Management Plan.	Preparation and dissemination of Disaster Management Plan with special focus on vulnerable groups including children such as Emergency protocols for children, School disaster safety plan, Children Evacuation Plan with location of emergency shelter	Proper disaster management plan and its dissemination to public is lacking	No	0
Children Participation in Disaster Management	Incorporating children's viewpoints, enabling them to assist their families during disaster, disseminate	There is no policy or activity currently undertaken to ensure inclusive and participatory	No	0

	information through intergenerational learning, help in management and relief works when school act as emergency shelters etc	DRR specially in case of children		
Data collection about children with special needs and below 15 years of age.	Such children may have special evacuation and relief requirements	No database of disabled children or children requiring special evacuation needs are available with any department	Somewhat	0.5
Early warning systems.	Educate children about local early warning system and such information should be disseminated keeping in view the understanding	Indigenous methods such as using the loudspeakers of mosques and conducting announcements from loudspeaker mounted vehicles in local	Yes	1

	levels of children	language are very effective. Local Police also assist in timely dissemination of early warnings specially in case of floods. The availability of mobile phone and mobile internet, and the increase in popularity of various social media platforms are also contributing for effective dissemination of early warning regarding disasters		
Alternative sources of water, electricity and communication.	In case of extreme disaster, preparedness measures for	Mainly on individual level	Somewhat	0.5

	provision of water and electricity from alternate sources should be in place along with the availability of alternate communication channels			
Information of Buildings	Collection of information about the buildings whose building plans are not approved or situated in hazard prone areas	In Urban areas information regarding buildings in the context of disaster management is collected while rural areas are completely ignored. The developmental plan and hazard maps are not mostly integrated	Somewhat	0.5
Children disaster education and awareness.	Information of DRR and CCA should be given to children at school.	Different government departments are taking initiatives in the	Somewhat	0.5

	Implementation of awareness programs for non-school going children. Children should be made aware of local emergency protocols and emergency helpline	context of children disaster awareness. However, DDR and CCA is not integrated into the school curriculum yet. Secondly, disaster management plan and maps are not published keeping in view the understandability of children		

7.2.3 Disaster response

Table 7.7 tabulate the result of content analysis based upon the interviewees answers in response to key disaster response measures. The interview response has been scored as 0, 0.5, and 1. Where 1 correspond to full achievement, 0.5 correspond to somewhat achievement and 0 correspond to the total lack of the implemention of the key measure by the institutions responsible for disaster response.

Table 7. 7 Response: Content analysis of Interviewees response

Key Measure	**Explanation**	**Interviewees Response**	**Achievement of Key**	**Score**

		Summary	**Measure (Based on Interviewees Response)**	
Evacuation of children	Availability and mobilization of equipments and implementation of such mechanism that enable safe evacuation of children and children with special needs	The government departments do not have any database to use for accurate estimation of number of children, especially children with disabilities or families that will require evacuation. The government departments mobilize most of their resources and with the timely support from Army they are able to undertake	Somewhat	0.5

		disaster evacuation in a better manner		
Search and Rescue of children	The search and rescue team should be aware of the specialized nature of children and children with special needs	The personal of different departments that undertake disaster response activities such as Rescue 1122, Civil Defense, Volunteers and Army are well trained	Yes	1
Protection of Children	Implementation of such mechanism to protect children from Physical harm, Sexual and emotional abuse, neglect and other kinds of violence etc during disaster and in shelter camps	Various laws and policies are being implemented by various departments regarding children protection	Yes	1
Relief items for children	The relief items should meet the specialized needs of	In relief item, various items specific to	Somewhat	0.5

	children and families with children specially the infants	children are provided. However, such items are insufficient in quantity		
Shelter Camp for children	Shelter camp with facilities for unaccompanied children and families with children and children with special needs	Welfare homes for children are established in various districts but they are not enough to cater for all the children after disaster. Most of the children have to stay in camps with inadequate water, food and sanitation facilities	Somewhat	0.5

7.2.4 Disaster recovery

Table 7.8 tabulate the result of content analysis based upon the interviewees answers in response to key disaster mitigation measures. The interview response has been

scored as 0, 0.5, and 1. Where 1 correspond to full achievement, 0.5 correspond to somewhat achievement and 0 correspond to the total lack of the implemention of the key measure by the institutions responsible for disaster recovery.

Table 7. 8 Recovery: Content analysis of Interviewees response

Key Measure	**Explanation**	**Interviewees Response Summary**	**Achievement of Key Measure (Based on Interviewees Response)**	**Score**
Accessible database of missing and unaccompanied children	Availability of accessible database of missing and unaccompanied children to relevant stakeholders and public where required	Information desk and helpline are established after disaster	Somewhat	0.5
Family tracking and reunification system	Availability of such system that result in immediate tracking of a child's family and their reunification	No online system of Family tracking and reunification system exist. However, in case of disaster various	Somewhat	0.5

		information desks and helpline are created in this regard. Social media is also widely used for this purpose		
Kinless children	Availability of such institutional setup that take care of children that become kinless during the disaster	A complete setup of Welfare Homes for orphan or kinless children are available	Yes	1
Incentives for families during the recovery from disasters	Incentives for rebuilding houses, livelihood restoration and geographic relocation	Fixed amount is paid according to the relief policy of PDMA depending upon the nature of damages	Yes	1
Programs for physical and mental recovery	Implementation of programs that provide medical and psychological	In case of physical injury, the injured is transferred to	Somewhat	0.5

	help to children for their recovery	health facility. The psychological support is provided to the children only in Shelter homes. There is no such team of Psychologist is formulated that visit the disaster affected areas after any disaster		
Implementation of the build back better approach and relocation programs	Keeping in view the impact of possible future hazard the build back better approach should be utilized. The institutions should also implement incentivized relocation program	Build back better approach is not incorporated in the recovery and rehabilitation programs.	No	0
Provision of credit facility and implementation of	Such facilities should be provided for early	Fixed monetary support as per	No	0

livelihood restoration and diversification programs.	recovery and economic resilience	relief policy is provided. However, no livelihood restoration or diversification program exist		

7.2.5 Outcome of the Content Analysis

performance of disaster management institutions, based on content analysis is 'average'. In the mitigation phase of disaster management cycle the institutional performance is only 'fair'. This below average performance in disaster mitigation shows the lack of institutional abilities to carry out disaster mitigation measures. In the preparedness and recovery phase of disaster management cycle, the institutional performance is 'average' whereas it is 'good' in the disaster response phase of disaster management cycle as shown in Figure 7.3.

PERFORMANCE SCALE					
Performance	**Poor**	**Fair**	**Average**	**Good**	**Excellent**
Scale	**0 (0-20%)**	**1 (20-40%)**	**2 (40-60%)**	**3 (60-80%)**	**4 (80-100%)**
Mitigation		✓			
Preparedness			✓		
Response				✓	
Recovery			✓		
Overall			✓		

Figure 7. 3 Performance Scale

Chapter 8

8. CONCLUSION

This chapter present the conclusion of this research. It is divided into three parts. In the first part, disaster resilience of children is discussed and in the second part, institutional performance is discussed. In the last and third part of this chapter, limitations of this study and suggestions for future research are presented.

8.1 DISASTER RESILIENCE OF CHILDREN

From this study, it is evident that children's disaster resilience does not explicitly depend on the characteristics of children themselves. Rather, it is also considerably dependent upon the household, community, urban, and regional characteristics. Secondly, the social, physical/infrastructural, economic, institutional, and psychological dimensions of resilience are the outcome of these characteristics. This study argues that the resilience of children against earthquake, flood, or any other hazard, triggering disaster must not be considered as a single entity but rather as a combination of these characteristics and dimensions. The study advocates that children's disaster resilience is specific to hazard type, geographical location, social cultures, and religious beliefs. Thus, it proposes a multidimensional framework and index to measure the disaster resilience of children.

In this study, the MCDRI is further explored by its application in four multi-hazard prone communities of Peshawar in Pakistan. This study has determined significant variations in all five dimensions of resilience, particularly in economical, physical, and institutional resilience. The various dimensions of children's disaster resilience fit perfectly into the National Disaster Management Plan 2012, Pakistan School Safety Framework, 2017, National Disaster Response Plan 2019, and the national development plans of Pakistan. Institutions have been unable to implement appropriate disaster mitigation, preparedness, response, and recovery practices essential for children's disaster resilience. This research will be significant for disaster management institutions and policymakers for formulating holistic and effective strategies for disaster risk reduction of children.

The methodology provided in this study can quickly and comprehensively assess the dimensional and aggregate degree of resilience of children against disasters. It is an easy, flexible, and straightforward method, free from technical, organizational, and academic jargon, to be applied by disaster management professionals and policymakers, irrespective of their professional background. The MCDRAF, while providing perspective on children's disaster resilience, also recognizes the need for disaster resilience from household to regional level in an integrated and holistic manner. In the case of children disaster resilience, the MCDRI not only assist in finding the least resilient children but also the precise set of indicators and dimensions that are making them lesser resilient to disasters, that can help in devising an appropriate course of action for effective disaster management and risk reduction strategies. This flexible and easy-to-use methodology can be utilized at various spatial scales, rural or urban, and for better reflection of local conditions, indicators can be included or excluded. It can also be used to assess children's disaster resilience in the context of any single hazard or multi-hazards environment by incorporating hazards specific indicators.

8.2 PSYCHOLOGICAL RESILIENCE OF CHILDREN TO DISASTERS

This study offers an approach for quantification of children psychological resilience to disaster by proposing the much-needed psychological resilience assessment framework for children in disaster studies by utilizing the 4 components of life stressor, mental health, attitude and awareness. Secondly, the proposed CPDRAF is further explored and validated by its application using CPDRAI in four multi-hazard prone communities of Peshawar in Pakistan. The result shows significant variations in psychological resilience of children among the four areas. It is evident that psychological resilience of children to disaster can be influenced by extraneous factors. It can be lessened as well as increased with effective psychological disaster preparedness that enable children to adapt well to new perceived realities of life. In the context of children from psychological view point the study presented disaster as an agent of change and awareness. Therefore, psychological disaster preparedness is stressed upon to enable children to make the necessary adaptations as implied by the

change and awareness is case of disaster. This study also stresses upon the fact that the effect of trust as moderator between attitude and awareness should be explored with special focus on children and disasters. The proposed framework and assessment methodology can be easily adopted and applied to quantify the psychological resilience of children and identify precise component or set of indicators that can be improved for efficacious children psychological resilience and disaster risk reduction.

8.3 INSTITUTIONAL PERFORMANCE

This paper gives insights into the much-needed performance assessment of institution in the context of children DRR studies. This study proposes an approach for quantification of institutional performance by devising a Performance Scale. It is evident that there is a room for improvement in institutional performance in all the four phases of disaster management cycle namely - mitigation, preparedness, response and recovery, especially significant improvement is needed in the disaster mitigation phase. The proposed framework and assessment methodology can be easily adopted and applied to quantify the institutional performance and identify precise phase of disaster management cycle that can be improved for effectual disaster resilience of children.

8.4 MEASURES REQUIRED FOR DISASTER RESILIENCE OF CHILDREN

The following measures should be adopted to ensure disaster resilience of children.

1. Schooling of children: Education enhances individual ability and resilience to deal with disasters. Out of school children will not receive any counselling regarding disasters and will be less resilient.
2. Mainstreaming DRR and CCA education into curriculum: This step is necessary to ensure that disasters related education is given to children in schools/madrassas.
3. Promoting the learning of national language: Those children who can communicate in the national language will be more resilient, because in disaster relief operations, local institutions and national institutions take

part. Moreover, most of the government emergency helplines are also in Urdu.

4. Multi Hazard Vulnerability and Risk Assessment (MHVRA) of educational institutions: In October 2005 earthquake, more than 18,000 school age children were killed (approximately 23% of the total deaths) and over 20,000 children suffered serious injuries; along with the destruction of 7,489 schools in Pakistan. Similarly, more than 10,000 schools were destroyed in the 2010 floods in Pakistan. In spite of these harsh realities, MHVRA of not even a single educational institution has been carried out. Therefore, MHVRA should be done for all educational institutions on priority basis.
5. Preparation of School Safety Plan: While keeping in view the findings of MHVRA and local hazards, School Safety Plan should be developed for each school to ensure disaster resilience of children.
6. Disaster Awareness Exercises and Drills in Schools: Disaster awareness drills and exercise should be regularly carried out in schools. Such programs should be the part of school annual calendar.
7. Emergency Contact Details: Children should memorise the following contact details, which can be useful during disaster response and recovery:
    a. Home address.
    b. Family member phone number.
    c. Any relative address.
    d. Phone number any relative.
    e. Contact number of emergency service providers such as Police, Rescue 1122 etc.
8. Psychological distresses in Children: Disasters can adversely impact the children mental health. Also, children with signs of psychological issues will be less resilient to disasters than children who are psychologically healthier. Therefore, children should be keenly observed for the signs of any psychological distress such as:
    a. Feeling intensely unsafe

b. Withdrawal from family, friends and previously enjoyed activities.
c. Suicidal tendencies
d. Sense of fear because of hearing about terrorism and other disasters
e. Sleep problems
f. Anti-Social behaviour such as lying, cheating and stealing
g. Feeling of guilt and worthlessness
h. Rebellious attitude such as frequently defying adults, refusing to follow rules etc.
i. Restlessness and hyper-activeness

9. Preparation of Community Safety Plan: Community Safety Plan with disaster safety guidelines along with the map of emergency evacuation routes and emergency shelter locations should be prepared at local level in each community.
10. Dissemination of disaster safety plans: Such plans should be distributed to children and other members of the community. This can be done:
    a. By printing a disaster safety leaflet at the start or end of textbooks.
    b. By distribution of disaster safety pamphlet in the community.
11. Disaster related discussion in the family: Parents and elder should educate and guide children by discussing disaster related issues with them. It will make children more resilient to disasters.
12. Livelihood options of the household: Multiple sources of livelihood will increase disaster resilience because even if one source is cut off, the household can survive on another. Therefore, the livelihood options should be enhanced.
13. Saving for emergency situations: Families should save money for emergencies to have sufficient economic resilience to deal with adverse situations.
14. House ownership: House ownership should be enhanced because the higher the ownership of the housing units, the better will be the quality and maintenance of the houses. Hence more resilience against disasters.

15. Female decision-making role in the family: Females in the family should be capable to may act as an alternate decision-maker for children in case of emergency without waiting for the household head.
16. Problems in Family: Children should feel safe and comfortable in the home. Problems in family such as parents' marital problems including separation or divorce, fighting or arguing as well as death and severe illness of family member and poverty etc. can adversely affect child mental health and make them less resilient psychologically to disasters.
17. Disaster supply kit: Preparation for disasters increases the resilience of households. Families should have disaster supply kits containing necessary items such as water, non-perishable food, flashlight, first aid kit, necessary drugs, and medications, etc.
18. Children access to communication facilities: It should be ensured that children have access to radio, TV, telephone, or any other source of communication, so that they can get disaster early warning as well as effectively respond to it.
19. Training of children on how to contact emergency services: Children should be trained, so that they are able to contact local emergency/rescue helpline during a disaster by themselves.
20. Children understanding of disaster early warning systems: Children understanding level of disaster early warning systems should be enhanced by educating them as well as the disaster early warning systems should be designed in such a way that they are easily understandable and able to convey a proper early warning.
21. Children participation: Children viewpoints should be incorporated in the preparation of school and community disaster safety plan, so that they feel confident and believe in the effectiveness of such safety plans.
22. Social capital in the community: Social capital and trust among community members, especially among neighbours is necessary to collectively protect each other from a disaster.
23. Interest in the adaptation of safety measures against disaster: Children in particular and community as a whole must show interest in the adaptation

of safety measures against disaster. They must be willing to follow disaster safety guidelines.

24. Risk aversion attitude: Fatalistic attitude or attributing disaster damages to uncontrollable natural causes rather than controllable human actions, such as disaster preparedness and thus believing caused damages are not preventable should be avoided. Instead, based on scientific evidence disaster mitigation measure should be adopted.
25. MHVRA at District level: MHVRA should be carried out for all the districts of Pakistan to develop hazards maps and prioritize risk prone areas and vulnerable population. Disaster risk assessment is lagging in Pakistan
26. Integration of Disaster Risk Assessment into Developmental Plans: Land use planning and zoning should be done while keeping the multi hazard context of the area, so that any new development does not amplify the disaster risk.
27. Incentivize Development that reduces the impact of hazard: Various administrative and financial instruments should be used to promote development that reduces disaster risk. Various incentives such as tax-cut, better infrastructure facilities and low fee for water, gas and electricity connections etc. should be provided to incentivize such development.
28. Dissemination of information through intergenerational learning: Children can be an asset in dissemination of disaster safety information. They can share what they learn with their family and friends. This will enhance the disaster resilience.
29. Laws/Policies/SOPs for children: To take care of the specific requirements of children and children with special needs such as infants, blind, mute and deaf etc. before, during and after disaster comprehensive guidelines should be prepared and their effective implementation must be ensured.
30. Data collection about children with special needs and below 15 years of age: The government departments do not have any database to use for

accurate estimation of number of children, especially children with disabilities or families that will require evacuation. Therefore, such data should be collected and maintained to ensure the implementation of such mechanism that will enable safe evacuation of children and children with special needs.

31. Information of Buildings: The information of the buildings whose building plans are not approved or situated in hazard prone areas should be collected. In Pakistan, in urban areas information regarding buildings in the context of disaster management is collected while rural areas are completely ignored. The developmental plan and hazard maps are not usually integrated.
32. Shelter camp: Shelter facilities should be provided for unaccompanied children and families with children and children with special needs.
33. Alternative sources of basic amenities: Alternative sources of water, electricity, communication and other basic amenities of life must be maintained to ensure resilience against any large-scale disaster.
34. Missing and unaccompanied children database: After a disaster an accessible database of missing and unaccompanied children should be made available to relevant stakeholders and public where required.
35. Family tracking and reunification system: Such system that result in immediate tracking of a child's family and their reunification should be established. In Pakistan, helpdesk and helpline are usually created.
36. Psychological aid to children: In addition to medical aid, programs for psychological screening and psychological recovery of children after disaster should also be established.
37. Build back better approach: In the recovery phase of disaster management build back better approach should be adopted to increase disaster resilience by integrating DRR measures into the restoration of physical infrastructure
38. Relocation programs: Relocation programs should be adopted in disaster recovery phase and the exposed population should be relocated to a safe geographic location with respect to the location of the source of hazard.

39. Provision of credit facility: Credit facilities should be provided to the disaster affected communities to facilitate the disaster recovery.
40. Livelihood restoration and diversification programs: After disaster, in the recovery phase of disaster management not only the livelihood restoration programs for disaster affected communities should be executed but also the sources of earning should be diversified to ensure disaster resilience.
41. Public Education: Mass public awareness programs on disaster resilience should be started while focusing on the local hazards with respect to the geographic location. Various means of communication such as pamphlet distribution, print and electronic media, radio channels and social media networks should be utilized for this purpose.

8.5 LIMITATIONS AND FUTURE RESEARCH

Following are the limitations of this study that warrant future research attention:

i. Every natural hazard does not result in disaster. However, children cannot differentiate between the hazard and disaster. Therefore, by just merely experiencing a hazard, children may respond that they have experienced a disaster. Therefore, questions regarding the intensity of hazard experienced must be incorporated in future research to determine whether children have experienced a disaster or not.
ii. During the data collection face, it was found that children below 7 years of age were not suitable for answering the survey questions. Therefore, future research is required to treat children below 7 years of age differently than elder children in term of data collection.
iii. The target population of this research were children, with different educational backgrounds. The answering of few questions required some pre-requisite knowledge. Lack of such knowledge may result in different meaning of same indicator for different responders. Therefore, future research should adopt viable solution to overcome this limitation.
iv. Those indicators that were having a uniform value for all the respondents within a single study area and also having a uniform value for all the

respondents across all the four study areas were excluded from the final result. However, since all the four study areas were from the same district of Peshawar, therefore these indicatiors should be consider in the future research, as they may vary when this methodology is applied on a wide geographic area.

v. Researchers should also keep in mind that the length of the questionnaire also affects the accuracy of respondents responds. After answering few questions, children usually tend to lose interest in answering the remaining questions with due consideration and contemplation.

vi. Subjective weighting was used for indicators. To further improve MCDRI, statistical models for assigning weights to indicators can be incorporated in future research.

vii. In the context of children psychological disaster resilience, this study stresses upon the fact that the effect of trust as moderator between attitude and awareness should be explored with special focus on children and disasters.

viii. Lastly, although the sample size was adequate to conduct statistical analysis, future research is required to employ a larger sample and on different study areas to see whether the results would differ from what have been reported in this study.

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Questionnaire # **QUESTIONNAIRE SURVEY** **ANNEX-A**

This questionnaire survey is a part of research that is being conducted by the Department of Urban and Regional Planning, National University of Sciences and Technology, Islamabad. The purpose of this research to assess the disaster resilience of children. All the data that is being collected will not be used for any other purpose than the stated purpose.

Guardian Consent

I, being the legal guardian, hereby give permission for my child to participate in this questionnaire survey. I also agree to assist my child and provide the information wherever required in this questionnaire survey. Date ……

SECTION 1: GENERAL INFORMATION

1. Age (in years) _____ 2. Gender _____ 3. Number of Siblings _____ 4. Family Size _____
5. Children below 15 years of age in your family (Number) _____
6. Do you know your home address? **Yes** ☐ **No** ☐
7. Do you know the address of any of your relatives? **Yes** ☐ **No** ☐
8. Do you know the contact number of any of your family member? **Yes** ☐ **No** ☐
9. Do you know the contact number of any of your relatives? **Yes**☐ **No**☐
10. Do you know any emergency helpline? **Yes**☐ **No**☐
11. Can you contact any emergency helpline in case of disaster? **Yes**☐ **No**☐
12. Were you aware of the fact that 1121 is the children emergency helpline? **Yes**☐ **No**☐
13. Do your parents allow you to visit your neighbour house by yourself? **Yes**☐ **No**☐
14. Are you suffering from any disability (such as disability of listening, speaking, hearing, walking, autism or any other disability)? **Yes**☐ **No**☐. If yes, name of the disability: _____

SECTION 2: EDUCATIONAL INFORMATION

15. How often your family discuss disaster related issues with you? **Never**☐ **Sometime** ☐ **Regularly** ☐
16. What is the education of your parents? **Father Education**: _____ **Mother Education**: _____
17. Please tick the type of educational institution that you are going to.

School☐ **Madrassa**☐ **College**☐ **None of these** ☐ **Any other:** _____

If you are going to any of the above educational institute, please answer the questions from **i** to **vii**:

i. In which class/grade do you study? Class/Grade: _____
ii. How well can you communicate in Urdu language? **Very well**☐ **Somewhat**☐ **Not at all**☐
iii. How often your teachers educate you on disasters? **Never**☐ **Sometimes** ☐ **Regularly** ☐
iv. How often are disaster safety exercises/drills carried out in your school? **Never**☐ **Sometimes** ☐ **Regularly** ☐
v. Is there any lesson on local hazards and disasters in your school curriculum? **Yes**☐ **No**☐
vi. How often you are asked to share your viewpoints regarding disaster safety in School?
Never☐ **Sometimes**☐ **Regularly**☐
vii. How well are you aware of the Disaster Safety Plan of your school?
Well aware☐ **Moderately aware**☐ **Not at all aware**☐
viii. Do you possess the Disaster Safety Plan of your School? **Yes**☐ **No**☐

SECTION 3: DISASTER PREPAREDNESS INFORMATION

18. How many disaster awareness programs/drills have been undertaken by you? **Number:** _____

Number of Flood awareness drills/programs: _____ **Number of Earthquake awareness drills/programs:** _____

19. Do you have undertaken Water, sanitation and hygiene (WASH training)? **Yes**☐ **No**☐
20. Do you possess the community disaster safety plan? **Yes**☐ **No**☐
21. How often you are asked to share your viewpoints regarding disaster safety in your community?
Never☐ **Sometimes**☐ **Regularly**☐
22. How well are you aware of local disaster emergency safety guidelines/protocols?
Very well☐ **Somewhat**☐ **Not at all**☐
23. Do your family have disaster supply kit (containing necessary items such as Water, non-perishable food, Flashlight, First aid kit, Prescription medications)? **Yes**☐ **No**☐
24. How well do you understand disaster's Early Warning Systems? **Very well**☐ **Somewhat**☐ **Not at all**☐
25. Do you have access to the following facilities?

Electricity	**Yes**☐ **No**☐	Clean water	**Yes**☐ **No**☐	Sanitation	**Yes**☐ **No**☐
Alternate Electric Source (Such as UPS, Generator)	**Yes**☐ **No**☐			Tv	**Yes**☐ **No**☐
Alternate Water Source (Such as water hand pump)	**Yes**☐ **No**☐			Radio	**Yes**☐ **No**☐
Telephone	**Yes**☐ **No**☐	Motorcycle	**Yes**☐ **No**☐	Health Insurance	**Yes**☐ **No**☐

Mobile **Yes☐ No☐** Car/Jeep/Pickup **Yes☐ No☐** Life Insurance **Yes☐ No☐**

SECTION 4: ECONOMIC INFORMATION

26. Number of Earning members in the family: _____ 22. Family average monthly income: _____
23. Number of Family income sources: _____
24. Do your family save money to deal with any emergency situations such as disaster? **Yes☐ No☐**
25. Has your family taken any loan in recent past? **Yes☐ No☐** If yes, In which year? **Year: _____**
26. Is there any female earning member in your family? **Yes☐ No☐**
27. How often do you undertake work to support yourself or your family financially?
    Regularly☐ Sometimes☐ Never☐
28. How often do you have three meals per day? **Regularly☐ Very often☐ Sometimes☐**
29. How often does your family undertake recreational activities (such as going to picnic)?
    Regularly☐ Sometimes☐ Never☐

SECTION 5: HOUSING INFORMATION

30. Are your family residing in rented house? **Yes☐ No☐**
31. Is your house building plan approved by local authority? **Yes☐ No☐**
32. What is the location of your house? **Between Levee and riverbank☐ Floodplain☐ Upland☐**
33. What is the building type of your house? **Combined☐ Semidetached☐ Detached☐**
34. Which type of material is used in the construction for your house? **Katcha☐ Pacca☐**

SECTION 6: DISASTER EXPERINCE

35. What kind of disaster exposure/experience do you have?
    Directly Experienced Disaster **Yes☐ No☐**
    Directly Experienced Flood **Yes☐ No☐** Directly Experienced Earthquake **Yes☐ No☐**
    Media Exposure (Watch disaster such as Flood or Earthquake through TV or Social Media) **Yes☐ No☐**
36. If you have directly experienced any disaster, please answer the questions from **i** to **vii**.
    i. Have you ever separated from your family due to disaster? **Yes☐ No☐**
    ii. Have you ever remained in disaster relief/shelter camp? **Yes☐ No☐**
    iii. Have you ever remained in your relative's house due to disaster? **Yes☐ No☐**
    iv. Have you ever witnessed death of family or friend due to disaster? **Yes☐ No☐**
    v. Have you ever witnessed damages to your home, school or community due to disaster? **Yes☐ No☐**
    vi. Has your education ever disrupted due to disaster? **Yes☐ No☐**
    vii. Have you ever got physical injury due to disaster? **Yes☐ No☐**

37. After having direct disaster exposure or disaster exposure through media were you having the following condition.
    Tick (✓) the appropriate option

		Totally True	Somewhat True	Not True
i.	Feeling unsafe and having intense ongoing fear			
ii.	Feeling that you cannot do or achieve anything in life			
iii.	Thinking that this life is meaningless			
iv.	Thinking that you are burden on your family and others			
v.	Often accused of cheating, stealing or lying by others			
vi.	Having Sleep problems such as difficulty in sleeping, excessive sleeping or nightmares			
vii.	Withdrawn from family, friends and previously enjoyed activities			
viii.	Having hallucination or sense of unreality			
ix.	Having persistent feeling of sadness and hopelessness			
x.	Declining grades in school or unwilling to go to school			
xi.	Constantly worrying, anxious and hypervigilant			

SECTION 7: LIFE STRESSOR

38. Are your parents separated? **Yes☐ No☐**
39. Are you going through severe illness or injury? **Yes☐ No☐**
40. Is any of your family member going through severe illness or injury? **Yes☐ No☐**
41. Have you last a family member or friend in recent past? **Yes☐ No☐**
42. Do you feel constantly unsafe or remain in state of fear after hearing about terrorism or disasters? **Yes☐ No☐**
43. Do you think that you are treated fairly in your family? **Yes☐ No☐**

44. Do you think that you are treated fairly in your school? **Yes**☐ **No**☐

SECTION 8: PSYCHOLOGICAL INFORMATION

Please give your answers based on how currently things have been for you, by ticking (✓) the option that best describes your situation.

		Totally True	Somewhat True	Not True
i.	You are having a constant sense of fear and feeling unsafe.			
ii.	You are having sleep problems such as difficulty sleeping, excessive sleeping or nightmares.			
iii.	You are usually on your own and generally play alone or keep to yourself.			
iv.	You prefer to be alone rather than be with your family and friends.			
v.	You often feel sad, unhappy or down-hearted.			
vi.	You believe that difficulties will be over soon, and good things will happen in future.			
vii.	You often think to leave school.			
viii.	You are not going to school as regularly as the other students due to some issues.			
ix.	You think that you are not getting good marks in school.			
x.	You take things that are not yours from school, market or elsewhere.			
xi.	You are often accused of lying.			
xii.	You believe that you are being a burden to others.			
xiii.	You often think that the world would be a better place without you.			
xiv.	You often think that life is meaningless and want to make it all go away.			
xv.	You find it hard to concentrate and you are easily distracted.			
xvi.	You often unintentional injurie yourself?			
xvii.	You often argue with adults.			
xviii.	You usually do as you are told by your elders such as elder brother/sister, parents and teachers.			
xix.	You easily get angry and often lose temper.			
xx.	Your friend often annoys you.			
xxi.	You worry a lot.			
xxii.	You easily get confused and cannot comfortably understand anything new.			
xxiii.	You often feel unwell and get stomachaches or headaches.			

SECTION 9: ATTITUDE TOWARDS DISASTERS

Please tick (✓) the option that best describes your situation.

		Totally True	Somewhat True	Not True
i.	You think that disasters only occur because of the anger or indignation of God.			
ii.	You believe that the damages caused by disaster are not preventable.			
iii.	You are willing to follow disaster safety guidelines issued by the government.			
iv.	If disaster safety training is offered, will you take part in it.			
v.	You think that damages caused to us by disaster are part of our fate and nothing can be done to cope with it.			
vi.	You are interested in adaptation of various safety measures to reduce the impact of disasters.			

SECTION 10: DISASTER AWARENESS INFORMATION

Please tick (✓) the option that best describes your situation.

		Totally True	Somewhat True	Not True
i.	You are aware of local hazards in your area.			
ii.	You are aware of local disaster emergency guidelines/protocols.			
iii.	You know how to deal with local hazards safely.			
iv.	You are aware of disaster safety plan of your community.			
v.	You understand the disaster safety plan of your community.			
vi.	You know evacuation routes, to be used during a disaster.			
vii.	You are aware of the location of disaster relief shelter/camp.			

Any suggestions or Comments

Interview Guide

ANNEX-B

Education Department

Introduction: This interview is the part of research titled as "*Disaster Resilience of Children in Hazard Prone Areas: A Case Study of Peshawar, Pakistan*" being conducted by the Department of Urban and Regional Planning, National University of Sciences and Technology, Islamabad. The purpose of this interview is to assess the ability of institutions in the disaster resilience of children.

Historical Information: In October 2005 earthquake, in Pakistan more than 18,000 school age children were killed (approximately 23%, of the total deaths) and over 20,000 children suffered serious injuries. The 2005 earthquake resulted in the destruction of 7,489 schools in Pakistan. Similarly, more than 10,000 schools were destroyed in the 2010 floods in Pakistan.

Predetermined Questions	Spontaneous Questions
1. Being an important stakeholder, what is the role and responsibilities of your department in the Disaster Management of Children? 2. Have your department conducted MHVRA with the support of other relevant stakeholders for the educational facilities? If no, why not? If yes, • For how many educational facilities, the MHVRA has been conducted? • Can you provide us the copy of any one of the MHVRA that has been conducted by your department for the purpose of our research? 3. Has your department integrated Disaster Risk Assessment into the Developmental Plans of New Schools? 4. In case of already existing Schools, what kind of structural mitigation as per the local hazards has been carried out by your department? 5. How many schools have their own disaster safety plan? • Is this school level disaster safety plan disseminated to teachers and students? • How are the viewpoints of children incorporated in preparation of disaster safety plans for Schools? 6. Is the information of local hazards, commonly occurring disasters and climate change incorporated into School curriculum? 7. What is the mechanism of disaster safety drills and trainings for teachers and students being followed by your department? • Is such disaster safety trainings and drills part of School annual calendar? 8. How many schools have been identified to be used as emergency shelters during disasters? • For the purpose of relief work when such schools act as emergency shelters, Is the teachers and students trained to carry out relief tasks? 9. Is there any kind of preparation undertaken by your department to provide education to children in shelter/relief camps until the complete recovery of disaster affected families? 10. What are the main barriers preventing your department from effective Disaster Management of Children in its area of jurisdiction? 11. Are there any suggestions that you would recommend for the disaster resilience of children?	

Town Municipal Administration

Introduction: This interview is the part of research titled as "*Disaster Resilience of Children in Hazard Prone Areas: A Case Study of Peshawar, Pakistan*" being conducted by the Department of Urban and Regional Planning, National University of Sciences and Technology, Islamabad. The purpose of this interview is to assess the ability of institutions in the disaster resilience of children.

Predetermined Questions	**Spontaneous Questions**
1. Being an important stakeholder, what is the role and responsibilities of your department in the Disaster Management of Children? 2. Has your department identified risk prone areas in the Town, through MHVRA? If no, Why? If yes, • Has the map of such areas developed and disseminated to public? • Can you provide us the copy of such maps for the purpose of our research? 3. Is there any kind of map with evacuation routes and location of emergency shelters prepared by your department and made available to public? • Are such maps prepared keeping in view the understanding level of children? • What kind of different efforts have been made to ensure the availability of this map to children? Such as printing the map on the School textbook covers etc. 4. During shelter identification and planning for relief items, how your department incorporate the needs and concerns of families with children, unaccompanied children and children with special needs? 5. Keeping in view the multi hazard context of the area, how your department carry out land use planning and zoning and develop developmental plans? 6. Has your department provided incentives for such development that reduce the impact of hazards? If yes, provide details of such incentives. 7. What kind of bylaws related to disaster resilience practices have been prepared and enforced by your department? 8. In case of extreme disaster, are there any preparedness measures for provision of water and electricity from alternate sources undertaken by your department? 9. Is there any database of buildings whose building plans are not approved or situated in hazard prone areas maintained by your department? If yes, • What other kind information does this database contain? 10. In case of disaster recovery, Is there any geographic relocation program and construction guidelines available, keeping in view the build back better approach? 11. What kind of different disaster drills and simulation exercises has been undertaken by your department? 12. What are the main barriers preventing your department from effective Disaster Management of Children in its area of jurisdiction? 13. Are there any suggestions that you would recommend for the disaster resilience of children?	

Social Welfare and Community Development Department	
Introduction: This interview is the part of research titled as "*Disaster Resilience of Children in Hazard Prone Areas: A Case Study of Peshawar, Pakistan*" being conducted by the Department of Urban and Regional Planning, National University of Sciences and Technology, Islamabad. The purpose of this interview is to assess the ability of institutions in the disaster resilience of children.	
Predetermined Questions	**Spontaneous Questions**
1. Being an important stakeholder, what is the role and responsibilities of your department in the Disaster Management of Children? 2. Is there any rules or SOPs to protect children from physical harm, sexual and emotional abuse and neglect etc. during disaster and in Shelter/relief camp? 3. In shelter/relief camp, how did your department address the needs and concerns of children, including children with special needs such as infants, blind, mute and deaf etc.? 4. Keeping in view the specialized nature of children, is the staff of your department trained to deal with them? (Details of such training) 5. Who did the relief items provided in shelter/relief camp meet the specialized needs of children and families with children specially the infants? 6. Does your department provide psychological support to children after disaster? If no, why? If yes, how? 7. How does your department take care of kinless children after a disaster? 8. What steps are taken by your department for tracking of a child's family and their reunification? 9. Is there any database of unaccompanied children found during disaster available after the disaster that can be accessed by public to search for missing children? 10. What kind of steps are taken by your department to create awareness amongst children and about the needs and safety of children in the community? 11. Is there any children emergency helpline maintained by your department during disasters? 12. What are the main barriers preventing your department from effective Disaster Management of Children in its area of jurisdiction? 13. Are there any suggestions that you would recommend for the disaster resilience of children?	

PDMA Khyber Pakhtunkhwa & District Disaster Management Unit Peshawar

Introduction: This interview is the part of research titled as "*Disaster Resilience of Children in Hazard Prone Areas: A Case Study of Peshawar, Pakistan*" being conducted by the Department of Urban and Regional Planning, National University of Sciences and Technology, Islamabad. The purpose of this interview is to assess the ability of institutions in the disaster resilience of children.

Predetermined Questions	Spontaneous Questions
1. What is the role and responsibilities of your department in the Disaster Management of Children? 2. How did your department assess disaster risk to identify and prioritize risk prone areas and vulnerable population? • Is there any kind of hazards map available to public? 3. What steps have been taken by your department for the integration of Disaster Risk Assessment into Land use Zoning and Developmental Plans? 4. In disaster management literature it is widely stressed upon that the new developments should reduce the disaster risk and do not amplify it. Is there any kind of incentives offered to the development that reduce the impact of hazard? 5. Are there any Laws/Policies/SOPs available and implemented to protect children during disaster and in shelter camp from Physical harm, Sexual and emotional abuse, neglect etc.? 6. Are there any Laws/Policies/SOPs available and implemented to take care of children with special needs such as infants, blind, mute and deaf etc. in case of disaster? 7. Minor children and children with special needs may have special evacuation and relief requirement, is there any dataset of such children available to effectively plan for their evacuation and relief? 8. What steps have been taken by your department to ensure that children understand the Early warning systems? 9. What kind of awareness programs have been conducted by your department regarding the needs and rights of children in disasters? How many disaster safety trainings/drills for children have been conducted by your department? What is the mechanism for disaster awareness of non-school going children? 10. In case of extreme disaster, what kind of preparedness measures have been undertaken by your department for alternate communication channels and the provision of water and electricity from alternate sources? 11. What kind of facilities are provided to families with children, unaccompanied children and children with special needs in Shelter camps? 12. Is there any accessible database of unaccompanied and missing children available? 13. Which kind of mechanism is being implemented for the family tracking and reunification of unaccompanied children? 14. Is there any institutional setup available to take care of kinless children after disaster? 15. What type of incentives are available to families after a disaster for rebuilding houses and livelihood restoration? Is there any geographic relocation program offered to exposed population? Credit facility, livelihood diversification programs? 16. Keeping in view the build back better approach, is there any guidelines available for the rebuilding phase of the disaster? 17. What kind of medical and psychological supported are provided to children after a disaster? 18. What are the main barriers preventing your department from effective Disaster Management of Children in its area of jurisdiction?	

19. Are there any suggestions that you would recommend for the disaster resilience of children?	

Rescue 1122 & Civil Defense Department	
Introduction: This interview is the part of research titled as "*Disaster Resilience of Children in Hazard Prone Areas: A Case Study of Peshawar, Pakistan*" being conducted by the Department of Urban and Regional Planning, National University of Sciences and Technology, Islamabad. The purpose of this interview is to assess the ability of institutions in the disaster resilience of children.	
Predetermined Questions	**Spontaneous Questions**
1. Being an important stakeholder, what is the role and responsibilities of your department in the Disaster Management of Children? 2. How many first aid, search and rescue, firefighting trainings and other kinds of training of public including children has been conducted by your department? 3. Do your department possess enough special equipments and have implementation mechanism that enable safe evacuation of children specially the children with special needs? 4. Is there any kind of database of families with special evacuation requirements available to your department? 5. Are the search and rescue teams of your department aware of the specialized nature of children and children with special needs and trained to deal with them? 6. Are there any policies or SOPs that are being implemented by your department to protect and deal with special children such as infants, blind, mute and deaf etc. during disaster? 7. In case of disaster during the emergency relief operation, how is children protected from sexual and emotional abuse? 8. What are the main barriers preventing your department from effective Disaster Management of Children in its area of jurisdiction? 9. Are there any suggestions that you would recommend for the disaster resilience of children?	