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Original Article

Evaluating Community Participation in Public Sector Disaster Resilience Initiatives in Swat, Pakistan

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ABSTRACT

Disaster resilience initiatives in Pakistan's Swat region have been criticized for their limited effectiveness. This study explores the role of community participation in public sector disaster resilience initiatives, examining the intersections between participation, planning, and project implementation. Using a convergent parallel mixed-method research Approach, the study examines the experiences and perceptions of local communities regarding their involvement in disaster risk assessment, resilience planning, project formulation, and implementation. Results of the qualitative and quantitative data identify significant barriers to meaningful community engagement. The findings reveal significant gaps in community participation, characterized by top-down decision-making processes, limited stakeholder engagement, and inadequate representation of local needs. The findings highlight the need for participatory mechanisms, capacity-building initiatives, and contextualized planning to address the unique needs of Swat's communities. This study contributes to the understanding of community participation in disaster resilience and informs policy and practice reforms to promote inclusive and effective disaster management in Pakistan.

Introduction

Despite repeated disasters, communities in Swat demonstrated notable resilience. Swat District, located in Pakistan's Khyber Pakhtunkhwa province, is vulnerable to natural and human-induced disasters due to its rugged terrain, rivers, and glaciers, making it prone to floods, landslides, earthquakes, and avalanches (Rahman et al., 2023). Climate change exacerbates these risks, increasing extreme weather events' frequency and severity (Bacha et al., 2021). Recent devastating disasters, including the 2009 militancy crises, floods 2010, earthquake 2015, and the flood 2022 affected millions of people (Government of Pakistan, 2022). The 2010 floods

damaged 15539 houses in the district Swat and changed the landscape of the Swat River basin (Rahman et al., 2023). The 2010 floods further exacerbated the situation, damaging 870 schools and 16 colleges (Asian Development Bank & World Bank, 2010). The 2015 earthquake resulted in 36 deaths, 253 injuries, and extensive property damage to 10,931 houses (PDMA, 2016). The floods 2022 damaged 1631 houses, 106 km of roads, 27 micro hydropower, 12 Basic Health Units, and 252 water supply schemes (Government of Khyber Pakhtunkhwa, 2022). Besides, these disasters frequent landsliding, forest, and settlement fires are also occurring in the districts. The increasing trend of temperature due to climate change is creating more vulnerabilities in upstream communities to Glacial Lake Outburst Floods (Jan & Muhammad, 2020). In anthropogenic disasters, Swat suffered devastating consequences from insurgency and terrorism between 2007 and 2009, displacing over 600,000 people. Around 30% of public welfare facilities were damaged by the crises. The education sector was severely impacted, with 356 schools damaged and militants targeted female schools, intimidating teachers, and disrupting education (World Bank & Asian Development Bank, 2009; & Elahi, 2015). These crises had far-reaching effects on Swat's education, destroying schools and forcing thousands of children out of education for an extended period. The militants significantly halted girls' education, making access to education a substantial challenge. These actions deprived 17000 boys and 23000 girls of access to education (UNESCO, 2010). Responding to these disasters, the government has spent millions of rupees on physical infrastructure, health, education, environment, water, sanitation, power sector, telecommunication, and social welfare. Parallel to government funding projects worth PKR 11470.05 million have been completed in the region through donors' support and PKR 24111.77 million is still in progress (PDMA, 2024). The focus of these projects is community sustainability and resilience building to disasters and climate change.

Despite demonstrating resilience, disaster risk reduction efforts in the district remained limited due to inadequate and insufficient resources (Jan & Muhammad, 2020). Pakistan's Disaster Risk Reduction Policies, particularly the National Disaster Risk Reduction Policy stress the importance of building local resilience to mitigate disaster impacts (Jan et al., 2024 & NDMA, 2013). However, a significant knowledge gap persists regarding the specific factors contributing to disaster resilience in the Swat district, revealing concerns around policy implementation, contextual understanding, research deficits, and local capacity building. The policy-intention-implementation disconnect, neglecting Swat's unique socio-cultural, economic, and environmental factors hinders evidence based decision making and community empowerment. Keeping in view the critical role of community participation in disaster resilience, there is a need to understand the extent and effectiveness of community engagement in resilience building in Swat, Pakistan. The existing top-down approaches often overlook local knowledge, capacities, and needs, leading to inadequate disaster resilience projects and programmes. Previous research has also identified loopholes in the top-down approach and indicated that participatory community resilience building engages diverse stakeholders, yielding numerous benefits. This approach empowers communities to build robust resilience and thrive amidst adversity (Schoch-Spana et al., 2019). This study aims to evaluate community participation in disaster resilience initiatives in Swat, Pakistan. Specifically, the objectives are to assess the current level of community participation, identify challenges and barriers, explore enhancement strategies, and examine the relationship between community participation and disaster resilience. To achieve these objectives, we investigated existing community engagement mechanisms and examined the role of local institutions and stakeholders in promoting community participation in resilience building. By addressing these key aspects, this research seeks to provide valuable

insights into community participation in disaster risk reduction and resilience, ultimately informing policymakers and practitioners on effective strategies to enhance community engagement and resilience in Swat. The study focuses on answering two research questions i.e. to what extent are local communities involved in public sector disaster resilience initiatives in Swat, Pakistan, and what barriers hinder effective community participation? & Considering the existing challenges and barriers, how can community participation in disaster risk reduction be enhanced in Swat?

Literature Review

Globally, the threat from natural, health, and environmental hazards, and terrorism is escalating (UNDRR, 2022 & Cutter et al., 2013). The past two decades have seen devastating disasters, terrorist attacks, infectious disease outbreaks, and social unrest, affecting millions annually (Bündnis Entwicklung Hilft, 2024). Despite comprehensive disaster resilience principles emphasizing prevention, mitigation, preparedness, response, and recovery, efforts have predominantly focused only on post-disaster response and recovery (Ostadtaghizadeh et al., 2015). This oversight neglect has put more lives at risk. Recently, the international community has shifted towards a more systematic and comprehensive risk management approach i.e. integrating pre-disaster (Disaster Risk Reduction) and post-disaster activities with an emphasis on building resilience against disasters. Building resilience is now a key policy issue for sustainable community development (Grafton et al., 2019). Governments and global frameworks, such as the Sustainable Development Goals (SDGs), Sendai Framework for Disaster Risk Reduction (SFDRR), and the Paris Climate Change Agreement, prioritize community resilience to address climate change, disasters, and extreme events (UNDRR, 2022; Robert et al., 2005 & Poterie & Baudoin, 2015) . Over the past fifteen years, researchers have extensively explored the concept of community disaster resilience, which refers to a community's capacity to absorb, adapt, and recover from sudden disruptions caused by hazards and disasters (Tariq et al., 2021). Researchers have identified various dimensions to measure disaster resilience and sustainability. These dimensions include the social, physical, natural, economic, and institutional dimensions and community capital (Shah et al., 2020). Disaster resilience is critical for mitigation, anticipating, preparing, responding, and recovery from disasters (Rahman & Shaw, 2015).

Several research studies have been conducted to assess the resilience dynamics in the context of community participation, collaboration, and inclusiveness. These studies have informed policy decisions to protect individuals, communities, and assets from the impact of hazards and disasters through their participation. These studies include Aldunce et al. (2016), Lin (2019), Harahap (2020), Duque et al. (2024), Sajjad et al. (2023), Aleha et al. (2024) and Tariq (2023), etc. Aldunce et al. (2016) highlighted the importance of inclusive governance structures, cooperation, and dialogue platforms to promote resilience. The study stressed community engagement and leadership for strengthening social connections and networks. Local agencies and governments play a vital role in supporting community participation. However, several challenges affect the participation of communities including power dynamics, inequity, and injustice. Social learning, diversity of perspectives, and expertise are necessary for resilience building. Breaking down barriers between agents and groups, sharing power, and fostering receptive learning environments can decrease risk and improve institutions. Lin (2019) examines the impact of disasters on social relations and natural resource management after the 2004 Indian Ocean Tsunami at Koh Klang Island showcasing resilience through community-based initiatives.

The research findings indicate that natural resources and social norms provide the foundation for resilient communities. Community and ecosystem-based approaches enhance environmental and social resilience, enabling communities to better prepare for future disasters.

Harahap (2020) emphasized that post-disaster recovery should prioritize community improvement and resilience through participatory approaches. The study in Banda Aceh, Indonesia found that participatory village planning encouraged community involvement, but empowerment was limited. Prolonged facilitation is necessary for effective community empowerment, highlighting the need for tailored participatory approaches. Duque et al. (2024) systematic review study examined the link between political participation and community resilience in disaster contexts. The findings indicate that political participation enhances community resilience by promoting transparent reconstruction projects, fostering trust and autonomy in disaster risk management, and ensuring civic power. However, participation is often hindered by barriers, limiting its influence on decision-making and disaster risk management. The review highlights the importance of political participation in building resilient communities, emphasizing the need for inclusive and empowering civic engagement. Ludin et al. (2019) study on Malaysian floods found high community disaster resilience and social cohesion. Key factors influencing resilience in Malaysia included housing, experience, volunteering, and emergency team participation. The study established strong correlations between community participation and social cohesion, underscoring the importance of social cohesion in disaster resilience.

Aldunce et al. (2021) study stressed stakeholder participation in building resilience, requiring active engagement from diverse actors. This study examined and analyzed Australia's Natural Disaster Resilience Programme and assessed how practitioners frame participation in resilience-building, using social-interactive discourse theory. Findings highlight the importance of local government and community involvement, addressing challenges such as meaningful communication and power structures. Sajjad et al. (2023) examined Community Disaster Resilience (CDR) in Pakistan between 2004 and 2014, revealing temporal trends and spatial patterns. Notably, the results indicate substantial regional disparities, with Balochistan and other southern regions exhibiting lower resilience than northern areas. The study emphasizes incorporating resilience data into disaster risk planning and management frameworks to minimize the consequences of natural hazards intensified by climate change. Shah et al. (2020) assessed the resilience of elementary schools in four flood-affected districts of Khyber Pakhtunkhwa, Pakistan. The study evaluated 20 schools across four dimensions: physical, institutional, human, and external relationships. The results showed that Nowshera schools were the most resilient, followed by Charsadda, Peshawar, and Dera Ismail Khan. The study recommends improving flood resistance through training, capacity building, participation, emergency preparedness, and budget allocation.

Qasim et al. (2016) measured community resilience in flood-prone areas of Charsadda, Nowshera, and Peshawar, Pakistan. Results reveal alarmingly low community resilience indices across all sites. To enhance resilience, the study recommends improving social, economic, institutional, and physical indicators through participation, preparedness, awareness, structural measures, and non-structural initiatives, enabling communities to better cope with future flood hazards. Ahmad & Afzal (2019) assessed household vulnerability and resilience in three districts of Punjab i.e. (Muzaffargarh, Rajanpur, and Rahim Yar Khan) affected by the 2010 floods. The study found higher vulnerability and lower resilience in these areas, with Muzaffargarh and

Rajanpur being the most susceptible. The study recommended collaborative efforts between communities, and local and provincial disaster management authorities to mitigate vulnerability and enhance resilience. Aleha et al. (2024) studied rehabilitation and recovery efforts and assessed community resilience in Southern Punjab. Findings revealed significant gaps in risk awareness, community participation, planning, and solutions emphasizing collaboration, resilient infrastructure upgrades, and disaster mitigation strategies. Tariq (2023) in his research analyzed 36 CDR frameworks, identifying six critical dimensions (Physical, Health, Economic, Environmental, Social, and Governance) and 86 resilience indicators. The approach was applied in a case study on flash flooding in Peshawar, Pakistan, engaging academics, practitioners, and community members. The study demonstrated that improving adaptive capacity can enhance community resilience through infrastructure development, debris clearance, participation, training, and funding. The adaptable framework and participatory modeling approach facilitated stakeholder engagement, context-specific intervention design, and improved mitigation and preparedness strategies.

It is evident from these case studies that community participation is vital for effective disaster resilience building, offering numerous benefits, including context-specific solutions, enhanced awareness, and empowered local ownership. However, challenges such as resource constraints and power imbalances must be addressed through inclusive decision-making, capacity building, and collaborative governance. Successful initiatives demonstrate the effectiveness of community-led approaches in disaster resilience building. Prioritizing community participation is crucial for building resilient communities, and policymakers, practitioners, and researchers must address challenges and implement effective strategies to ensure sustainable disaster management.

Methods

This study employed a convergent parallel mixed-methods design (see Figure No 02) to evaluate community participation in public sector disaster resilience initiatives in the district Swat, Pakistan. The design integrated both quantitative and qualitative data collection and analysis methods to provide a comprehensive understanding of the research phenomenon (Creswell & Creswell, 2018). Cluster sampling was used to select the study participants. According to the most recent government report, District Swat has a population of 2,687,384 individuals and 381,246 households, spanning a total area of 5,337 square kilometers (see Figure 02 for location Map) (Government of Pakistan, 2023). The district is administratively divided into seven tehsils and 65 union councils (UCs), comprising nine urban and 56 rural councils (Asian Development Bank, 2021). Out of the total, 12 UCs have been declared at high risk for multiple disasters (District Disaster Management Unit, 2020). These UCs include Baydara, Chuprial, Dorishkhela, Kotanai, Khwazakhela, Devli, Gulibagh, Charbagh, Mingora, Odigram, Tindodag and Matta Kharare. The total population of these UCs is 538,121 and consists of 64,827 households (Government of Pakistan, 2023 & Asian Development Bank, 2021). These 12 UCs were selected as locals of the study. As per Krejcie & Morgan (1970) analogy, a sample size of 384 was taken. The study population consists of the local communities for quantitative data collection and key informants for qualitative data collection. The qualitative sample size of the study is 20. The following equation was used for the determination of sample size (equation i) and proportion allocation (equation ii) to each cluster of the study.

Sample Size Determination Equation

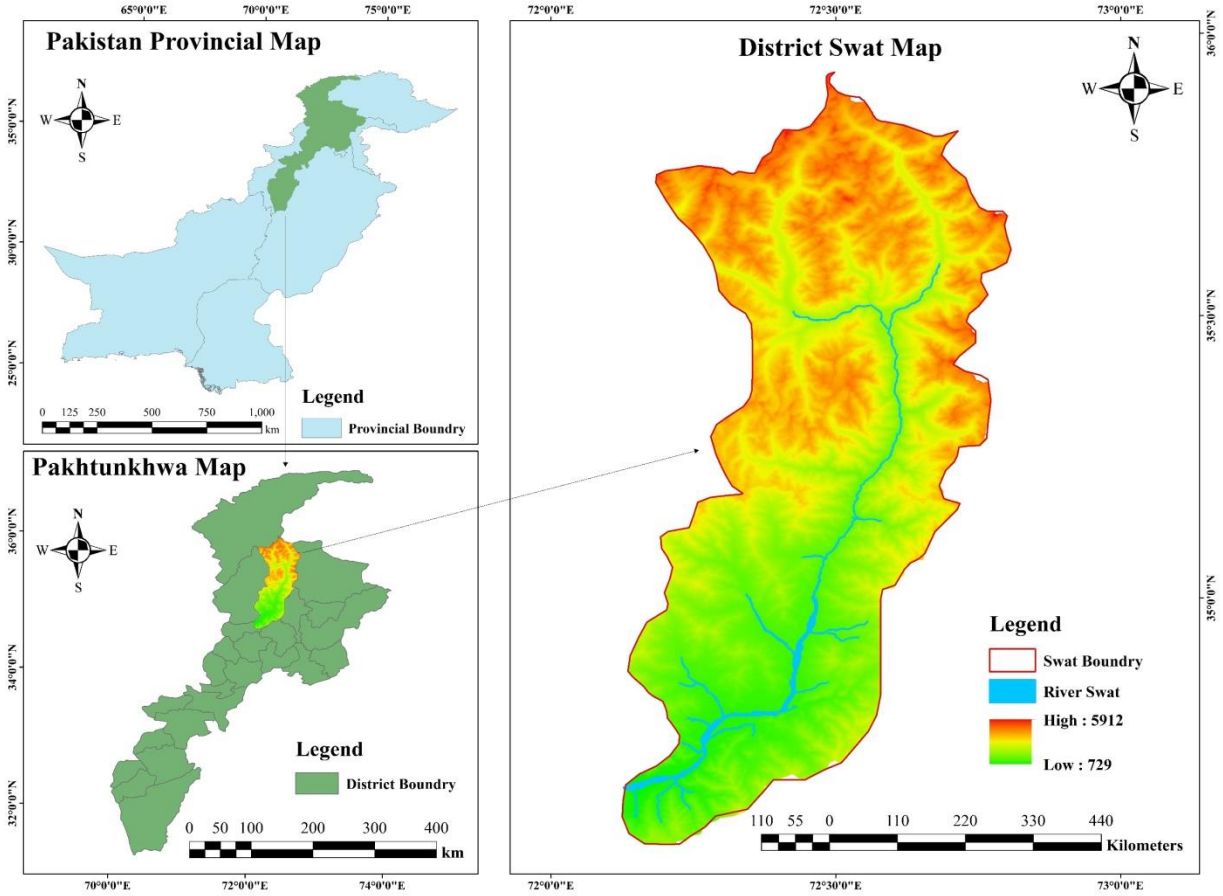
$$n = (Z^2 * p * (1 - p)) / E^2 \ldots\ldots\ldots \quad \text{(i)}$$

n = sample size
Z = Z-score corresponding to desired confidence level (e.g., 1.96 for 95% confidence)
p = estimated proportion of the population (e.g., 0.5 for maximum variability)
E = margin of error (as a decimal, e.g., 0.05 for 5% error)
(Source: (Krejcie & Morgan, 1970)

Proportional Allocation Equation

$$\mathbf{n} = \left(\frac{N1}{Ni}\right) ni \ldots\ldots\ldots\ldots\ldots\ldots \text{(ii)}$$

n=Sample size of each stratum
N1=Total Population of Each Strata
Ni=Total Population
ni= Total sample size
Source: (Cochran, 2007)



Adopted from (Rahman et al., 2023)

Figure 01: Map of the Study Area

Data Collection and Analysis

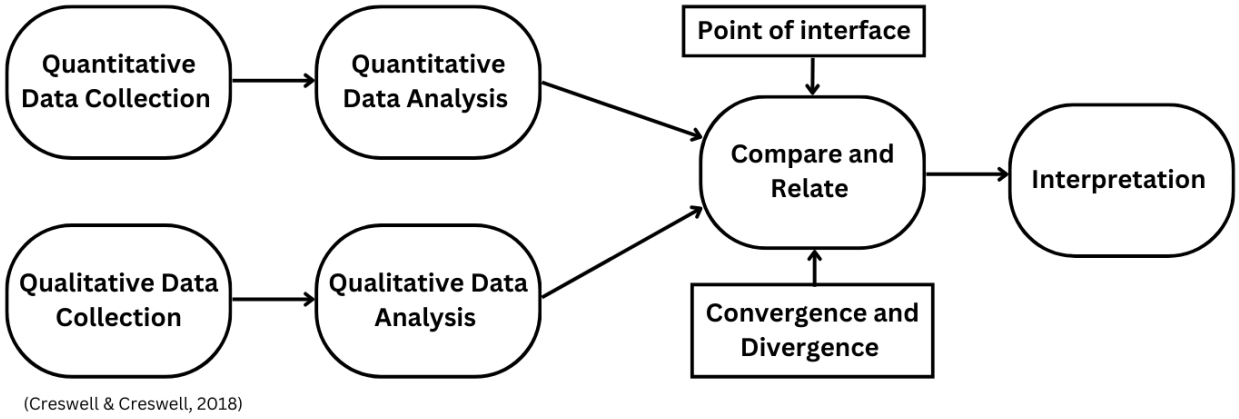
A survey questionnaire was administered to 384 community members in 12 UCs. The questionnaire assessed demographic information, community participation, risk awareness, and perception of public sector initiatives. The questionnaire statements were read in Pashto to the respondents and the response was recorded on the spot. Key informant interviews were conducted with 20 research participants including local government officials, NGO officials, and community leaders. Interviews explored community participation, challenges, and opportunities for improvement in disaster resilience initiatives. Pilot testing ensured questionnaire reliability (Cronbach's alpha = 0.775) (Nachmias & Nachmias, 1992). Interview protocols were pre-tested to ensure validity. Data triangulation enhanced the study's credibility. Quantitative data were analyzed using descriptive and inferential statistics (SPSS v. 25). The chi-square test was used to check the association between variables.

Chi-Square Equation

$$\chi^2 = \sum_{i-1}^{c} \sum_{j-1}^{r} \frac{(O_{ij} - e_{ij})^2}{e_{ij}} \text{.....(ii)}$$

Source: (McCall & Kagan, 1975)

Qualitative data were analyzed using thematic analysis. Interviews were transcribed, coded, and categorized into themes. Quantitative and qualitative findings were integrated using a convergent parallel design. Results from both methods were compared and contrasted to identify patterns, themes, and relationships. Informed consent was obtained from participants. Due to cultural sensitivity, the services of a female data operator were used to collect data from female respondents. To ensure confidentiality and anonymity in data pseudo names were used.



(Creswell & Creswell, 2018)

Figure No 02: Convergent Parallel Design

Results

Respondents Profile

Figure No 01 reveals the respondents' age distribution, with 37.5% falling within the 50-59 age range, making it the largest proportion, while 16.7% are in the 18-29 age group, the smallest percentage. The distribution forms a bell curve, with middle-aged groups (30-49 years)

comprising around 30% of the population. Furthermore, the 60+ age group accounts for 15.1%. The 60+ age group (15.1% of the population) is disaster-vulnerable due to reduced mobility, health issues, social isolation, economic constraints, and psychological factors. Disasters like floods, earthquakes, and heatwaves exacerbate these risks. Targeted preparedness, accessible evacuation, priority assistance, and social support are essential to protect this demographic group. Demographically, males comprise 84.9% of respondents, while females account for only 15.1%. This unequal representation of women in the study is due to the cultural fabric restricting their participation in social welfare and disaster risk reduction activities. The educational background of respondents exhibits diversity, ranging from uneducated (22.7%) to postgraduate (4.4%) qualifications. Specifically, 14.1% have below primary education, 11.2% primary to middle, 25% matric to intermediate, 13.8% graduates, and 8.9% masters. Low education levels hinder disaster risk reduction efforts, leading to limited awareness, inadequate preparedness, difficulty interpreting warnings, increased vulnerability, and reduced adaptive capacity. To address this, disaster risk reduction strategies should employ simplified communication, community-based initiatives, visual aids, targeted education programmes, and collaborative approaches.

Univariate and Qualitative Data Analysis

Table No. 01 presents data and opinions from sampled respondents and participants regarding community participation in public sector disaster resilience initiatives in District Swat. The study findings reveal that 97.9% of respondents believe that the government has not conducted risk assessments in their area, resulting in inadequate benefits from risk reduction projects. This indicates perceived government ineffectiveness, lack of data-driven decision-making, and significant community discontent. Furthermore, 71.4% of respondents think the government has not initiated disaster risk reduction efforts by conducting feasibility studies for potential projects, whereas 19.8% agree that such steps have been taken. Regarding participation in the planning process, 87.2% of respondents report that the government does not engage local communities and relevant stakeholders in disaster risk reduction-related planning. This suggests that most respondents believe local communities are not adequately involved, and the process is dominated by a top-down approach, limiting participation. The results also imply a lack of representation from diverse stakeholders, potentially leading to biases in decision-making.
Severe dissatisfaction (76%) with community engagement in disaster management was found in the study area in identifying and prioritizing disaster-related problems. This overwhelming disagreement highlights significant shortcomings in collaborative processes and underscores the urgent need for improved community engagement. People-centered approach is crucial for effective resilience, as it empowers local communities by enhancing their capacities and coping skills. However, a significant disparity between policy and practice was noted in the study area. While disaster management policies ostensibly prioritize community involvement, operational implementation remains tormented by shortcomings. Qualitative data also support the results of quantitative data regarding lack of risk assessment, failure to conduct feasibility studies, collaborative planning, and inclusive decision-making. Mr. Amjad Shoaib aged 39 working as an elected representative in the local government system said:

> *"Unfortunately, regular risk assessments are non-existent in our area. The government's response is often reactive, rather than proactive. Our community is*

rarely consulted, and local knowledge is disregarded. This approach undermines our safety. To ensure resilience, evidence-based solutions are essential."

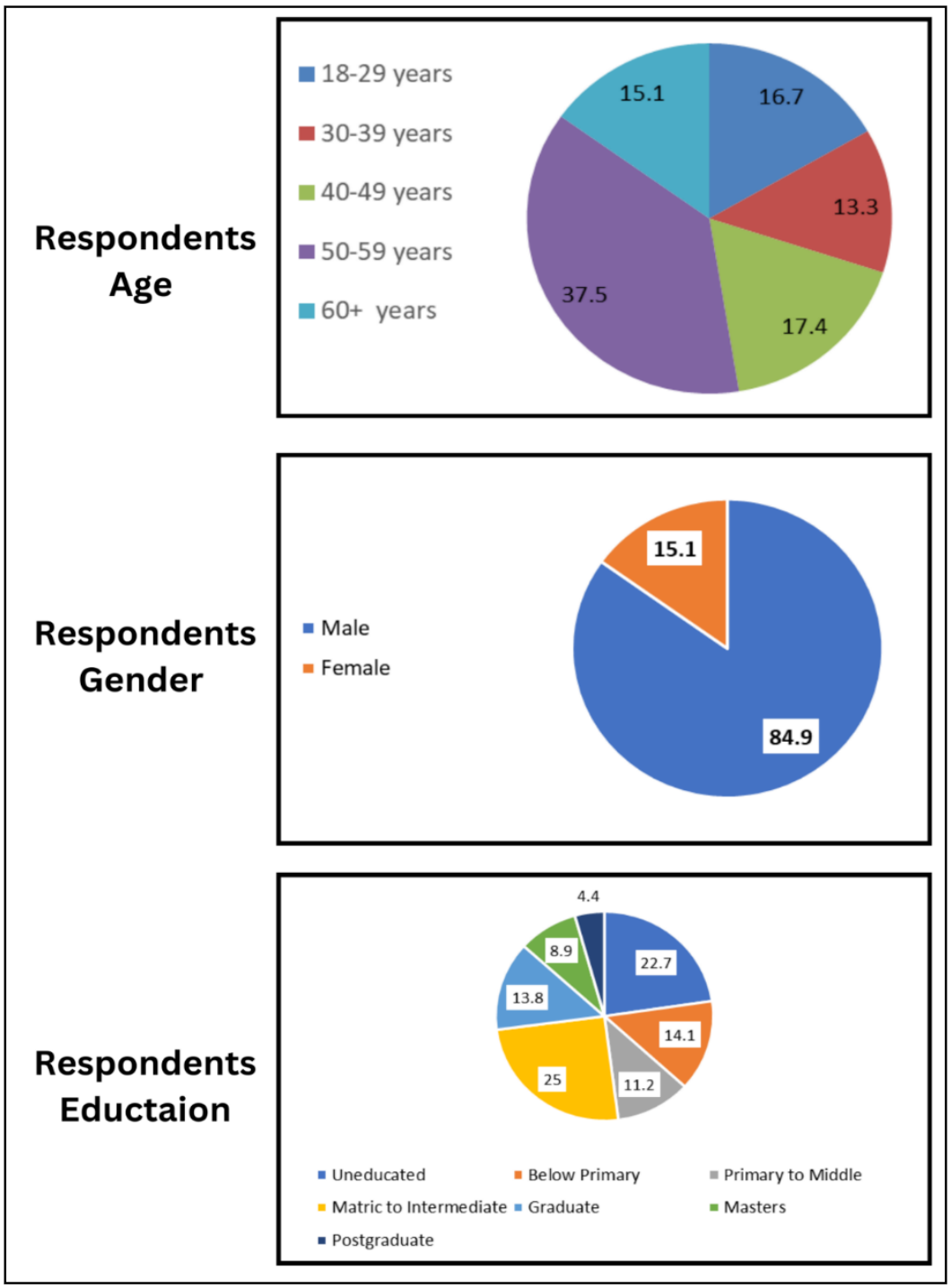


Figure No 01: Respondents' Profile

Mr. Aziz Khan, aged 43 working as Planning Officer at the District Swat said:

> *"Community participation is a cornerstone of the DRR policies and legislation, with standard procedures in place, but operational practices often contradict this principle. At the implementation level, serious gaps exist in ensuring participation."*

Ms. Anila Gull, aged 36 a housewife said:

> *"Community involvement in disaster risk reduction planning has been restricted, primarily occurring at a limited level only in response to disasters. In contrast, NGOs have empowered local communities through inclusive project implementation."*

These findings reveal substantial deficiencies in Swat's disaster resilience framework, marked by a prevailing reactive approach. The approach is characterized by inadequate risk assessments, and limited community engagement in planning compromising community safety and resilience. A significant policy-implementation gap persists, hindering effective community participation. The value of community involvement is widely recognized, exemplified only by successful NGO-led initiatives. To enhance resilience, evidence-based solutions are crucial, relying on regular risk assessments, inclusive community engagement, and data-driven decision-making.

The Planning Commission Form (PC-1) formulation process faces widespread dissatisfaction, with 87.8% of respondents disagreeing that PC-1 preparation incorporates stakeholder consultations and community input. This majority disagreement implies inadequate consultation and insufficient incorporation of community input. Moreover, 88.3% of respondents believe vulnerable communities lack a strong voice in the Planning Commission Form approval process. Additionally, 85.2% of respondents report not receiving any risk reduction plan for their area from local disaster management authorities. The government's failure to inform stakeholders effectively has led to widespread dissatisfaction, with respondents feeling unaware of the risk reduction plan's essential details. This lack of transparency underscores the urgent need for improved communication channels and strategies to bridge the information gap and foster trust among stakeholders. There is a concerning disconnect between community awareness and empowerment regarding disaster risk reduction (DRR) plans. On one hand, communities lack awareness of these plans. On the other hand, community empowerment to execute and implement these plans is also insufficient, with 70.3% of respondents expressing disagreement. Regarding the implementation and monitoring of DRR projects, the majority (86.5%) reported no community engagement. Furthermore, 86.2% indicated widespread exclusion of communities in evaluating these projects. Only 11.5% of respondents believed community participation is encouraged in the evaluation process. These findings suggest that communities are not adequately engaged in implementation, monitoring, and evaluation processes. This leads to top-down approaches that overlook local expertise and miss valuable opportunities for effective disaster risk reduction. Qualitative data converges with the quantitative data.

Zarmnina Bibi aged 48 working as a school teacher said:

> *"As a resident of Swat, we have never been involved in the Planning Commission Form (PC-1) formulation process for disaster resilience projects. The process is*

entirely top-down, ignoring local community input. This lack of participation results in projects that often fail to address our actual needs, despite our intimate knowledge of the area. Consequently, projects are frequently inefficient, and valuable resources are wasted".

Gul Zameen aged 53 working as a shopkeeper said:

"Living in the Swat Valley, I've experienced the consequences of inadequate disaster risk reduction planning. Unfortunately, local communities like mine are rarely consulted in the formulation and approval of PC1 for projects. Authorities often make decisions without our input. Only a few NGOs have involved us in project planning, while government officials typically adopt a top-down approach."

Nusrat Ullah aged 41 works as a horticulturist said:

"Normally, we receive information from politicians that a project has been approved, but we're unaware of who prepared it and who will implement it. There is zero community participation in the implementation of projects across social, economic, and physical sectors. As a result, the common man doesn't benefit; only the elite and those with political connections are involved."

The systematic exclusion of local communities from disaster resilience planning in Swat raises significant concerns. Despite their intimate knowledge of the area, residents are rarely consulted in the formulation and approval of Planning Commission Form (PC-1) projects, resulting in inefficient and ineffective initiatives that fail to address community needs. This top-down approach wastes resources, undermines disaster risk reduction efforts, and perpetuates inequality, benefiting only the elite and those with political connections. Inclusive planning is crucial for context-specific solutions, effective resource allocation, trust-building, and sustainability. To address these issues, authorities should establish participatory mechanisms for PC-1 formulation, engage local communities in project planning, foster transparency and accountability, support capacity-building initiatives, and promote collaborative governance models.

The data further demonstrate that more than half of respondents (54.2%) believe volunteers are actively engaged in reducing disaster risks and responding to emergencies. However, a significant portion (21.6%) disagreed. Additionally, 24.2% remained neutral, possibly due to limited awareness about volunteer roles. These findings suggest that many organizations effectively utilize volunteer services but gaps in engagement still exist. Regarding participatory simulation and training as an anticipatory action, only 36.5% of respondents agreed that training, rehearsals, and drills are conducted, whereas 33.9% disagreed. An alarming gap was observed regarding the gender sensitivity of the Disaster Risk Reduction (DRR) process. The data show that 89.8% of respondents disagreed that gender-sensitive interventions are prioritized across all phases of DRR indicating rare consideration of gender-specific needs. This overwhelming disagreement suggests systemic neglect of gender-sensitive interventions, potentially exacerbating existing inequalities and undermining resilience. The "gender blindness" in disaster resilience highlights the urgent need for integrated gender analysis, gender-sensitive policies, and capacity building among responders to ensure equitable and effective disaster risk

reduction. Regarding the utilization of traditional local knowledge, the government failed (59.9%) to effectively integrate traditional local knowledge into disaster frameworks indicating limited efforts to harness community expertise. The majority disagreement suggests a significant knowledge gap, overlooking valuable local insights that could enhance disaster response. This top-down approach misses opportunities for effective community-centered solutions. To address this, governments should establish community engagement mechanisms, incorporate local knowledge into risk assessments, and provide training for local leaders. Both qualitative and quantitative data converge with each other. Qualitative data indicated full support of quantitative data. Basit Khan aged 61 retired and previously worked as a farmer said:

> *"During the floods, it was the volunteers who reached us and evacuated us. We were trapped on the second floor, and there was no mechanism in place for evacuation. A local volunteer quickly fastened a rope, reached us, and connected a wooden cradle to it, allowing my family to be safely evacuated".*

Muhammad Ali working as a government employee and hailing from Swat said:

> *"I have seen Rescue 1122, district administration, and local government conducting rescue simulations in river swat before the monsoon season. The Civil Defence volunteer also participated in the simulation. However, these simulations lack the participation of the general public".*

Nusrat Jahan aged 39 running her home-based cottage industry shared her observations, stating that:

> *"Women's needs are often overlooked, particularly in terms of their engagement in risk assessment, preparedness, and healthcare requirements. Very few organizations, specifically NGOs, engage women in training programs. In government-led actions, men predominantly participate, while women are largely excluded from the decision-making process. This neglect undermines women's ability to cope, adapt, and recover."*

These results of qualitative data provide valuable insights into disaster resilience, highlighting critical factors like voluntarism, preparedness, and gender-sensitive planning. Data reveals that local volunteers played a vital role in saving lives. However, disaster preparedness efforts, particularly simulations, are hindered by a lack of public participation, limiting their effectiveness in building resilience. Moreover, persistent gender disparities overlooked women's needs in risk assessment, preparedness, and decision-making, thereby undermining resilience. Effective disaster response resilience requires community engagement, inclusive approaches, and volunteerism, which bridge gaps in official mechanisms.

Table No 01: Community Participation in Public Sector Disaster Resilience Initiatives

Attributes	Option			Total
	Agree	Disagree	Neutral	
My village benefits from regular risk assessments conducted by the government, enabling participatory and data-driven decision-making for risk reduction initiatives	00 (00%)	376 (97.9%)	08 (2.1%)	384 (100%)
The government has taken initial steps towards disaster risk reduction in my area by conducting feasibility studies for potential projects	34 (8.9)	274 (71.4)	76 (19.8)	384 (100%)
The disaster risk reduction planning process engages diverse stakeholders, including local communities, to ensure inclusive decision-making	05 (1.3%)	335 (87.2%)	44 (11.5%)	384 (100%)
Local communities are engaged through a collaborative process to identify and prioritize their disaster-related problems	09 (2.3%)	292 (76%)	83 (21.6%)	384 (100%)
The Planning Commission Form (PC-1) has been formulated after stakeholder consultations, incorporating community input	05 (1.3%)	337 (87.8%)	42 (10.9%)	384 (100%)
Vulnerable communities have a strong voice in the approval process of the Planning Commission Form	3 (0.8%)	339 (88.3%)	42 (10.9%)	384 (100%)
The government has disseminated the risk reduction plans to us through respective departments	04 (1.0%)	327 (85.2%)	53 (13.8%)	384 (100%)
Communities are empowered to execute disaster risk reduction plans and projects	13 (3.4%)	270 (70.3%)	101 (26.3%)	384 (100%)
Local communities actively participate in the implementation and monitoring of major risk reduction projects	41 (10.7%)	332 (86.5%)	11 (2.9%)	384 (100%)
Community participation is encouraged in the evaluation of disaster risk reduction projects	44 (11.5%)	331 (86.2%)	9 (2.3%)	384 (100%)
Volunteers are actively engaged in reducing disaster risks and responding to emergencies.	208 (54.2%)	83 (21.6%)	93 (24.2%)	384 (100%)
Emergency response management training, rehearsals and drills are systematically conducted in our area	140 (36.5%)	130 (33.9%)	114 (29.7%)	384 (100%)
All phases of disaster risk reduction prioritize gender-sensitive interventions	14 (3.6%)	345 (89.8%)	25 (6.5%)	384 (100%)
The government facilitates the integration of traditional local knowledge into disaster management frameworks	84 (21.9%)	230 (59.9%)	70 (18.2%)	384 (100%)

Bivariate Analysis

The findings presented in Table No. 02 demonstrate the dynamic role of community participation in enhancing disaster resilience. The statistically significant associations between disaster resilience and various factors, including regular risk assessments (p=0.000), community-driven projects feasibility studies (p=0.009), and local consultation and participation in planning (p=0.002) underscore the importance of inclusive and collaborative approaches to ensure resilience. The identification and prioritization of problems by local people (p=0.003) further emphasizes the need for community-led initiatives. However, the hindrance posed by limited community involvement in prioritization and planning highlights a critical gap in current practices. Encouragingly, the study also reveals significant links between disaster resilience and stakeholder consultation in PC-1 preparation (p=0.007) and community engagement in project implementation and monitoring (p=0.000). The striking associations of disaster resilience with participatory implementation and evaluation (p=0.000), volunteer engagement (p=0.000), community-based emergency response simulation (p=0.000), and gender-sensitive interventions (p=0.000) provide compelling evidence for the effectiveness of community-centered strategies. These results collectively stress the imperative of empowering local communities and integrating their perspectives into disaster risk reduction initiatives to foster resilience.

Table No. 02: Association between Community Participation and Disaster Resilience

Attributes	Attitude	Resilience			Total	Statistics
		Low	Medium	High		
My village benefits from regular risk assessments conducted by the government, enabling participatory and data-driven decision-making for risk reduction initiatives	Agree	00	00	00	00	(p=.000) ($\chi2$=16.297)
	Disagree	45 (12.0%)	92 (24.5%)	239 (63.6%)	376	
	Neutral	0 (0.0%)	7 (87.5%)	1 (12.5%)	8	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
The government has taken initial steps towards disaster risk reduction in my area by conducting feasibility studies for potential projects	Agree	7 (20.6%)	6 (17.6%)	21 (61.8%)	34	(p=.009) ($\chi2$=13.613)
	Disagree	22 (8.0%)	73 (26.6%)	179 (65.3%)	274	
	Neutral	16 (21.1%)	20 (26.3%)	40 (52.6%)	76	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
The disaster risk reduction planning process engages diverse stakeholders, including local communities, to ensure inclusive decision-making	Agree	2 (40.0%)	3 (60.0%)	0 (0.0%)	5	p=.002 $\chi2$=17.445
	Disagree	42 (12.5%)	78 (23.3%)	215 (64.2%)	335	
	Neutral	1 (2.3%)	18 (40.9%)	25 (56.8%)	44	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Local communities are engaged through a collaborative process to	Agree	3 (33.3%)	4 (44.4%)	2 (22.2%)	9	p=.003 $\chi2$=15.819
	Disagree	36 (12.3%)	64 (21.9%)	192 (65.8%)	292	

identify and prioritize their disaster related problems	Neutral	6 (7.2%)	31 (37.3%)	46 (55.4%)	83	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
The Planning Commission Form (PC-1) has been formulated after stakeholder consultations, incorporating community input	Agree	2 (40.0%)	3 (60.0%)	0 (0.0%)	5	p=.007 $\chi2$=13.946
	Disagree	41 (12.2%)	80 (23.7%)	216 (64.1%)	337	
	Neutral	2 (4.8%)	16 (38.1%)	24 (57.1%)	42	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Vulnerable communities have a strong voice in the approval process of the Planning Commission Form	Agree	1 (33.3%)	2 (66.7%)	0 (0.0%)	3	p=.035 $\chi2$=10.375
	Disagree	43 (12.7%)	82 (24.2%)	214 (63.1%)	339	
	Neutral	1 (2.4%)	15 (35.7%)	26 (61.9%)	42	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
The government has disseminated the risk reduction plan to us through respective departments	Agree	1 (25.0%)	3 (75.0%)	0 (0.0%)	4	p=.020 $\chi2$=11.666
	Disagree	41 (12.5%)	77 (23.5%)	209 (63.9%)	327	
	Neutral	3 (5.7%)	19 (35.8%)	31 (58.5%)	53	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Communities are empowered to execute disaster risk reduction plans and projects	Agree	1 (7.7%)	8 (61.5%)	4 (30.8%)	13	p=.004 $\chi2$=15.434
	Disagree	39 (14.4%)	64 (23.7%)	167 (61.9%)	270	
	Neutral	5 (5.0%)	27 (26.7%)	69 (68.3%)	101	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Local communities actively participate in the implementation and monitoring of major risk reduction projects	Agree	0 (0.0%)	17 (41.5%)	24 (58.5%)	41	p=.000 $\chi2$=24.344
	Disagree	40 (12.0%)	78 (23.5%)	214 (64.5%)	332	
	Neutral	5 (45.5%)	4 (36.4%)	2 (18.2%)	11	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Community participation is encouraged in the evaluation of disaster risk reduction projects	Agree	0 (0.0%)	18 (40.9%)	26 (59.1%)	44	p=.002 $\chi2$=17.491
	Disagree	42 (12.7%)	77 (23%)	212 (64.3%)	331	
	Neutral	3 (33.3%)	4 (44.4%)	2 (22.2%)	9	
	Total	45	99	240	384	

		(11.7%)	(25.8%)	(62.5%)		
Volunteers are actively engaged in reducing disaster risks and responding to emergencies.	Agree	26 (12.5%)	30 (14.4%)	152 (73.1%)	208	p=.000 χ2=55.362
	Disagree	12 (14.5%)	45 (54.2%)	26 (31.3%)	83	
	Neutral	7 (7.5%)	24 (25.8%)	62 (66.7%)	93	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
Emergency response management training, rehearsals and drills are systematically conducted in our area	Agree	19 (13.6%)	17 (12.1%)	104 (74.3%)	140	p=.000 χ2=34.344
	Disagree	19 (14.6%)	52 (40.0%)	59 (45.4%)	130	
	Neutral	7 (6.1%)	30 (26.3%)	77 (67.5%)	114	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
All phases of disaster risk reduction prioritize gender-sensitive interventions	Agree	1 (7.1%)	1 (7.1%)	12 (85.7%)	14	p=.000 χ2=38.241
	Disagree	42 (12.2%)	79 (22.9%)	224 (64.9%)	345	
	Neutral	2 (8.0%)	19 (76.0%)	4 (16.0%)	25	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	
The government facilitates the integration of traditional local knowledge into disaster management frameworks	Agree	10 (11.9%)	18 (21.4%)	56 (66.7%)	84	p=.007 χ2=14.236
	Disagree	28 (12.2%)	72 (31.3%)	130 (56.5%)	230	
	Neutral	7 (10.0%)	8 (11.4%)	55 (78.6%)	70	
	Total	45 (11.7%)	99 (25.8%)	240 (62.5%)	384	

Discussion

The compelling evidence from the results underscores the important role that community participation plays in enhancing disaster resilience. Community-driven initiatives, such as risk assessments, participatory feasibility studies, and local consultation demonstrate the effectiveness of inclusive approaches. These initiatives empower local communities to take ownership of their resilience while identifying and prioritizing disaster related problems in the community. As a result, targeted solutions can be developed to boost resilience and foster a sense of community-led preparedness. By putting decision-making power in the hands of local stakeholders, inclusive approaches ensure that solutions are context-specific, culturally relevant, and responsive to the urgent needs of communities. Unfortunately, the current study found a very disappointing trend in the public sector resilience initiatives in the context of community

participation. Even though effective resilience requires local community consultation throughout the assessment, planning process, and implementation (Duque et al., 2024). Sim et al. (2021) highlighted that multiple hazard risk assessment informs risk reduction efforts and improves resilience. An indicators-based and participatory assessment approach offers flexibility, allowing adaptation to various disasters and user needs. Risk and vulnerability are critical factors influencing disaster impacts (Li et al., 2011). In Pakistan, the National Disaster Risk Management Framework stresses comprehensive risk assessment, guiding government departments to develop technical capacities and institutional arrangements for hazard, vulnerability, and capacity assessments across the country through active community participation (Government of Pakistan, 2007). Pakistan's National Disaster Risk Reduction (DRR) policy emphasizes a community-driven approach to disaster resilience, mandating the adaptation and refinement of Community-Based Disaster Risk Management (CBDRM) frameworks at provincial and district levels (NDMA, 2013). Besides assessments, research also emphasizes the importance of participatory planning in disaster resilience (Hendricks et al., 2022). The participatory approach enables planners, scientists, and disaster managers to understand local perspectives, issues, gender dynamics, and opportunities (Hidayat & Rasadi, 2020 & Cronin et al., 2004). It fosters consensus-building and prioritization for future disaster risk reduction (Sim et al., 2021). However, community participation in risk assessment, planning, and decision-making requires integration into the field base practices (Gaillard, 2010). The traditional top-down project management approaches often neglect the role of multiple stakeholders, including communities (Crawford et al., 2013). This inflexible planning and decision-making exacerbate uncertainties in vulnerable communities (Bonanno et al., 2024).

Resilience building relies on inclusive approaches that account for the diverse needs and perspectives of vulnerable groups and individuals experiencing socio-economic disparities. However, limited community involvement in prioritization and planning exposes a critical gap in current practices in the study area. Encouragingly, stakeholder consultation, community engagement, participatory implementation, volunteer engagement, community-based emergency response simulations, and gender-sensitive interventions all exhibit significant links to disaster resilience. Research highlights the crucial role of community participation in ensuring the success of disaster resilience projects. A study in Ghana demonstrated a direct correlation between community participation and successful project implementation, fostering transparency, accountability, and enhancing resilience (Ofosu & Ntiamoah, 2016). Similarly, Iddi & Nuhu (2018) found that community involvement in monitoring and evaluating physical infrastructure projects promotes sustainability and reduces vulnerabilities. Participatory monitoring and evaluation guarantee project legitimacy, create stakeholder networks, and reduce conflicts of interest (Zikargae et al., 2022 & Matsiliza, 2012). Genuine community participation in monitoring and evaluation ensures that disaster resilience projects directly benefit vulnerable populations. Meaningful participation of poor and marginalized communities in decision-making processes and evaluation is vital for them to benefit from development and disaster risk reduction initiatives (Soransora, 2013). Participatory DRR approaches effectively identify local vulnerabilities, prioritize adaptive capacities, and ensure the successful implementation of projects and plans (Chaudhury, 2017). By empowering local communities, these approaches promote resilient and sustainable communities. Community involvement fosters a culture of safety and resilience (di Girasole & Cannatella, 2017). During disasters, effective response relies on the participation of volunteers. Research shows that volunteer involvement enhances emergency response (Shi et al., 2018). Citizen participation builds resilience and reduces

vulnerabilities, but traditional approaches often overlook informal volunteers. Given increasing risks and climate change, leveraging informal volunteers as surge capacity is crucial. Civil protection institutions can adapt by utilizing technologies, establishing online volunteer platforms, and fostering networked governance (Schmidt et al., 2018). Regular rehearsals and drills develop emergency officials' capacity, test response systems, and promote learning (Dube, 2015). Embracing community participation and volunteer engagement enhances resilience, reduces vulnerabilities, and builds a relationship of trust.

Disasters disproportionately affect women and girls in the study area, exacerbating existing socio-political marginalization. Unlike men, women face limited access to knowledge, information, and training due to biased public policies and practices. This exclusion perpetuates their vulnerability and silences their voices in decision-making and policy development for resilience-building. Adopting a gender-sensitive approach to risk assessment and preparedness-mitigation planning reduces women's vulnerability to disasters (Sadia et al., 2016). Similarly, research on the 2004 Indian Ocean Tsunami and the 2005 Kashmir earthquake reveals that while hazards themselves are indiscriminate, societal structures amplify the impact on marginalized groups, including women, children, the elderly, and people with disabilities (Ariyabandu & Fonseka, 2009). Besides, integrating local perspectives is crucial, as it respects community-specific contexts, challenges, vulnerabilities, culture, traditions, and values. This integration fosters trust, cooperation, and social cohesion, addresses unique community needs, and promotes tailored solutions for resilience, well-being, and sustainable disaster risk reduction. Traditional practices, such as land stabilization through planting, rainwater harvesting, and adaptation in agriculture practices can be enhanced by integrating scientific and engineering expertise. Research highlights the significance of indigenous local knowledge in helping communities worldwide survive disasters, with numerous social science studies documenting its effectiveness globally (Hiwasaki et al., 2014). In Chitral, a study found that local communities employ centuries-old traditional knowledge to predict disasters. Innovative early warning systems include whistling and shouting to alert downstream communities during floods and lighting fires by nomads near glaciers to signal glacier outburst floods (Dekens, 2007). These community-led initiatives demonstrate effective communication and cooperation. Additionally, folklore, poetry, and stories of past disasters serve as vital tools for passing information to younger generations.

Conclusion

District Swat's unique vulnerability profile, characterized by exposure to floods, earthquakes, landslides, glacial floods, and terrorism, necessitates a community-centric approach to resilience building. This study examined disaster risk reduction efforts in Swat, uncovering substantial gaps and areas for improvement. Key challenges include ineffective risk assessments (97.9% disagreement), inadequate inclusive planning (87.2% rejection), and community engagement deficits (76%). Additionally, community empowerment gaps (70.3%), emergency preparedness shortfalls (33.9%), gender blindness (89.8%), and limited local knowledge integration (59.9%) were identified. Despite the National Disaster Risk Management Framework and Disaster Risk Reduction policy emphasizing community-driven approaches, current practices reveal limited community involvement. Effective disaster resilience depends on addressing socio-economic disparities, empowering marginalized groups, and integrating local perspectives and traditional knowledge. This participatory approach ensures context-specific

solutions, fosters social cohesion and trust, empowers local stakeholders, and optimizes resource allocation. Moreover, community-led initiatives promote sustainability, address the needs of vulnerable groups, and cultivate a culture of resilience. To harness these benefits, strategic investments should focus on establishing community-led disaster management committees, conducting participatory risk assessments, providing capacity-building programmes, supporting community-based early warning systems, and fostering inclusive decision-making processes. By prioritizing community participation, District Swat can develop robust resilience, mitigating the impact of disasters and conflicts, and ensuring a safer, more sustainable future for its inhabitants. Future research should focus on evaluating participatory assessments, community engagement mechanisms, and context-specific gender-sensitive policies.

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