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Research Article
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Strengthening Community Resilience: Developing Community Based Model for Sustainable Volunteer Engagement in Emergency and Disaster Management in Pakistan

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Abstract: *Emergencies and disasters continue to pose persistent threats to communities worldwide, emphasizing the need for community-centered Disaster Risk Reduction (DRR) strategies. This study designs and evaluates a Community-Based Disaster Management (CBDM) model aligned with the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030. The model focuses on structured Volunteer Engagement (VE) through Community Emergency Response Teams (CERTs) to enhance resilience and promote integration between community members and local Emergency Management Services (EMS). A qualitative approach was adopted, guided by Creswell's model development framework (Creswell, 2015). Data were collected through thematic analysis of expert interviews and focus group discussions. Fourteen purposively selected professionals with at least seven years of experience in disaster or emergency response participated, including emergency service personnel, disaster management experts, community representatives, and volunteers. Findings highlight critical gaps in existing CBDM frameworks, particularly their limited capacity to address everyday emergencies and their weak integration of volunteers with EMS. The proposed model addresses these issues by institutionalizing volunteer participation and enhancing coordination mechanisms. The developed CBDM model strengthens community resilience by aligning with SFDRR priorities, promoting inclusive participation, localized governance, and multi-sectoral collaboration. Integration of CERTs in daily emergency response supports sustainable DRR and enables communities to build back better.*

Key Words: Community-Based Disaster Management (CBDM), Sendai Framework, Volunteer Engagement, Community Emergency Response Teams (CERTs), Disaster Risk Reduction, Resilience, Emergency Services Integration

Introduction

Although the concept of a community is central to DRM it remained ambiguously defined in both academic and policy discourses. As per Islam, (2013) communities have traditionally been perceived to be a passive collection of individuals, who are reliant upon external decision-making structures for their survival and recovery. The said perspective often underpins the top-down approach in DRM models, whereby communities are treated as dependent entities rather being active participants in the decision-making process. However conversely to the above, contemporary scholars emphasize communities as autonomous entities possessing indigenous resources, unique social networks, and adaptive capacities (MacQueen et al., 2001). In Pakistan, this dual nature is particularly evident in rural and urban communities which reflect contrasting levels of resources and networking to deal with any disaster. For example, during the 2005 earthquake in Kashmir, far-flung villages in the Neelum Valley demonstrated remarkable self-sufficiency in organizing improvised Search & Rescue Operations days before formal aid could arrive there (Maqbool et al., 2017). Whereas, the urban slums were often found dependent upon government or NGO intervention

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during floods which shows that there are systemic inequities in dependency on the community's resource distribution and institutional support in problem-solving. Bridging these perspectives requires a hybrid approach that combines community-driven initiatives with structured institutional frameworks.

The Rationale of the Study

Communities have immense potential for bringing about phenomenal positive changes in their areas including disaster resilience. Although the importance of volunteerism in DM has been widely accepted there remain gaps in interventions to be made for the strategic volunteer integration with local EMS. Isolated and few and far between training programs might have some practical implications in the face of real-time disasters which are few and far between. Moreover, without any intra-volunteer organizational structures and connectivity with the local EMS, all efforts made on community/volunteer training go to waste. Non-connectivity or lack of coordination mechanism with EMS or any other government umbrella organizations the entire system of volunteerism becomes ineffective at the time of need.

This requires a well-defined framework for guiding and coordinating volunteers for their recruitment, organization, training, and retention. It further requires that the volunteers undergo periodical training/ refresher and advanced training, and participate in emergency drills and scenario-based mock exercises. This again requires a management framework that ensures volunteer-EMS coordination in responding to day-to-day emergencies and is able to play their due role in all phases of DM activities, to make healthier, safer, and resilient communities.

The existing models either neglect volunteer-EMS coordination or the participation of volunteers in any of the phases of DM. The rationale of this study has been to bridge that gap by developing a robust framework for community engagement in DM while creating and maintaining their link and close coordination with the local EMS and to engage in day-to-day emergency response and be better prepared for efficient and effective community disaster response under the guideline, coordination, and supervision of local EMS. This shall ensure resource sharing, information exchange for disaster prevention and mitigation, and swift disaster response in the context of Pakistan. Moreover, as per Abid, Rafique & Raza, (2023) adopting the transformational leadership style, guides to innovative and proactive approach which is essential to tackle adverse disastrous situations.

In order to grasp such missed opportunities aimed at capacity-building, development of local leadership, and rapid and context-aware response. This study is grounded in the faith that structured and sustained volunteer engagement can bridge the gap between communities and formal EMS. It develops and validates the CBDM framework that encompasses all phases of DM and ensures a seamless coordination mechanism of community/ volunteers with the EMS.

Pakistan's Disaster Landscape: Geographic and Socio-Economic Vulnerabilities

Pakistan unique geographic and socio-economic factors provide a conducive-environment for multi-faceted natural phenomena and human-induced disasters. These disasters include, but are not limited to, earthquakes, floods, heat waves, droughts, cyclones, forest fires, and industrial accidents. The active seismic regions in the Northern parts of the country, particularly Gilgit-Baltistan and Khyber Pakhtunkhwa, are highly susceptible to catastrophic earthquakes, like the Kashmir earthquake in 2005 with a magnitude of 7.6 that resulted in over 73,000 fatalities and displaced around 3.5 million people (Maqbool et al., 2017). Collaborative efforts among the local communities, government agencies, and international partners are critical in the mitigation of disaster impact and in enhancing community resilience (Abid et al., 2019).

Gaps in Existing Volunteer Engagement Frameworks in Pakistan

Volunteer engagement in Pakistan faces several systemic challenges that hinder its potential for social development and youth empowerment. Existing frameworks demonstrate significant gaps in organizational capacity, policy implementation, and structural support that must be addressed for volunteerism to become a reliable tool for national development (Gul, 2023).

Research Problem

Despite global advancements in CBDM, there remained a critical gap in the existing models that could effectively address everyday emergencies while being contextually tailored to the unique geographic, socio-economic, and institutional landscape of Pakistan. The existing Frameworks such as the CERTs model by FEMA of the United States, the Integrated Community-Based Disaster Management System (ICBDM) of Taiwan, and the Vulnerability Assessment Framework proposed by Smit & Wandel (2006) have proven to be effective within their specific cultural and regional contexts. However, these models fall short when transposed to Pakistan due to their limited adaptability to diverse geographic terrains, socio-political complexities, localized risk, and under-resourced emergency infrastructures. There can be the possible utility of these frameworks but still, it requires scientific verification by application in the Pakistani context and some adjustment keeping in view the specific conditions and overall DM perspectives, whether or not the existing the existing models address all phases of DM.

These models often emphasize response to large-scale disasters but lack the mechanisms to institutionalize Volunteer Engagement (VE) in day-to-day emergencies. This is a significant limitation in Pakistan, where small & medium-scale emergencies such as house fires, road traffic accidents, and seasonal urban flooding, etc. occur regularly and cumulatively cause substantial human and economic loss. According to the National Disaster Management Authority (NDMA), over 70% of recorded emergencies in Pakistan from 2010 to 2020 were non-disaster incidents, yet these continue to be managed solely by under-resourced professional responders, leaving communities unprepared and passive.

A major shortcoming across many existing CBDM frameworks is the lack of integration between community volunteers and local Emergency Management Services (EMS). Volunteerism in Pakistan remains informal and sporadic. Most community trainings are one-time events with limited follow-up, little cross-community coordination, and no institutional memory or knowledge retention strategy. Consequently, during emergencies, even trained volunteers often act in isolation, disconnected from EMS or broader disaster response networks. This fragmented system not only impedes effective response but also discourages sustained community participation.

There is also a theoretical gap. Much of the existing literature treats volunteer engagement as a peripheral add-on to formal disaster management systems, rather than as a central, institutionalized component. Few models comprehensively address how everyday VE can serve as a training ground and resilience-building platform for communities to handle large-scale disasters. This oversight contradicts emerging theoretical perspectives—such as Community Resilience Theory, which emphasizes social cohesion, continuous local engagement, and adaptive capacities as foundational to disaster preparedness and recovery.

Therefore, the absence of a holistic, integrated, and context-sensitive CBDM model that leverages VE for both everyday emergencies and large-scale disasters constitutes a serious shortfall in Pakistan's disaster management capabilities. The proposed research addresses this knowledge gap by developing and evaluating a model that formalizes and operationalizes the role of community volunteers through structured CERTs, systematically integrated with EMS and guided by a unified coordination framework. Theoretically, this research contributes to the field by expanding the application of Community Resilience Theory to include non-disaster emergencies and day-to-day community engagement. Practically, it seeks to enhance Pakistan's disaster readiness by institutionalizing community participation, building sustainable local capacity, and strengthening horizontal and vertical linkages among stakeholders.

Research Questions

Primary 1: How can an integrated Community-Based Disaster Management (CBDM) model be designed to effectively strengthen community resilience within the context of Pakistan?

Secondary 1: What are the critical elements and strategies necessary for the successful integration of the proposed theoretical framework into the CBDM model?

Secondary 2: How can Community Emergency Response Teams (CERTs) be effectively established and formally integrated with local Emergency Medical Services (EMS)?

Research Objectives

Primary: To develop an integrated CBDM model to enhance community resilience by creating a networking mechanism between local EMS and CERTs for prompt emergency response to offer effective assistance before EMS arrival.

Secondary 1: To determine the key strategies required to integrate Crisis Management Theory into the CBDM model effectively, with a focus on enhancing community resilience.

Secondary 2: To establish Community Emergency Response Teams (CERTs) and integrate them formally with local Emergency Medical Services (EMS) for coordinated and effective emergency response.

Research Significance

This study presents a significant academic and operational contribution by developing a context-sensitive Community-Based Disaster Management (CBDM) model tailored to Pakistan's unique socio-cultural, economic, and geographic conditions. The model emphasizes structured volunteer engagement, formal integration of Community Emergency Response Teams (CERTs), and sustained collaboration with Emergency Medical Services (EMS). By doing so it bridges critical gaps in disaster risk reduction (DRR) efforts and contributes to a more resilient and responsive community-centered disaster management system.

Theoretical Contribution

This research enriches and expands existing theoretical frameworks in disaster and emergency management, particularly Community Resilience Theory. It introduces an integrated model that not only emphasizes post-disaster recovery but also includes proactive community engagement in day-to-day emergencies. Traditionally community resilience theory has been applied in contexts of major disasters; this study extends its relevance to everyday emergency management, positioning routine response as a pathway to long-term resilience.

Policy Contribution

From a policy perspective, the study provides a practical framework for institutionalizing volunteer engagement in disaster management. It highlights the need for an enabling legal and administrative environment that formalizes the role of community-based volunteers in both emergency and disaster contexts. The CBDM model offers evidence-based recommendations for integrating CERTs into official emergency response structures at the district and provincial levels.

The study supports the alignment of Pakistan's disaster management policies with international frameworks such as the Sendai Framework for Disaster Risk Reduction (2015–2030) and the Hyogo Framework for Action (2005–2015). This framework advocates for departure from top-down disaster planning to an inclusive, grassroots-based strategy that empowers the local actors. It encourages the governments to make investments in capacity-building at the local level, creating a National Volunteer Registry, developing a standardized training curriculum, and allocating dedicated funds for initiatives related to community preparedness for disaster response.

Practical Contribution

The proposed CBDM Model holds significant practical value for disaster management/response agencies, community organizations, and non-governmental organizations (NGOs). It presents an adaptable and replicable structured framework designed to enhance the preparedness and response capacities of the community. The model has emphasized the development & implementation of standardized various training modules for volunteers, to ensure that they are equipped with the skills and knowledge relevant to socio-cultural and local hazard dynamics. It also establishes an integration mechanism that enables seamless collaboration between CERTs and EMS through holding joint and well-coordinated drill practice, simulation exercises, and shared communication protocols.

Operational Definitions

Emergency

It is an urgent, sudden, and often unforeseen situation that poses an immediate risk to life, health, property, or the environment and requires prompt action to mitigate its effects (UNDRR, 2017).

Disaster

It is a severe disruption of the functioning of a community or society which involves widespread material, economic environmental, and human losses and the impact which exceeds the capacity of the affected community to cope with, making use of its own resources (UNDRR, 2017).

Disaster Management

Disaster management refers to the systematic organization, planning, and coordination of resources, responsibilities, and procedures to address the humanitarian aspects of emergencies, encompassing preparedness, response, recovery, and mitigation phases (IFRC, 2020). It includes a whole cycle of activities aimed at minimizing the risk and consequences of any disaster, in order to promote community resilience. DM is not limited to emergency response; it also includes proactive measures for the mitigation of risks, preparing for potential emergency situations, and facilitating the recovery process.

Phases of Disaster Management

The process of DM has been typically divided into four interconnected and overlapping phases which include mitigation/ prevention, preparedness, response and recovery, and effective training to improve disaster response (Adams et al., 2022).

Mitigation Phase

This phase focuses on measures aimed at reducing disaster risk (mitigation) or eliminating it (prevention) before its occurrence to ensure sustainable development is part of DRR activities. This is a pre-disaster stage which includes proactive implementation of land-use planning, enforcement of building regulations and codes, environment protection, and conducting of campaigns for public awareness. The efforts for mitigation aim to create safer and more resilient communities by reducing vulnerabilities and by minimizing exposures to potential hazards.

Preparedness

Preparedness also falls in the pre-disaster phase which includes planning, training, and resource allocation to ensure a state of readiness for the disaster response. The main activities of this phase include the development of emergency response plans, conducting simulation exercises, and stockkeeping essential supplies. The preparedness phase is aimed at enhancing the capabilities of individuals, communities, and organizations for effective disaster response when it strikes.

Response

The response phase involves a set of immediate actions to be taken during or directly after a disaster strikes to save lives, protect property, and address the basic needs of the affected populations. Activating emergency service, deployment of first responders, and coordinating the relief efforts. Efficient, effective, and timely response is crucial in minimizing disaster impact and alleviation of human suffering.

Recovery

It is the long-term phase which starts after the initial response. This phase deals with rebuilding and restoration of infrastructure and services to a normal or pre-disaster state. These efforts address economic, social, physical, and psychological impacts. It is aimed at reducing vulnerability to future disasters by ensuring sustainability and community resilience.

Community Resilience

Community resilience denotes the ability of a community to anticipate, absorb, adapt to, and recover from the effects of hazards or disasters in a timely and efficient manner while preserving essential structures, functions, and identity (UNDRR, 2017). The term "community" itself has been understood in various ways. A common definition describes a community as a group of persons having diverse characteristics connected through social ties, shared perspectives, and collective actions within a specific geographical setting (Macqueen et al., 2001). The community experiences vary across the cultural and DM context, which

highlights the significance of collaborative community participation in disaster preparedness activities along with EMS and other stakeholders for building resilience Patterson & Patel, (2010).

Volunteer

A volunteer is an individual who engages in activities or services willingly, without coercion or financial compensation, to benefit others outside their immediate household (International Labor Organization, 2011).

Volunteerism

Volunteerism is the practice of contributing time, skills, and effort through voluntary action which is often channeled through any organization or an informal network to address societal challenges and to enhance collective well-being (United Nations Volunteers, 2018).

Volunteer Engagement

It is a dynamic aspect of volunteerism at the heart of the volunteer experience. It includes the many strategies, practices, and activities used by various organizations for attracting, retaining, and effectively mobilizing volunteers to pursue their mission. In the recent past, VE has gained substantial attention for the crucial role it can play in shaping the volunteer experience to maximize the impact of the efforts of volunteers. VE is instrumental in creating a mutually beneficial volunteer-organization relationship. Volunteers contribute their time, skills, and passion to help organizations achieve their goals and address societal needs. Effective engagement efforts enable organizations to explore the potential of their volunteer workforce for greater productivity, impact, and satisfaction.

The key aspect of VE is the recruitment and onboarding of volunteers, through which organizations can effectively attract volunteers with shared missions and values. Ilyas et al., (2020) highlighted the importance of aligning organizational tasks with the motivational drives of the volunteers, to ensure a strong volunteer organization match. In addition to that providing clear guidelines and procedures is essential for volunteers during the onboarding creating a sense of ownership.

Role of Community in Disaster Management

The community plays a key role across the DM field, which encompasses preparedness, response & recovery, and retains a prominent position in many conceptual frameworks related to decision-making during disasters. Patterson & Patel, (2010). conducted an in-depth analysis of community involvement and presented models that span the spectrum of DM. The models study processes like risk perception, vulnerability assessment, resilience-building, and capacity enhancement. Their central concepts like social resilience are closely linked with the Social Capital Theories which highlight the importance of social networks, mutual support, and trust in developing a collective action Patterson & Patel, (2010).

Community-Based Disaster Risk Management (CBDRM)

The Federal Emergency Management Agency (FEMA) established the CERTs program to address the complex challenges, faced by the United States in the late 20th century (FEMA, 2022). This program has become a valuable model with the passage of time for promoting worldwide community-based disaster response (CBDR) efforts. The success of CERTs has been largely attributed to their integration at both local as well as federal levels in the USA. The support of the local community has influenced extensive regional initiatives and the standardization of training protocols. As mentioned by Simpson (2001) the importance of embedding CERTs within emergency response plans and to broaden their scope beyond immediate crises underscoring their vital role in improving Disaster Preparedness (DP) to strengthen Community Resilience. The overall objective of CBDM is to enhance community resilience (Fu & Zhang, 2024).

Literature Review

Theoretical Background

Contingency Theory

Contingency theory suggests that there is not a single "best" approach to manage a situation instead the

most effective course of action is contingent upon the prevailing specific conditions. The theory has been applied in various fields like leadership and organizational behavior for determining the most appropriate context-based strategy. In the DM context, this theory highlights the importance of flexibility and adaptability. DM is generally unpredictable and complex which requires a response that is tailored to the unique characteristics of the disaster. The theory proposes that the best practices in DM are not universal but can be adapted to the specific circumstances of each event. This adaptability is crucial in managing the dynamic & chaotic environment created due to the disaster. The theory directly relates to DM because it supports the idea of customized response, based on the disaster type, available resources, and affected community's specific needs. The theory does provide a framework to understand why a DM plan should be flexible & context-specific. The theory provides a basic perspective for DM, highlighting the need for adaptive and context-sensitive responses to effectively manage the complexities and unpredictability of a disaster (Donaldson, 2001).

Relational Model of Crisis Management

Jacques et al., (2007) critiqued the traditional, linear model of crisis management (CM), which depicted the process as a series of different phases. They have proposed a relational model that recognizes the interconnectedness of CM and issue management. According to this model, a crisis does not unfold in a predictable and sequential manner, rather the processes involved often overlap and dynamically interact. They highlight the importance of understanding the relationship among crisis Prevention, preparedness, incident management, and post-crisis recovery. The relational model offers a more nuanced and holistic approach to managing crises by situating these elements within the broader context of organizational management. The model is closely related to DM because it provides a more realistic description of how a crisis unfolds & how it should be managed.

Community Resilience Theory

As per Mancini and Bowen (2009), Community Resilience Theory (CRT) concentrates on the endurance capacity of a community, to adapt and recover from danger whether it be a typical challenge or an unforeseen disaster. CRT proposes that a resilient community is better equipped to return to or even exceed its pre-disaster levels of functioning after facing a disaster. Resilience is made through a combination of economic, social, and institutional factors that enable a community to absorb shocks, recover from disruption, and sustain its long-term functionality. The theory is important for DM because of its emphasis on the importance of building & maintaining strong and adaptable communities that are capable of effectively responding & recovering from disasters. CRT dictates DM practices by promoting strategies that increase community preparedness, foster social cohesion, and support recovery efforts. It is more likely that a resilient community can mitigate the impacts of a disaster and rapidly recover from it. Hence reducing overall loss and improving long-term outcomes. CRT has contributed to DM by providing a framework to strengthen a community before, during, and after disasters by ensuring its effective navigation and recovery from a crisis.

This study is deeply rooted in principles of CRT which underscores the ability of a community to withstand, adapt, and recover from any adversity. By integrating the theoretical framework, we have prioritized the development of a strategy that enhances social cohesion, strengthens institutional capacity, and fosters adaptive capability in the community. Our approach acknowledges that a resilient community is better prepared for disasters and is more capable of achieving sustainable recovery and post-crisis growth. The application of CRT in this study shows our commitment to creating DM practices that are proactive, adaptive, and inclusive to ensure long-term functionality and stability in the face of a disastrous situation. The perspective aligns with contemporary DM paradigms, which underline the importance of building robust & sustainable communities to be the cornerstone of effective DM efforts.

Comparative Models

Integrated Community-Based Disaster Management in Taiwan

Chen et al., (2006) have discussed an Integrated Community-Based Disaster Management (ICBDM) system used in Taiwan which emphasized the need for customized DM strategies tailored for specific

characteristics of a community. It provides a phased process relating to project orientation, vulnerability assessment and identification of problems, development of strategy, organization establishment & practices. Moreover, it highlighted the significance of the involvement of various public and private sector organizations as partners to ensure the effective implementation of the project.

Conceptual Framework for Vulnerability Assessment and Mainstreaming

The model proposed by Smit & Wandel (2006) focuses on community involvement in hazard and vulnerability assessment both in present and future scenarios. Emphasizing stakeholder and community engagement, it aims to enhance the collective adaptability, coping capacity & resilience of a population, referred to as an "adaptive capacity." This framework follows the "bottom-up" approach, through the involvement of key community stakeholders in the decision-making process to implement changes that are relevant to the needs of the community.

The Evacuation and Action Model

Dash and Gladwin (2007) presented a comprehensive framework for evacuation with a focus on individual factors, characteristics of an event, and risk perception. The model makes an analysis of evacuation actions and emphasizes that risk perception involves multiple elements fluctuating between individuals and their communities. Such elements include socio-economic status, past experiences, trust in the authorities, data about storms, characteristics of homes, and the dissemination of the messages. The collaboration between these variables can increase or diminish risk perception. The authors aimed to organize decision-making factors, analyze of utilization of information, and understand the influences on individual actions during the evacuation process.

Models of Disaster Recovery

In these models, the dimension of the post-disaster recovery phase of DM has been extensively studied, yielding comprehensive conceptual models. (Lemyre et al., 2005) present a model focused on managing and accessing psychosocial needs after a disaster, taking the community as a crucial resource, similar to the concept of adaptive capacity outlined in the study of (Smit & Wandel, 2006). The model presented the Psychosocial Risk Assessment and Management Framework (PRAMF), which integrates community members and stakeholders in the post-disaster psychosocial aspects.

The concept of resilience is pivotal, emphasizing the presence of preventive factors at the level of individual, family, and the community, in order to mitigate adversity and strengthen the community's capacity to deal with dealing with present & future disasters. Additionally, Chen et al., (2006) have integrated risk perception, vulnerability, disaster response, evacuation, action, and recovery in a conceptual model, contributing to a comprehensive understanding of DM. These models collectively provide frameworks to address psychosocial needs, resilience, and community-based intervention programs for effective disaster recovery and preparedness.

Method

This study employs a qualitative research design (inductive approach) integrating to develop the Community-Based Disaster Management (CBDM) model. Creswell's model development Rozi et al., (2021) framework was employed to structure the research for Model Development.

Model Development

A qualitative approach was adopted to conceptualize the CBDM model. Fourteen experts in emergency management, disaster response, and community resilience were selected using purposive sampling based on their experience (minimum of seven years) and affiliations with key organizations such as Punjab Emergency Services (PES), Civil Defense Services (CDS), Rescue Warden Service, District Disaster Management Authorities (DDMAs), Boy Scouts Organizations, Red Crescent, and NGOs.

Research Design

The exploratory research design was employed which was grounded in an extensive literature review spanning DM, CR, and CERTs. This theoretical foundation provides an outline for the development of the

framework for the semi-structured interview guide and the focus group discussion. To explore four key dimensions, the interview guide was carefully structured. These dimensions include:

i. The organizational structures and hierarchy of emergency response systems.
ii. The operational challenges encountered while dealing with the disaster response scenarios.
iii. The key critical success factors for integrating CERTs into formal disaster management frameworks.
iv. Existing gaps in policy and training that affect the disaster response capabilities of the communities.

The interview guide was based on balanced structured questions with the flexibility to allow participants to introduce any novel perspective besides ensuring comprehensive coverage of all of the research objectives.

Sampling Strategy

The purposive sampling technique was employed in this study to select fourteen qualified experts from seven key disaster management organizations. The selection criteria required the participants to possess a minimum of 7 years of operational experience in EMS and/ or in DM. The threshold of 7 years minimum experience was established based on three key considerations as supported by the literature. Firstly, as per Ericsson et al., (2007), the research on expertise development indicates that true mastery in complex fields like DM typically requires 5 to 7 years of deliberate practice. Secondly, studies on emergency personnel competency suggest that this is the timeframe for the transition from operational to strategic understanding (Flin, 2008). Thirdly, as depicted by McLennan et al., (2016) the career progression models in emergency services showed that this time period marks the assumption of supervisory roles & responsibilities. In the sampling frame selected two representatives were selected from each organization, one for in-depth interviews and another for the focus group discussions, to ensure balanced representation to maintain organizational diversity. The selection of seven interview participants aligns with Guest et al., (2006) findings that 90% of qualitative research themes emerge within the first six interviews. The parallel focus group of seven members follows Krueger & Casey's, (2014) recommendation for an ideal focus group size (5-8 participants) which balances diversity of perspectives with effective group dynamics.

Data Collection Procedures

Focus Group Discussions

A separate group of seven experts participated in carefully structured focus group discussions (FGDs) designed to validate and refine the conceptual framework. This interactive session lasted 120 minutes was led by the principal researcher and was moderated by a moderator. The FGD process followed four structured phases: (1) Introduction, where objectives and guidelines were clearly explained, (2) Open Discussion, allowing experts to critically examine the preliminary model (3) Brainstorming, generating constructive suggestions for improvement and (4) Consensus Building where key recommendations were synthesized. The discussions were recorded (with consent) by detailed field notes documenting non-verbal cues and group dynamics.

Semi-Structured Interviews

Seven in-depth interviews were conducted with selected experts, each lasting between 45 to 60 minutes. Semi-structured format was used for conducting interviews, combined with predetermined questions with opportunities for exploration of emerging themes. Sessions were held in private settings through face-to-face and secure video conferencing platforms, depending on the availability and preference of the participants. All interviews were recorded with prior consent to ensure accurate data by verbatim transcription.

Ethical Considerations

The research adhered ethical guidelines were adhered to throughout the research and data collection process. All participants were provided with comprehensive information about the purpose & procedures of the study and written informed consent was received from all of them. During the consent process, it was emphasized that there would be voluntary participation with clear assurance to the participants that they could withdraw at any stage without consequence. To maintain confidentiality strict data

anonymization protocols were adopted and all personal identifiers were removed from transcripts and reports. Transparency was ensured through clear communication regarding data usage and storage procedures.

Data Analysis

Braun and Clarke's (2006) six-phase framework was followed for rigorous thematic analysis of the qualitative data collected through interviews and FGDs. The analysis started with immersion in data by repeatedly reading the transcripts (Familiarization). By initial coding, discrete concepts were identified. Which were subsequently, grouped into preliminary codes (Coding). After that, these preliminary codes were organized into overarching themes through "Theme Development". To ensure consistency and validity, the emerging thematic framework was tested against the raw data (Reviewing Themes). To reflect their conceptual essence the final themes were clearly defined and named (Defining & Naming Themes), then incorporated into the research narrative (Report Writing). This systematic approach was used to ensure the authentic representation of the collective expertise of the participants in light of the research objectives.

Outcome and Transition

An empirically grounded conceptual framework for the VE for the CBDM model was yielded in this study. The qualitative findings of the study identified critical operational requirements, potential challenges in implementation, and the key success factors for CBDM systems. Such insights provided a solid foundation for validation, limited testing, and extensive trials of the Model. The methodology employed in this phase ensured that the model so developed was theoretically sound and practically viable with strong relevance to real-world DM context.

Results

The conceptual model for Community-Based Disaster Management (CBDM) was developed through a rigorous thematic analysis of qualitative data from focus group discussions and expert interviews. The process began with data familiarization, where transcripts were thoroughly reviewed to identify key patterns. Initial coding was performed to label significant statements, which were then grouped into broader themes. These themes were refined to ensure coherence and distinctiveness, with NVivo software aiding in data organization and analysis.

Based on the focus group discussion thematic analysis of focused group discussion reveals several key themes related to CBDM integration, the role of CERTs, networking mechanisms, effective collaboration, disaster preparedness, the proposed CBDM model, and challenges and opportunities in implementing hierarchical structures.

Table 1

Findings from the Thematic Analysis of Focus Group Discussion

Initial Codes	Themes
Collaborative approach Community participation Empowerment	Perspectives on CBDM
Local insights Quick mobilization	Role of CERTs
Networking mechanisms Regular meetings Joint exercises Shared platforms	Networking Mechanisms
Clear communication channels Shared databases Standardized protocols Joint training sessions	Effective Collaboration
Comprehensive disaster preparedness efforts Community Education Early warning systems	Disaster Preparedness

Initial Codes	Themes
Regular drills Community involvement Post-disaster debriefing sessions	
Structured approach Continuous improvement Inter-agency coordination	Proposed CBDM Model
Clear organizational hierarchy Flexibility Integration of CERTs Local community leader's involvement	Organizational Hierarchy
Challenges in implementation Resistance to change Thorough training programs Opportunities for cross-training Awareness programs	Challenges and Opportunities

Perspectives on CBDM

Participants emphasized the collaborative nature of CBDM, advocating for active community participation and empowerment. As one participant, representing the Emergency Services Department, remarked, "*Our organization believes in a collaborative approach where communities actively participate in DM.*" This sentiment reflects the importance of the engagement of the local community in disaster response efforts.

The participant from the Civil Defense Department resounded a similar sentiment, stating, "*Community involvement is at the core of an effective DM. Without active participation of the community, our efforts would be hindered significantly.*"

Role of CERTs

The CERTs have emerged as valuable first responders in case of any emergency or disaster. CERTs have bridged the gap between a community and the formal local EMS. Being residents of the area, their local intuition and swift mobilization capability have been elaborated throughout the discussion. It is evident that a participant from the Municipal Fire Service said, *"The CERTs enhance our emergency response by providing local insight and manpower.*" This recognition shows the critical role CERTs can play in ensuring an effective disaster response at the level of the community.

The Boys Scout Organization representative shared his perspective and said, "*CERTs are the backbone of volunteer disaster response and community CR. During any disaster, CERTs provide immediate response and effectively coordinate DM efforts.*"

Networking Mechanisms

The discussion among the participants shed light on the significance of the robust networking mechanism of CERTs, EMS, and other stakeholders. Regular joint exercises, meetings, and shared communication platforms were considered to be vital for seamless coordination during all phases of DM. The Civil Defense Department representative articulated, "*Networking includes regular training, CERTs meetings, joint planning and simulation exercises, which are essential to ensuring seamless coordination during any disaster.*"

The member from the NGO highlighted, "*An effective networking mechanism/ framework allows swift sharing of information and resource deployment, which leads to lesser response time and better outcomes in case of any emergency or a disaster.*"

Effective Collaboration

Clear communication channels, shared databases, and standardized & well-articulated protocols were identified to be critical components of effective collaboration between CERTs and the local EMS. Joint training sessions, regular coordination meetings, and periodic mock exercises were deemed instrumental in fostering trust & enhancing operational efficiency. As highlighted by the participant from the NGO, "*Regular coordination meetings and joint training sessions are key to maintaining a strong working relationship.*"

The representative from the Punjab Emergency Service Department said, "*Collaboration is not just about communication; it is about understanding the strengths and limitations of each other to work cohesively during a Crisis.*"

Disaster Preparedness

The participants highlighted the importance of comprehensive disaster preparedness efforts, including community awareness/education, an early warning system, and regular drills/ mock exercises. For continuous improvement engagement of the Community in risk assessment and their feedback during post-disaster debriefing sessions was considered to be essential. The participant from the Boys Scout organization stated, *"The preparedness phase comprises of the activities including educating the community, installation of early warning system, standardized training and regular mock exercises & drills which are mandatory to ensure a swift & effective disaster response."*

The Civil Defense Department representative said, "*Involvement of community in preparedness activities is a basic requirement for our community to be resilient, which cannot be ignored or under-estimated."*

Proposed CBDM Model

The participants viewed the proposed CBDM Model optimistically, it contained a structured approach that emphasizes community engagement in pre-disaster preparedness activities, organizing the volunteers as CERT, integration with the local EMS, and engaging them in everyday emergency response with EMS making it instrumental for continuous improvement and a bridge in inter-agency coordination. They recognized that the proposed model has the potential to enhance the efficiency and effectiveness of community disaster response. It was evident from the comments of the participant from the PES who mentioned, "*The proposed model enhances inter-agency coordination as it leads to an effective & efficient response mechanism.*"

The participant from an NGO said, "*The proposed model is in line with the vision of a DM community-centered and community lead approach, where everyone has a key role to play in hazard prevention, risk mitigation, and an effective response."*

Organizational Hierarchy

During the course of the discussion, the organizational hierarchy depicted in the proposed CBDM Model underscored the importance of a well-structured & clear communication channel & flexibility. CERT engagement with existing EMS structures empowering local community leaders and involving them in the decision-making process was found to be very important for effectively managing disaster response. As one participant said, "*A clear hierarchy ensures efficient decision-making, with CERTs acting as an essential part of the overall emergency structures."*

Another participant from the Fire Service highlighted, *"Flexibility in the hierarchy allows us to adapt to dynamic situations & allocation of the resources where they are maximum beneficial.*"

Challenges and Opportunities

The participants recognized challenges like resistance to change and to maintain flexibility, they also identified the opportunity for cross-training & collaboration. A thorough training and awareness program was deemed essential for the mitigation of implementation-related challenges and for fostering a more integrated emergency response network. As one of the participants reflected, "*The challenges include resistance to change but the opportunity lies in a more coordinated and effective disaster response system."*

A participant from the Boys Scout Organization said, "*Challenges push us to innovation and improvement. Through collaborative and shared learning, we can turn the obstacles into stepping stones toward a safer community."*

The thematic analysis of the interviews with experts explores important insights essential for making an effective VE and management strategy. Within the multipart discussion, several recurring themes emerged signifying crucial components fundamental to the proposed Model. These themes include Preparation and Training, CERT Development & Integration, Response & Rehabilitation, and Recovery &

Reconstruction. Each theme summarizes various initial codes, shedding light on the intricacies and nuances involved in VE and management within the context of disaster response and community resilience.

Table 2

Findings from the Thematic Analysis of Interviews with Experts

Initial Codes	Themes
Awareness-raising Recruitment/registration processes Effective use of IT & social media Training programs Hazard mapping Prevention strategies	Preparation and Training
Team integration with ESD Engagement plan development Exercise drills and simulations	CERT Development and Integration
Prioritization of tasks Establishment of communication and response mechanisms Conducting rescue and rehabilitation activities	Response and Rehabilitation
Implementing the Recovery & Reconstruction Project Establishment of Reporting & Feedback Mechanism Debriefing Session Problem Identification Recognition & Reward System Research & Development Initiatives	Recovery and Reconstruction

Preparation and Training

The thematic analysis probed into the perspective of representatives from many departments, regarding preparedness & training for disaster response. Through the initial coding process, several vital themes emerged. One prominent theme was "Preparation and Training," which summarized the importance of being in a state of readiness and aware in efforts to mitigate the impact of the disaster.

The participants highlighted "Awareness-Raising" as a crucial feature, highlighting the necessity to inform and educate the communities regarding potential hazards and proper response protocols. For example, the Civil Defense representative said, "*We conduct awareness sessions in local schools to educate children about safety measures in case of earthquake.*"

"Recruitment & registration process" was also identified as vital for building capable response teams (CERTs). A Fire Service participant shared, "*We streamline the recruitment processes to ensure that only qualified and physically fit individuals join our firefighting teams, to enhance our emergency response/ firefighting capabilities.*"

The effective usage of Technology & social media appeared as another key feature under the code "Effective Use of IT and Social Media." the Boys Scouts representative described, *"We can leverage social media platforms to disseminate awareness messages regarding preparedness tips and engage with the community in various disaster preparedness campaigns."*

The "Training programs" were emphasized across the departments, with participants emphasizing a need for continuous skill development. The NGO representative mentioned, *"We conduct regular first-aid and evacuation drills to ensure that our volunteers are well-prepared for any emergency & disastrous situation."*

"Hazard Mapping" was recognized as an essential step in risk understanding and mitigation. The representative from PESD specified, *"We use GIS technology to map the vulnerable areas which are prone to flooding, enabling our teams to implement targeted mitigation measures."*

Finally, "Prevention Strategies" were highlighted as vital to reduce the likelihood & severity of a disaster. A Rescue Warden highlighted, *"We focus on the proactive measures like reinforcing the building structures to withstand earthquakes, rather than only relying on reactive response."*

CERT Development and Integration

The thematic analysis focused on the stakeholders' perspective regarding CERT development & integration, explaining key themes such as "CERT Development & Integration." Under this theme, several initial codes have emerged such as "Teams Integration with EMS", "Engagement Plan Development" and "Exercise Drills and Simulations" showing the multi-layered approach necessary for effective CERT program implementation.

"Teams Integration with EMS" was recognized as a critical aspect of CERT development, highlighting the need for seamless coordination between CERTs and EMS. A participant from EMS operations mentioned, "*We prioritize integration of CERTs into our emergency response system, ensuring coordinated efforts during emergency incidents that require medical assistance.*"

The code "Engagement Plan Development" showed the importance of the strategies for engaging community members in the CERTs initiative. A stakeholder responsible for community engagement said, *"We do comprehensive planning to engage residents in CERT training activities, fostering the sense of ownership and resilience in the communities.*"

The "Exercise drills and simulations" appeared as a key element of CERT training, providing the participants with a practical experience and enhancing their preparedness. A CERT trainer described, *"We conduct regular drills and simulation exercises close to real-life scenarios, allowing our CERT members to enhance their skills and improve their response capability."*

Response and Rehabilitation

The thematic analysis discovered perceptions about response and rehabilitation efforts in disastrous situations revealing key themes which included "Response & Rehabilitation." In this theme, 3 initial codes emerged, such as "Prioritization of Tasks", "Establishment of Communication & Response Mechanisms" and "Conducting Rescue & Rehabilitation activities" highlighting vital elements of an effective DM.

The "Prioritization of Tasks" code highlighted the importance of efficient management of resources and talking about immediate needs during the emergency/ disaster response. A participant from DM authority commented, *"We prioritize the tasks based on the urgency & impact, ensuring that critical requirements are addressed to minimize further harm effectively."*

"Establishment of Communication & Response Mechanism" emerged as a key aspect for coordination efforts and circulating information during crisis situations. A participant stated, *"We establish a robust communication channel & response protocols to facilitate coordination among stakeholders and ensure efficient and timely resource allocations."*

The code "Conducting Rescue and Rehabilitation Activities" underscored the importance of the implementation of practical actions to rescue affected persons and support the recovery process. A rescue team member clarified, "*We conduct search and rescue operations followed by rehabilitation activities for providing immediate relief and assistance to the affected communities in rebuilding their livelihoods".*

Recover and Reconstruction

In the "Implementation of Recovery and Reconstruction Projects," the code underscored the significance of executing practical initiatives to rebuild infrastructure for the restoration of affected communities by disasters. A participant involved in reconstruction efforts said, "*We prioritize the implementation of recovery projects to rebuild homes, schools, and other vital infrastructures, aiming to the restoration of normalcy in the affected areas by disasters."* "Establishment of Reporting and Feedback Mechanism" emerged as a vital aspect to facilitate transparent communication as well as accountability throughout the recovery process. A stakeholder responsible for community engagement remarked, "*We establish reporting mechanisms to solicit feedback from affected populations, ensuring that their voices are heard and incorporated into decision-making processes."*

The code "Debriefing Sessions" emphasized the significance of considering the experiences and lessons learned after the disaster response and recovery activities. A participant having experience in

debriefing sessions stated, "*We conduct regular debriefing sessions after the incidents to evaluate our performance, identify the areas for improvements, and share the best practices among the members of the team.*"

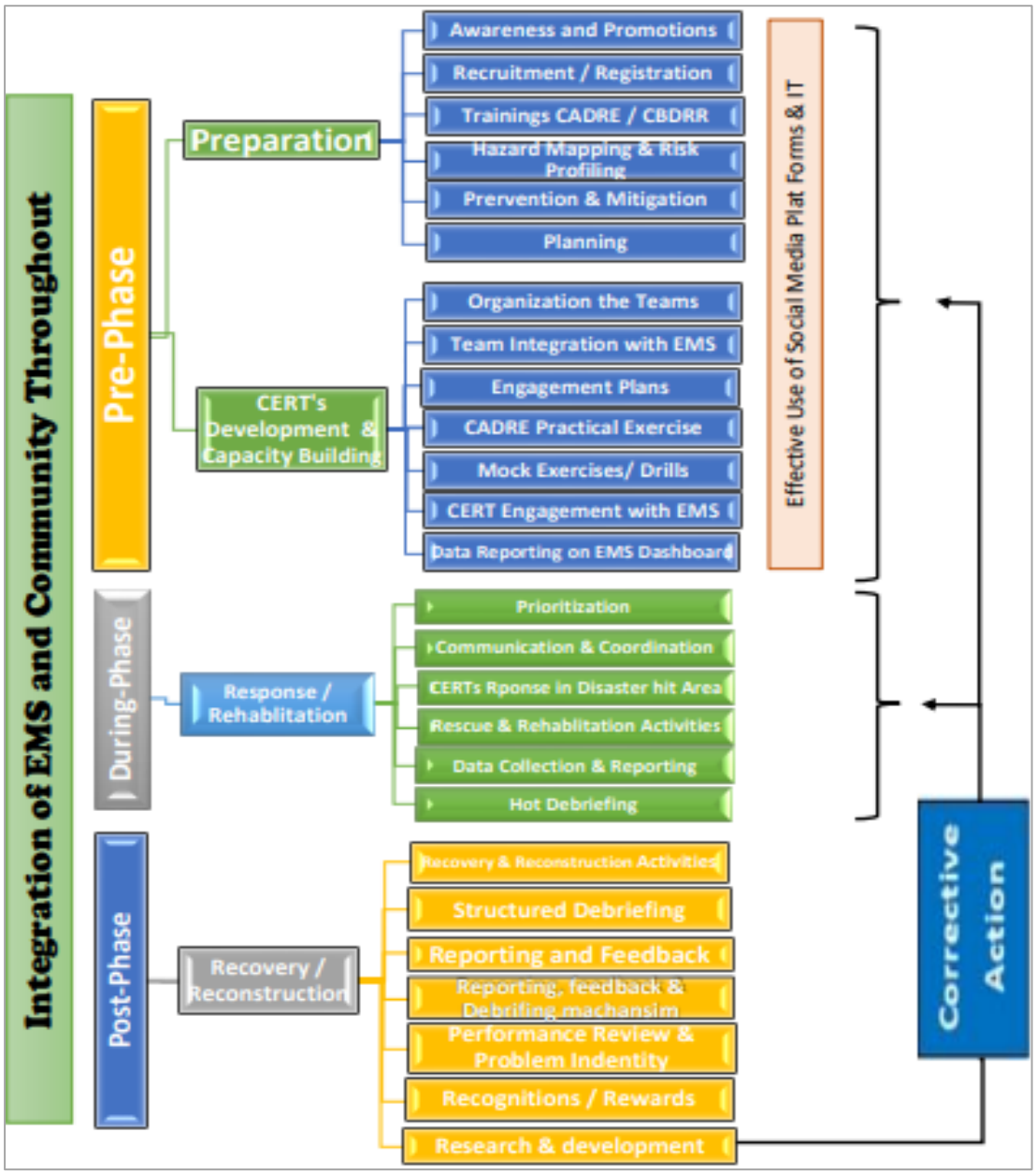
"Problem Identification" emerged as a critical step to address the challenges and barriers encountered during the recovery & reconstruction phase. A representative from a DM Agency said, "*We prioritize the identification of problems to proactively resolve issues hindering the progress of recovery effort, fostering adaptability & community resilience.*"

The "Recognition & Reward Systems" code highlighted the importance of acknowledgment and incentivizing the contribution to recovery and reconstruction endeavors. A stakeholder responsible for human resources said, "*We implement a recognition and reward system to appreciate the dedication & hard work of individuals and teams taking part in recovery efforts, fostering motivation and commitment.*"

The "Research and Development" initiatives highlighted the importance of innovations and continuous improvement to enhance the effectiveness of recovery & reconstruction strategies. A participant involved in research initiatives clarified, *"We invest in research & development initiatives to explore innovative approaches and technologies that can optimize recovery processes to build resilience against future disasters."*

Figure 1

An Integrated Model for Volunteer Engagement in Emergency & Disaster Management



The developed model presents a comprehensive approach for the integration of the community with EMS throughout all phases of the DM Cycle, encompassing the pre-, During & Post-Phases. During the Pre-Phase the focus remains on preparedness & capacity building which involves creating awareness, recruitment & training of volunteers, conducting hazard mapping & risk assessment, and organizing the response teams (CERTs). It also includes planning; team integration of volunteers with EMS and conducting mock exercises and drills to ensure a state of readiness for the actual future events. The Response/ Rehabilitation phase prioritizes actions and establishes communication and emergency response mechanisms to carry out rescue and rehabilitation activities. In the post-phase, the focus shifts to recovery & reconstruction, where the performance is reviewed, problems are identified and recognitions are granted. Feedback is gathered to inform future efforts and R&D activities are undertaken to refine strategies. Throughout all phases of DM, corrective actions are continuously implemented to enhance the effectiveness of community and EMS integration to ensure a more resilient response to future emergencies & disasters.

Discussion

This study developed a Community-Based Disaster Management (CBDM) model to enhance disaster resilience through structured volunteer engagement, localized education, and inclusive planning. The findings align closely with the Sendai Framework's priorities, particularly in understanding disaster risk (Priority 1) and enhancing preparedness (Priority 4). Interviews revealed critical gaps in community risk awareness, emphasizing the need for participatory education programs that transform residents from passive beneficiaries to active stakeholders. The proposed model addresses this by integrating formal training with community knowledge networks reflecting the Framework's call for VE for inclusive risk governance and cultural transformation in disaster preparedness.

The study also identified coordination gaps between institutions and volunteers supporting the Sendai Framework's governance priority (Priority 2). The CBDM model proposes an integrated command structure to strengthen multi-stakeholder collaboration, complemented by capacity-building initiatives that align with Priority 3 resilience investments. Notably, the model extends beyond the immediate response to include long-term recovery strategies like mental health support and public-private partnerships, operationalizing the Priority 4 Build Back Better principle. By adopting the global Sendai priorities context, this research provides a scalable blueprint for reducing vulnerability through community-centered disaster management (UNDRR, 2015). The study emphasizes the role of CERTs in bridging the gap regarding time lag in emergency response before professional help arrives, this finding is consistent with Abid et al., (2016) on the critical role of community first responders in Pakistan

The model's emphasis on continuous training and standardized protocols resonates with Chen et al., (2006) who highlighted the success of Taiwan's Integrated Community-Based Disaster Management (ICBDM) program in enhancing local response capabilities. Similarly, the integration of CERTs into formal emergency systems echoes Jensen & Carr's, (2015) findings on the importance of pre-disaster team integration for effective crisis response. Thematic analysis revealed that participants viewed the model as practical and adaptable, particularly its focus on community empowerment and interagency collaboration key factors identified by Patterson & Patel, (2010). in fostering social cohesion and resilience.

Conclusion

The development of the Community-Based Disaster Management (CBDM) model in this study represents a significant advancement in local disaster preparedness strategies. By addressing critical shortcomings in previous frameworks, this model offers a comprehensive, inclusive, and sustainable approach to disaster risk reduction (DRR). It emphasizes the vital role of community engagement, continuous training, and strong coordination with emergency services. The model transforms passive community members into proactive stakeholders capable of contributing meaningfully across all phases of disaster management. These findings not only provide a robust foundation for future research and application in VE in CBDM but also hold the potential to influence broader national and international disaster management policies and practices.

The proposed CBDM model offers a holistic and adaptable framework that addresses the complex needs of disaster-prone communities. It not only supports the strategic priorities of the Sendai Framework for

Disaster Risk Reduction (2015–2030) but also presents a practical roadmap for integrating community strengths into formal disaster management systems. Through education, participation, coordination, and post-disaster involvement, this model enhances the capacity of communities to withstand and recover from disasters ultimately contributing to a more resilient and prepared society. On the other hand, it also helps in the reduction of vulnerabilities through community participation in post-disaster activities aimed at sustainable development hence supporting DRR for sustainable development to build back better.

Limitations and Way Forward

The developed model has not been tested for practicality, validity, and effectiveness. In the absence of such evaluation in Pakistani context the practical viability of the developed model remains under a question mark. A future study is required to evaluate this model through limited and extensive trials to test its practical viability in emergency and disaster scenarios in Pakistan.

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