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ACTIONABLE RESILIENCE: DEVELOPING LOCALIZED AND INCLUSIVE DISASTER RISK REDUCTION STRATEGIES FOR SKARDU, GILGIT-BALTISTANIN, PAKISTAN

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Article Info

Abstract

The mountainous area of Skardu, Gilgit-Baltistan, Pakistan is facing intensifying risks from several natural and anthropogenic hazards, such as earthquakes, landslides, floods and Glacial Lake Outburst Floods (GLOFs). This paper seeks to undertake a holistic community-based multi-hazard risk modeling in the Skardu district with its both physical hazards and socioeconomic vulnerabilities. The research combines primary field surveys, spatial analysis in a GIS environment and literature review to assess community exposure, frequency of hazard and coping capacity. The results indicate that while climate-induced disasters have become increasingly frequent and intense, current disaster management practices continue to be largely top-down in nature, failing to account for the local knowledge systems, traditional coping mechanisms, and the socio-cultural situations. The research underscores the significance of community perspectives to be mainstreamed in DRR planning and underscores the demand for inclusive and localized strategies based on Skardu's specific geographic, social, and economic conditions. By pin-pointing vulnerabilities in preparedness, response and coordination policies, this study makes actionable suggestions to improve resilience, early warning and livelihoods system and thus suggest policy interventions to support sustainable development in the fragile mountain region of Pakistan.

Keywords:
Community, Multi-Disaster Risk, Earthquakes, Landslides, Floods, Glacial Lake Outburst Floods (GLOFs), Assessment.

1. INTRODUCTION

The word "catastrophe" entered English in the 16th century from a Greek word that refers to an event such as a falling star, through the same Latin root, confirming the ugly word's associations with "terrible great name." The expression dates from a time when the stars were wrong; then the world would not end well (Encyclopedia Britannica Company, 2003; Ashraf et al., 2022). A 'disaster' is "a serious disruption of the functioning of a community or a society involving widespread human, material, economic, or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources" (Asian Catastrophe Reduction Centre, 2003).

The World Health Organization (WHO) defines a disaster as 'a disruption resulting from an event that discourages normal activities and causes a level of suffering that the affected community cannot manage without outside assistance' (Quarantelli, 1998). Disasters may be natural or man-made because they are inimical to life, property, jobs, or production or tend to disturb the social life, integrity of body or life, in the life of society, ecosystem, or in the environment of the society in which they occur. Natural disasters, especially, are devastating events that are the result of natural forces like a volcano eruption, tornado, or earthquake—things that simply cannot be controlled by humans. Such catastrophes are, of course, often known as 'Acts of God.' Such unforeseen events could lead to natural disasters that can wreak havoc and cause catastrophic damage.

Because the district of Skardu is part of a complex mountainous terrain of northern Pakistan and is characterized by complex mountainous topography, large glaciation complexes, and isolated settlements, it is susceptible to a variety of natural disasters. There are growing challenges due to the interacting effects of climate-induced hazards such as glacial lake outburst floods (GLOFs), landslides, avalanches, earthquakes, and flash floods (Ashraf et al., 2021). These risks are not only becoming more frequent and more severe because of global climate change but are also exacerbated by socioeconomic vulnerabilities such as poverty, poor infrastructure, and minimal disaster preparedness within communities (UNDP, 2022). In this context, the traditional top-down risk management methods are often not the most appropriate for properly managing disaster risks at the local level. One such approach that has become recognized to be of the essence in understanding and mitigating disaster risks at the local level is the Community-Based Disaster Risk Assessment (CBDRA). The participatory nature of the process means that communities' active participation in the identification, analysis, and prioritization of risks has the potential to draw upon local knowledge, cultural values, and historical coping mechanisms when carrying out such disaster planning (Twigg, 2015).

Research Objectives

This research study intends t :

1. To analyze community-based coping mechanisms and indigenous knowledge related to disaster preparedness and response.
2. To develop localized recommendations for disaster risk reduction based on community participation and multi-hazard assessment.

Literature Review

The Upper Indus Basin (UIB) in Pakistan is increasingly threatened by glacial lake outburst floods (GLOFs) and related hydro-meteorological risks, primarily driven by rapid climatic changes. Glacial melting, intensified by global warming, has heightened the vulnerability of this mountainous region, endangering local communities, infrastructure, and livelihoods (Butt et al., 2025; Khan et al., 2022). A study targeting educated respondents in the area found that a significant majority of participants acknowledge the growing risks associated with glacier melt and GLOFs (Butt et al. 2025). Over 98% agree that global warming is a major contributor, underscoring great awareness of climate influences. Frequent flood experiences in the past decade have made risk effects a lived reality for many, with major reported consequences including livelihood losses, displacement, and mental strain (Butt et al. 2025). Furthermore, geological factors and topography compound hazard risks in the UIB, making effective early warning systems and community engagement critical (Butt et al., 2025; Abbas et al., 2015).

The vulnerability of the region is multifaceted, extending beyond GLOFs to other hydro-meteorological risks identified in the Gilgit district, such as floods, landslides, avalanches, droughts, and riverbank erosion. These hazards have common and severe impacts on infrastructure, livelihoods, and ecological resources. A community-based risk assessment highlighted the physical vulnerability of critical infrastructure: over 20% of schools and 27% of health units were found to be at high risk. Social vulnerability is linked to poverty, limited education, and insufficient emergency preparedness, while ecological vulnerability is exacerbated by forest loss (Abbas et al. 2015; Rehman et al, 2023). Landslide analysis across Pakistan further identifies the northern areas, particularly Gilgit-Baltistan (GB) and Azad Jammu and Kashmir (AJK), as the most susceptible regions, with the Karakoram motorway being a major hotspot (Shabbir et al. 2022). Of 1089 recorded landslides over a 17-year period, 180 were fatal, causing 1072 deaths (Shabbir et al. 2022). The unique geography, characterized by high mountains, glaciers, and river systems, amplifies the region's overall vulnerability (Abbas et al. 2015; Khan et al. 2022).

Addressing these climate and hazard-related challenges requires localized adaptation strategies. Rural households in the Himalayan region of Pakistan are increasingly experiencing climate stressors such as erratic rainfall, rising temperatures, and shifting wind patterns. In response, farmers adopt coping strategies like changes in sowing time, use of drought-resistant crop varieties, and tree planting. Farmers using these strategies experience tangible benefits: profit improvements ranged between PKR 1658–2610, and wheat yields increased by 42–65 kg per hectare, while poverty levels fell by 2–4% (Ali et al., 2017). Similarly, the article "coping with climate change and its effect on productivity, income, and poverty: evidence from the Himalayan region of Pakistan" argues that enhancing farmer awareness, strengthening extension services, ensuring land rights, and increasing access to financial resources are key policy directions for bolstering resilience (Ali et al., 2017). Local communities also possess indigenous coping mechanisms and traditional knowledge, such as glacier growing, which reflects a holistic view of nature and exhibits deep-rooted resilience in managing climatic uncertainty (Shishakly, 2022).

The research criticizes current wooded area management practices and recommends community involvement, alternative strength resources, and stricter enforcement of wooded area safety legal guidelines. It also highlights obstacles in data insurance and requires broader-scale studies. The study

aligns with international deforestation traits and underscores the pressing want for sustainable wooded area policies in vulnerable regions.

Research Methodology

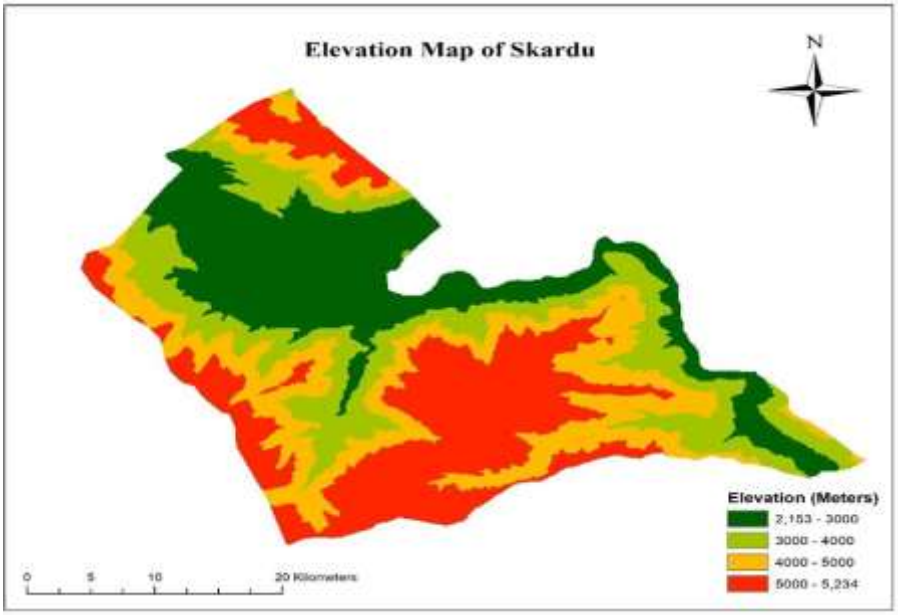
The area Skardu is a mountain town and capital of Skardu District, in Gilgit- Baltistan, Pakistan. It is the capital of the Baltistan region in the Karakoram Mountains, at an altitude of about 2,438 meters (7,999 feet) above sea level. It is known for its stunning beauty and is a very popular tourist destination due to the mountains, the Indus River, and the many trekking and camping sites, such as the foothills of the Deosai National Park, Kondus Valley, and Kachura Lake. Skardu is a transit city for all trekkers and expedition groups who try to access the great peaks of the Karakoram.

It is located at the confluence of the Indus and Shigar Rivers, and it is surrounded by a number of well-known peaks, including the extremely tall Gasherbrum I-II and K2, the second-highest summit in the world. The city has a rich cultural history and hosts several ancient places, including the Buddha Rock and the Kharpocho Fort, a sixteenth-century fort that sits on the hilltop over the Lahore Islami of Skardu.

Handicrafts traditionalists & mdash wood carving, chases, and embroidered are work. Like other Balti towns, Skardu is also famous for its traditional handicrafts, which particularly include the carved wood effect and the bedecked champa. The cry "Skardu" is believed to be a case from the Balti word for "lowland" or "Louis," according to historian De Filippi. The 10-kilometer (6-mile) wide and 40-kilometer (25-mile) long Skardu Valley, at the confluence of the Indus and the Shigar River, is at 2,228 meters (7,310 feet).

The active erosion within the adjacent Karakoram Mountains has led to significant accumulation of sediments throughout the Skardu Valley over time. The valley of Skardu is separated from the Indus Valley and Shigar Valley by mountains and is supported from three directions by two other valley glaciers. 2 million years ago until the Holocene, about 11,700 years ago, according to the help of scientists' estimates. The Skardu area came under the cultural influence of Tibetan Buddhists from the time of the growth of the Tibetan Empire under Songtsen Gampo in the mid-7th century CE. Tibetan tantric texts were found everywhere in Baltistan until about the ninth century. The tehsil Skardu now includes the district headquarters and the main urban area of Skardu. Gultari tehsil is situated in the southern part of the district and borders the line of manipulation. The rural area of Gamba tehsil is the base of TrangoAdventure (2023).

Elevation Map of Skardu



Geology

Skardu is placed along the Kohistan-Ladakh terrane, fashioned as a magmatic arch over a Tethyan subduction zone that later accreted onto the Eurasian Plate. The vicinity has low seismic activity compared to surrounding regions, suggesting that Skardu is located in a passive structural detail of the Himalayan thrust. The stone within the Skardu location is Katzarah schist, with a radiometric estimated age of 37 to 105million years. Several complex granitic pegmatites and a few alpine-cleft metamorphic rock deposits are discovered inside the Shigar Valley and its tributaries. Shigar Valley consists of the main Karakoram Thrust, isolating the metasediments (chlorite to amphibolite grade) at the Asian plate from the southern volcanoclastic rocks of the Kohistan-Ladakh island arc.

Topography

Skardu Airport is at an altitude of 2,230 meters (7,320 feet), and the mountains close by are 4,500 to 5,800 meters (14,800 to 19,000 feet) above sea level. Above Skardu, there are the most important glaciers in the world: the Baltoro Glacier, the Biafo Glacier, and the Chogo Lungma Glacier. Many of the surrounding peaks are over 20,000 ft, and some of the surrounding glaciers include some of the largest in the world, like the Godwin-Austen Glacier, the Baltoro Glacier, and others. The nearby region features some of the world's highest mountains, including K2 at 8,611 meters (28,251 feet) above sea level, the world's second-highest mountain, and the Gasherbrum group, also including Gasherbrum I at 8,068 meters (26,470 feet; 5.011 mi) and Gasherbrum II at 8,035 meters (26,362 feet), Broad Peak at 8,051 meters (26,414 feet; 5.017 mi), and Masherbrum at 7,821 meters (25,659 feet). There is also the Deosai Country wide Park, the second-highest alpine plain, located upstream of Skardu as well. It passes from the Maikop space in the foothills of Europe’s Northern Caucasus on account of Srinagar to the Nanga Parbat Mountain (elevation 8,126 m, 26,660 ft).

Weather

Climate The weather in Skardu all through the summer season is supported by using its mountain placing; the severe warmth of lowland Pakistan does no longer reach it. The summer monsoon is blocked by the mountains so that the summer rainfall is not particularly high either. But, those mountains make for very extreme winter conditions. During the April-to-October vacationer season, the mercury fluctuates between a most of 27°C (81°F) and a minimum (in October) 8°C (46°F). Winter Temperatures can fall below −10 °C (14 °F) in the midwinter month of December to January. the coldest temperature ever reached was −24.1 °C (−11 °F) on 7 January 1995.

Mountains in Skardu (K2 Mount Godwin-Austen)

The world's second-highest peak, also known as Mount Godwin-Austen, is a natural gift to Pakistan. K2, at an altitude of 28,250 feet, is in the extreme north of Baltistan near the Baltoro Glacier. K2 is located on the Pakistan-China border, so it has two accesses, but because of the harshness of the Chinese side, K2 is effectively established from the Pakistani front. K2 (1991), Vertical Limit (2000), K2: Siren of the Himalayas (2012), and The Summit (2012) are the movies that can account for the mountain climbing of K2.

Nanga Parbat, the world's 9th tallest mountain is located within the Western Himalayas, a tea garden with the aid of the side of the mountain.

Indus River: Towering at 8,126 meters (26,660 ft) high and notoriously challenging to scale, Nanga Parbat is known as the Killer Mountain and has claimed the lives of many. Nanga Parbat (2010), The Climb (1986), and 7 Years in Tibet (1997) were the films it appeared in.

GasherbrumI, Skardu, PK Global's 11th max height (also known as K5) at 26,509 feet, is located on the Pak-China border. This peak is also called Hidden Top. huge peak, Skardu, pk. (2025) It is the world's 12th highest peak, with a height of 8,051 meters (26,414 feet). is situated on the Pak-China border. Due to its massive top, it became known as Falcan Brak by means of the nearby Balti humans. Though this peak had already been scaled in 1957 for the first time, as a result, it is not a very popular destination for expeditions.

Gasherbrum II, Skardu, PK (2025). The thirteenth highest mountain in the world and the second highest of the Gasherbrum Peak, this glittering mountain is situated at the Pak-China border with an elevation of 8,005 meters (26,362 ft.). It is also popularly referred to as K4 (the fourth peak in the Karakoram range). Stats: height: 8 1/2 m (26,362 ft.)

Research Design

A mixed-techniques look at layout blanketed strategies for collecting and analyzing both qualitative and quantitative information. Triangulating information and ensuring a complete assessment of network-based totally disaster risks have been the objectives of this technique. The research plan's number one components are community survey Questions asked.

Discussions in cognizance agencies (FGDs) Mapping of geographic facts structures populace length and sampling techniques according to the latest information, there are more or less 214,848 humans residing in the Skardu District. Stratified random sampling turned into used to make sure representation throughout a number of demographic and geographic spheres of society. Gender, age ranges, sorts of livelihood, and levels of publicity to hazards had been many of the strata. the use of Cochran's components for unknown populations, a pattern length of two hundred respondents was selected to guarantee statistical relevance and reliability. Facts collection facts assets techniques Google Earth seasoned GIS Processing population SPSS analysis

Surveys

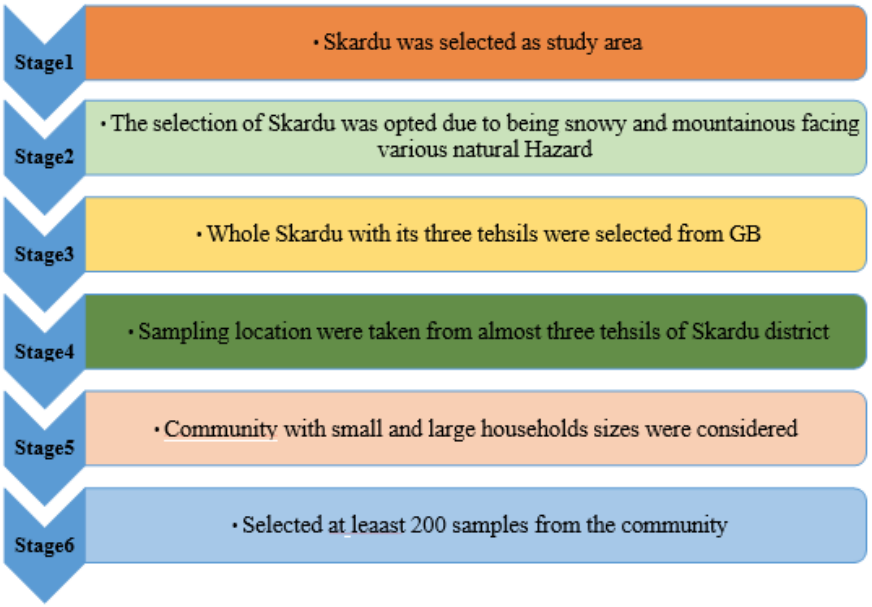
Organized to capture the diverse components of catastrophe risk at the network degree are enumerators who have been mainly skilled for the undertaking and selected from the nearby communities conducted in-person interviews inside the Balti and Urdu languages. They have been able to make certain 86f68e4d402306ad3cd330d005134dac records series, reduce communiqué hurdles, and construct rapport with respondents thanks to their linguistic and cultural fluency. Every interview lasted among 25 to 35 minutes. The survey's subject sections blanketed characteristics, prior catastrophe stories, hazard perception, preparedness and reaction techniques, accessibility to early caution structures, and views on community resilience. Extra questions evaluated information of conventional coping mechanisms and government interventions. To make sure that inclined and marginalized organizations ladies, the elderly, men and women with disabilities, and those dwelling in excessive-hazard areas had been blanketed, the survey placed a sturdy emphasis on consisting of a numerous go-phase of the community. Following gender-touchy protocols, lady enumerators performed interviews with girl individuals. Stratified random choice became used to select the very last sample of 200 respondents, and the effects were statistically big and representative of the Skardu populace universal.

Cognizance Organization Discussions (FDGs)

The consequences of the ballot have been improved by way of designated, context-specific narratives from 8 recognition organization Discussions (FGDs) carried out in numerous Skardu regions. FGDs have been mainly effective at documenting emotional reviews, shared network reminiscences, and social dynamics influencing resilience and disaster threat. Every FGD had six to 10 individuals and become meant to represent important demographic agencies inside the place, along with girls, teens, the aged and mixed-gender groups. This class promoted inclusive, candid conversations and warranted various viewpoints. Mainly in conservative or rural areas, gender-sensitive facilitation becomes hired to pay near regard to cultural norms.

The ladies’ and teenagers periods' girl moderators created a well mannered, comfy environment where members ought to proportion their viewpoints and stories. Discussion topics were pre-organized using a deliberate FGD approach. Indigenous knowledge structures, early caution structures, coping mechanisms and perceived vulnerabilities, previous herbal disaster experiences, and the characteristic of social capital in catastrophe preparedness and healing have been some of these. These topics have been intentionally wide to allow for flexibility in dialogue and to assure insurance of substantial research goals.

The conferences had been held in without problems reachable places, together with colleges, community facilities, and municipal council rooms. Discussions have been carried out in each Balti and Urdu, relying on the pursuits of the group. Each session lasts among sixty and ninety minutes. Each participant knowingly consented to the audio recording of the debates. note-takers and moderators took special notes, noting group dynamics and nonverbal clues in conditions in which recording became not possible Geographic records gadget (GIS) mapping one of the main factors of the studies design changed into the usage of Geographic information device (GIS) mapping to spatially analyses the distribution of secure zones, infrastructure vulnerabilities, populace exposure, and environmental risks for the duration of Skardu. This tool gave localized catastrophe chance reduction (DRR) planners a visible and facts-driven basis for comprehending the geographic aspects of catastrophe risk. a number of strategic advantages had been furnished by way of the GIS mapping initiative. With the aid of simplifying complicated chance information into visible representations, it advanced threat verbal exchange. It recommended nearby governments to make decisions primarily based on records, mainly in terms of infrastructure improvement and DRR resource distribution. Critiques of spatial fairness have been made feasible through its focus on terrible areas in regards to emergency access and readiness for failures. The GIS component created contextually applicable and actionable spatial danger checks by means of combining technological equipment with neighborhood information structures thru geospatial analysis and community interplay.



RESULTS

Table 1: Respondent's Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18–30	178	89.0	89.0	89.0
	31–45	17	8.5	8.5	97.5
	46–60	2	1.0	1.0	98.5
	Below 18	3	1.5	1.5	100.0
	Total	200	100.0	100.0	

The data displays the age distribution of the 200 survey participants. Here is the breakdown. With 178 responders, or 89% of the sample, the most prevalent age group is 18–30 years old. This implies that young adults made up the majority of participants, which may indicate a high participation rate among this demographic or a community dominated by young people. Of the sample, just 17 responders, or 8.5%, were between the ages of 31 and 45. This suggests a notable decline in involvement in contrast to the younger cohort. 46–60 years old: The fact that only two respondents (1%), or a very small percentage, were middle-aged suggests that older working persons are either under-represented or do not participate as much.

Table 2: Gender of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	35	17.2	17.2	17.2
	Male	165	82.8	82.8	100.0
	Total	200	100.0	100.0	

This table is primarily based at the respondents' gender distribution, 166 out of 200 respondents, or 83% of the sample, recognized as male. This means that guys make up the majority of survey participants. Of the complete pattern, 34 respondents, or 17%, recognized as lady girl participation is a long way lower in assessment. Cumulative percent: while the cumulative percent, which includes each male and female respondent, equals 100%, entire gender statistics coverage is shown. Overall, the findings show that women are still below-represented and that the survey sample is frequently male (greater than 4-fifths of the respondents were men).

Table 3: Respondent's Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Graduate or above	142	71.0	71.0	71.0
	Higher Secondary	53	26.5	26.5	97.5
	Middle	1	.5	.5	98.0
	No formal education	1	.5	.5	98.5
	Secondary	3	1.5	1.5	100.0
	Total	200	100.0	100.0	

The 200 respondents' best level of education is shown on this table and discern. that is a way to evaluate a graduate or higher: 142 humans, or seventy one% of the populace, maintain a primary graduate diploma or above that is 71% of the entire, which is also the remaining percent as of right now higher Secondary, which is similar to the 12th grade or university guidance fifty three humans (26.five%) have completed

upper secondary training. We calculated the cumulative mark at 117.five% (71% + 26.five%), which indicates that the census populace also finished decrease secondary and higher education. center (about eighth grade): just one man or woman (0.five%) has completed totally middle faculty. inside the aggregate, the quantity nowadays stands at ninety eight%. loss of formal education: best one individual (0.5%) sincerely has no formal schooling. for that reason, the cumulative fee rises to 98.five%. 3 individuals (1.5%) have finished secondary college (10th grade). The very last cumulative percentage is a hundred%.

Respondent's Occupation

Daily wage labor	14
Farming	33
Government employee	42
Livestock rearing	12
Small business	71
Tourism/hospitality	29

The data shows the frequency distribution of different main occupations. Small business is the most common occupation, with a frequency of 71, indicating it is the predominant field among the categories listed. Government employees follow with 42 individuals, while farming accounts for 33. Tourism and hospitality jobs have a frequency of 29, making them moderately common. Daily wage labor and livestock rearing are less frequent, with 14 and 12 individuals respectively. This distribution highlights small business as the leading occupation, with a significant gap between it and the other categories.

Table 4: Respondent's House Types

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cemented/Concrete	92	45.1	45.1	45.1
	Mixed	60	31.4	31.4	76.5
	Mud/Stone	41	20.1	20.1	96.6
	Wood	7	3.4	3.4	100.0
	Total	200	100.0	100.0	

This table shows residential structure records display that forty five% of respondents live in cement or concrete dwellings, demonstrating a tremendous growth within the use of current constructing methods. Additionally, 31.5% of people live in houses that integrate traditional and contemporary design elements. Nonetheless, 20% of those surveyed nonetheless reside in homes built with mudstone, suggesting that

these old creation methods are nonetheless in use handiest three five percentage of those surveyed claimed to have a timber domestic. In fashionable, 76.5% of the respondents live in cemented or blended-cloth houses, suggesting that greater sturdy and resilient dwellings are being constructed within the community.

Table 5: Monthly House Hold Income Approximate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10,000–25,000	21	10.3	10.3	10.3
	25,000–50,000	57	27.9	27.9	38.2
	Above 50,000	111	56.4	56.4	94.6
	Less than 10,000	11	5.4	5.4	100.0
	Total	200	100.0	100.0	

Table 5 shows the majority of families (56.4%) suggested having a monthly profits exceeding PKR 50,000, making this the maximum not unusual profits band amongst respondents. The institution this is in the PKR 25,000–50,000 bracket is the second largest (27.nine%). 10.3% of families mentioned incomes between PKR 10,000 and 25,000 in line with month, while simply 5.four% mentioned incomes less than PKR 10,000. households with excessive earning: given that over 1/2 of the respondents (56.four%) make greater than PKR 50,000 in line with month, the pattern's profits dispersion is rather high. approximately 28% of households within the center-income phase earn among PKR 25,000 and PKR 50,000. handiest 15.7% of all households earn less than PKR 25,000 per month, making them decrease-income households. average fashion: The facts shows that maximum of the families on this institution have month- to-month incomes that fall among slight and excessive, with incredibly few houses in the lowest earnings band.

Table 6: What is the most Frequent Disaster in Your Area (Most Damaging Disaster in Skardu)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Avalanche	13	6.3	6.3	6.3
	Don't know	1	.5	.5	6.8
	Earthquake	18	11.2	11.2	18.0
	Flood	73	35.6	35.6	53.7
	Land Sliding	1	.5	.5	54.1
	Landslide	94	45.9	45.9	100.0
	Total	200	100.0	100.0	

The information shows the responses to the query about the most common disaster within the location. Ninety four (45.9%) of the 205 respondents claimed that "Landslides" were the maximum common calamity. subsequent turned into "Flood," which became said through seventy three individuals (35.6%).

Of those who answered, thirteen (6.3%) said "Avalanche," whilst 23 (11.2%) stated "Earthquake." Few respondents suggested "Land Sliding" (1 respondent, 0.5%) or stated they "don't know" (1 respondent, 0.5%). by means of the period, primarily based on the whole chances. in addition to "Flood," over 1/2 of the most frequent screw ups, according to respondents (fifty three.7%), had been "avalanche," "earthquake," or "flood." however, it's far clear from the information that landslides are considered the most not unusual catastrophe within the vicinity, followed by means of floods, while earthquakes and avalanches are said to happen a whole lot less frequently.

Table 7: Seasonal Pattern of Occurrence of Disasters

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Autumn	12	5.9	5.9	5.9
	Spring	37	18.1	18.1	24.0
	Summers	106	53.9	53.9	77.9
	Winter	45	22.1	22.1	100.0
	Total	200	100.0	100.0	

According to the information, there is a clean seasonal trend inside the location's calamities. The most customarily indicated season, summer time (or "summers"), acquired fifty three. There are 9% of the replies, indicating that landslides, flooding, and monsoon rains are some of the factors that make a contribution to failures that appear in the course of warmer months. Iciness is the second most not unusual season, with an occurrence of 22.1%, suggesting the capacity for avalanches, heavy snowfall, or cold-associated hazards. The reality that 18.1% of replies came about within the spring might be attributed to seasonal climate variations or snowmelt-associated incidents. Autumn is the season with the bottom chance of disasters, in line with simply five. There are 9% of respondents. This distribution demonstrates a massive correlation among the frequency of disasters and seasonal climatic conditions, with summer season having the best threat and autumn the bottom.

Table 8: Have Homes been Damaged or Destroyed by Disasters Before

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	101	51.5	51.5	51.5
	No idea	1	.5	.5	52.0
	Yes	98	48.0	48.0	100.0
	Total	200	100.0	100.0	

Two hundred respondents' responses to the question, "Have houses been broken or destroyed by means of disasters before?" are displayed within the data. Responses are distributed almost lightly, with 51.5% (one hundred and five respondents) reporting that their houses have no longer been broken or destroyed

and 48.0% (98 respondents) reporting that failures have affected their houses. There is one responder (0.5%) said they had been uncertain or failed to know. nearly half of the studied population reported that disasters had significantly damaged or destroyed their homes, highlighting the sizable effect of failures in the area.

Table 9: Have you ever Received Disaster Prepared ness Training (Community Disaster Training Exposure)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	172	86.3	86.3	86.3
	Yes	28	13.7	13.7	100.0
	Total	200	100.0	100.0	

The findings display that the enormous majority of respondents have in no way taken a direction on disaster preparedness. Simply 28 (13.7%) of the 205 individuals pronounced having gotten such education, while 177 (86.3%) claimed they had by no means. This indicates a large hole in the community's training approximately disaster preparedness and raises the opportunity that maximum individuals lack the knowledge or abilities had to reply to disasters efficaciously. The findings highlight the want to intensify projects to increase network resilience via education in disaster preparedness.

Table 10: Do you know the Evacuation Plan or Safe Shelters for Disasters (Evacuation plans or safety shelters in Skardu)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	141	71.2	71.2	71.2
	Yes	59	28.8	28.8	100.0
	Total	200	100.0	100.0	

The information indicates that a full-size portion of the population polled isn't always aware about evacuation arrangements or catastrophe safe shelters. Just 59 (28.8%) of the 205 respondents claimed to be aware of any secure shelters or evacuation preparations, even as 146 (71.2%) claimed to be unaware of such. consistent with this, extra than -thirds of the population is ignorant of vital understanding that could help them respond effectively in the event of a disaster. The outcomes exhibit how important it is to growth public consciousness and verbal exchange concerning secure evacuation routes and places as a way to make sure community safety for the duration of emergencies.

Table 11: Are there Emergency Supplies Stored in your home such as food and Medicine (Emergency Supply Readiness in homes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	109	55.6	55.6	55.6
	Yes	91	44.4	44.4	100.0
	Total	200	100.0	100.0	

The information confirmed that respondents' evaluations on how emergency- prepared their houses were nearly evenly split. There is 114 individuals (55.6%) said they do now not have emergency elements inclusive of meals and medicinal drug handy, at the same time as ninety one individuals (44.4%) admitted to doing so. this means that even as a big part of the populace actively keeps emergency substances on hand, the vast majority do no longer. The findings suggest that encouraging households to prepare the correct emergency kits ought to obtain extra attention which will boom resilience in the course of catastrophes. This preparedness hole may additionally leave over half of of the populace at risk during calamities, underscoring the need of public schooling and useful resource allocation in improving catastrophe readiness.

Table 12: Does your Community have an Early Warning System (Community Based Early Warning System)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	153	77.1	77.1	77.1
	Yes	47	22.9	22.9	100.0
	Total	200	100.0	100.0	

The records factors to a significant lack of early warning machine accessibility within the neighborhood. Of the 205 respondents, 158 (77.1%) said their community did not have an early caution machine for screw ups, while simply 47 (22.nine%) mentioned its lifestyles. seeing that early warnings are crucial for fast evacuation and hazard reduction at some stage in emergencies, the outstanding majority of humans without get admission to to such systems factor to a widespread vulnerability. The findings demonstrate how crucial it's miles to expand or decorate early warning systems if you want to beautify network protection and disaster preparedness. the general public of citizens are nonetheless greater at risk of being caught off protect through unforeseen failures like floods or landslides, which had been formerly recognized as tremendous dangers in the vicinity, within the absence of these technologies.

Table 13: Does your Community have a Communication Method During Disaster (Communication Method During Disaster)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	134	67.8	67.8	67.8
	Yes	66	32.2	32.2	100.0
	Total	200	100.0	100.0	

The studies shows that the majority of community participants lack installed channels of touch in times of emergency. simplest 66 (32.2%) of the 205 respondents stated that an emergency communication machine become in location, whilst 139 (67.8%) spoke back that none existed. this is a first-rate flaw inside the catastrophe control infrastructure when you consider that powerful communication is crucial for planning evacuations, issuing warnings, and ensuring safety at some point of emergencies. The findings assist earlier solutions that pointed to a lack of early caution structures and readiness education, and in addition they screen systemic vulnerabilities. Strengthening communication networks ought to be a primary attention which will lessen risks and increase network resilience throughout catastrophes.

Table 14: What do you do first when a Disaster occurs (Immediate Reactions and Safety Actions in Emergencies?)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Call for help	39	19.0	19.0	19.0
	Help family/neighbors	122	59.5	59.5	78.5
	Option 1Evacuate	26	12.7	12.7	91.2
	Protect property	18	8.8	8.8	100.0
	Total	200	100.0	100.0	

The information suggests that there had been differences in the network's initial responses to calamities. The 122 respondents (59.5%) ranked assisting family or buddies as their first course of movement for the duration of disasters, indicating a robust emphasis on immediate social assist. 39 respondents (19.0%) indicated that they wanted outdoor help and they referred to as for help first. Only 26 respondents (12.7%) prioritize evacuation, in comparison to 18 respondents (8.8%) who pick belongings protection. these responses indicate that network members are more inclined to prioritize their private and their organization's needs over assets preservation or formal evacuation protocols. thinking about that earlier facts confirmed a lack of awareness about evacuation strategies and emergency supplies, the findings emphasize the need for greater certain commands on the way to allocate resources and conduct

evacuations. Coordinating person behaviors with protection great practices may be made simpler with extended disaster preparedness knowledge.

Table 15: How quickly do you Receive help After a Disaster? (Community Experience with Disaster Aid Timeliness)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2-3 days	55	26.8	26.8	26.8
	After a week	52	25.4	25.4	52.2
	Immediately	39	19.0	19.0	71.2
	Within a day	59	28.8	28.8	100.0
	Total	200	100.0	100.0	

The facts exhibits varying perspectives on the rate at which publish-disaster help is added. of these surveyed, 55 (21.8%) reported receiving help in to a few days, whilst 59 (28.8%) reported receiving it in a day. There is 52 respondents, or 25.4%, claimed that comfort arrives after every week, at the same time as 39 respondents, or 19.0%, stated that useful resource arrives right away. these results indicate a massive diploma of diversity inside the effectiveness of catastrophe reaction, with the general public (extra than 50% mixed) reporting delays of to 3 days or longer. The outcomes emphasize the need to streamline emergency response mechanisms in light of the community's heavy reliance on mutual aid (as seen in earlier replies) and inadequate preparatory infrastructure a good way to ensure the faster provision of essential help enhancing coordination between humanitarian agencies and local authorities could keep delays and improve results.

Table 16: What are the Biggest Challenges During Response? (Challenges During Disaster Response)

		Frequency	Percent	Valid Percent	Cumulative Percent
	Access roads blocked	99	48.3	48.3	48.3
	Communication breakdown	40	19.5	19.5	67.8
	Delay in aid	19	9.3	9.3	77.1
	Lack of information	24	11.7	11.7	88.8
	No medical services	23	11.2	11.2	100.0
	Total	200	100.0	100.0	

Blocked access roads have been stated through ninety nine respondents (48.3%) because the maximum crucial problem, underscoring the vital demanding situations confronted for the duration of disaster reaction. This illustrates the extensive logistical problems in conducting evacuations and offering help. Coordination of remedy sports turned into hampered with the aid of verbal exchange breakdowns, as

said by means of forty people (19.5%). Nineteen respondents (9.3%) mentioned delays in resource, and twenty-4 respondents (11.7%) emphasized a loss of statistics, displaying gaps in situational understanding and actual-time updates. Moreover, 23 respondents (11.2%) expressed concern approximately the dearth of clinical offerings, which places people at chance for health problems throughout emergencies. collectively, those challenges paint a photograph of systemic weaknesses, in which little investment, bad verbal exchange, and constrained infrastructure make powerful catastrophe management impossible. unique prices in road protection, healthcare readiness, and communiqué networks are required to remedy these problems and raise community resilience.

Table 17: Recent Trends in Disasters Frequency and Severity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	40	21.0	21.0	21.0
	Yes	160	79.0	79.0	100.0
	Total	200	100.0	100.0	

The research shows that humans in the network firmly experience that failures have end up extra frequent or extreme in latest years. Of the 162 respondents (79%) who mentioned a boom in disasters, just forty three (21%) disagreed. This vast majority highlights developing worries about environmental risks that would be connected to weather change or localized vulnerabilities. The findings are in step with earlier responses that highlighted common hazards which includes landslides and floods, suggesting that residents are acutely aware about the worsening trends in disasters. This view highlights how urgently adaptive measures like stronger early warning structures, infrastructure enhancements, and network training are hard to reduce the compounding dangers posed through more common or excessive disasters.

Table 18: After a Disaster what is needed most for Recovery?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Financial support	72	35.1	35.1	35.1
	Food/water	55	26.8	26.8	62.0
	Livelihood support	6	2.9	2.9	64.9
	Reconstruction of homes	28	13.7	13.7	78.5
	Shelter	34	16.6	16.6	95.1
	Trauma or counseling services	10	4.9	4.9	100.0
	Total	200	100.0	100.0	

Economic vulnerabilities and the pressing need for financial assistance to restore lives are shown by the

data, which shows that 72 respondents (35.1%) ranked financial support as the most critical need for recovery following disasters. Food and water were ranked as the second most urgent need by 55 respondents (26.8%), underscoring the dearth of resources in post-disaster scenarios. Notably, considerable infrastructure damage was indicated by the mention of shelter and home reconstruction by 34 respondents (16.6%) and 28 respondents (13.7%), respectively. The fact that trauma or counseling services (10 respondents, 4.9%) and livelihood support (6 respondents, 2.9%) received less attention indicates that short-term survival demands take precedence over mental health concerns and long-term healing. These findings demonstrate the community's prioritization of basic necessities and financial stability, but they also reveal deficiencies in all-encompassing recovery planning that takes mental health and sustainable livelihood strategies into account. To fulfill these needs, a well-rounded approach that blends short-term aid with long-term resilience-building initiatives is required.

Table 19: Which types of Disasters has your Community Experienced in the last 10–20 Years?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Avalanche	19	9.3	9.3	9.3
	Earthquake	31	15.1	15.1	24.4
	Flood	55	26.8	26.8	51.2
	Glacial Lake Outburst Flood (GLOF)	22	10.7	10.7	62.0
	Landslide	78	38.0	38.0	100.0
	Total	200	100.0	100.0	

Financial vulnerabilities and the urgent want for monetary assistance to repair lives are shown by the facts, which shows that seventy two respondents (35.1%) ranked economic assist because the maximum critical need for healing following screw ups. food and water had been ranked as the second one most pressing want by 55 respondents (26.eight%), underscoring the lack of sources in put up-disaster scenarios. substantially, big infrastructure harm become indicated through the point out of shelter and home reconstruction by means of 34 respondents (sixteen.6%) and 28 respondents (thirteen.7%), respectively.

The truth that trauma or counseling offerings (10 respondents, 4.9%) and livelihood support (6 respondents, 2.9%) acquired less attention suggests that brief-term survival needs take priority over mental fitness concerns and lengthy-term recovery. these findings display the community's prioritization of fundamental requirements and financial stability, but they also monitor deficiencies in all-encompassing recuperation making plans that takes intellectual health and sustainable livelihood strategies under consideration. to meet these wishes, a properly-rounded technique that blends short-time period resource with long-time period resilience-constructing projects is required.

Table 20: What Infrastructure is most at Risk?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bridges	38	18.5	18.5	18.5
	Power lines	32	15.6	15.6	34.1
	Roads	102	49.8	49.8	83.9
	Schools	3	1.5	1.5	85.4
	Water supply	30	14.6	14.6	100.0
	Total	200	100.0	100.0	

Roads are through a long way the most prone piece of infrastructure inside the network, with forty 9.8% of respondents declaring that they're at large chance for the duration of catastrophes. Bridges rank 2d in phrases of infrastructure vulnerability (18.5%), followed by using water delivery structures (14.6%) and electric strains (15.6%). faculties appear like the least frequently reported risky infrastructure, on the grounds that handiest 1.5% of respondents noted them. This highlights the importance of focusing on transportation networks (roads and bridges) and key utilities (strength and water infrastructure) because the number one sectors in the community that require upgrades in catastrophe resilience.

Table 21: Do Disasters Affect lively Hoods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Crop loss	81	39.5	39.5	39.5
	Job loss	20	9.8	9.8	49.3
	Livestock loss	62	30.2	30.2	79.5
	Market access issues	42	20.5	20.5	100.0
	Total	200	100.0	100.0	

The records show that the most often said impact (39.5% of respondents) is crop loss, suggesting that catastrophes significantly affect the lives of groups. loss of farm animals (30.2%) is the second maximum common result, followed by way of problems with marketplace get admission to (20.5%) and process loss (9.8%), both of which purpose disruptions in subsistence. those findings all spotlight the region's heavy reliance on agriculture and cattle for subsistence and revenue, as well as the direct chance that natural disasters constitute to regional exchange networks, economic balance, and food security. The effects emphasize the need for centered interventions to decorate agricultural resilience and amplify the variety of livelihood alternatives in catastrophe-prone areas.

Table 22: Who Supports your Community During a Disaster?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Local government	54	26.3	26.3	26.3
	NGOs	33	16.1	16.1	42.4
	Pakistan Army	25	12.2	12.2	54.6
	Religious institutions	47	22.9	22.9	77.6
	Volunteers	46	22.4	22.4	100.0
	Total	200	100.0	100.0	

The statistics shows that once calamities, the network receives assist from a ramification of sources. The number one supply of help, consistent with 26.three% of respondents, is the local government. Volunteers and spiritual organizations also are massive; 22.9% and 22.4% of respondents, respectively, recounted them. With 12.2% of the network being supported by way of the Pakistan army and 16.1% via NGOs, the military is every other important source of resource. All matters considered, these effects advocate a complicated machine of useful resource throughout crises, wherein government groups, spiritual agencies, volunteers, NGOs, and the army all take part in relief and healing efforts. This style of guide displays the community's dependence on each formal and informal network to cope with and get over crisis situations.

Conclusion

This research examined the disaster chance landscape in Skardu, Gilgit-Baltistan, from a network-based angle. It targeted on assessing the readiness, resilience, and potential of the local populace to control a number of herbal disasters. The research employed quantitative procedures to collect facts from relevant authorities, stakeholders, and communities. Because of its inclusive and participatory method, the look at affords treasured insights into the complicated nature of disaster dangers and the crucial position that local communities play in enhancing resilience. The look at located that Skardu is specifically vulnerable to earthquakes, floods, landslides, and Glacial Lake Outburst Floods (GLOFs). The topographical features of the vicinity, changing weather tendencies, and a loss of infrastructure development exacerbate the results of these calamities. Groups living in excessive-hazard places have reported experiencing more common, severe, and unpredictable landslides and floods in latest years, especially throughout monsoon seasons. The community's lack of familiarity with respectable disaster danger discount (DRR) strategies was the survey's major finding.

Many residents depend upon coping mechanisms and conventional know-how, that are beneficial however commonly no longer sufficient to live to tell the tale high-effect occasions. The lack of early caution systems, insufficient infrastructure, and a loss of institutional coordination are other significant factors that have been confirmed to enhance the opportunity of disasters. The socioeconomic capabilities of the society boom vulnerability, which encompass confined get admission to healthcare and emergency services, high prices of poverty, and low literacy. However, the researchers also discovered that the

network was exceedingly cohesive and inclined to take part in DRR sports, which gives a solid foundation for additional interventions. Network-based participatory methodologies served as the foundation for the study method, which protected recognition companies, key informant interviews, and family surveys.

These strategies performed a big position in shooting the requirements, perspectives, and experiences of different stakeholders. By way of incorporating local expertise and views, the researchers ensured that the findings had been grounded in daily truth and were now not simplest rigorously scholarly however also nearly beneficial. Through using participatory methods including vulnerability tests and threat mapping, it became viable to pick out places which might be at risk to risks and prioritize risk mitigation actions based totally on community comments. Two effective results of this backside-up approach had been involving neighborhood groups and fostering an experience of ownership over threat mitigation strategies.

This examine emphasizes Skardu's pressing need for included and network-focused DRR measures. Policymakers and improvement experts should prioritize the established order of localized early warning structures, capability-building workshops, and community schooling initiatives to enhance readiness on the neighborhood level, making an investment in climate-resilient infrastructure and integrating catastrophe chance reduction (DRR) into nearby improvement making plans are equally critical. The document additionally backs a multi-stakeholder approach that brings together authorities groups, NGOs, educational institutions, and local communities. This form of collaboration is needed to make sure that DRR interventions are contextually responsive and sturdy, as well as to bridge the distance between coverage and practice.

Recommendations

Following are the recommendations are made on the findings of this research study.

1. Plan frequent schooling periods and schooling campaigns about protection and preparedness measures for screw ups.
2. To improve preparedness, behavior mock exercises and disaster drills three.
3. To locate risks and weaknesses, do hazard assessments based totally within the community.
4. Create and perform thorough disaster response plans that encompass shelters and evacuation routes.
5. For timely notifications and updates, installation reliable pre-alarming and communiqué systems.
6. Contain local authority’s organizations and non-governmental businesses in preparation activities.
7. Roads, bridges, strength grids, and water supply structures are examples of crucial infrastructure that must receive ordinary maintenance and inspection.
8. Encourage the construction of structures that may face up to earthquakes.

9. Make certain that zoning and constructing codes are strictly followed.

10. In excessive-risk places, increase the quantity and mobility of NDMA (Countrywide Disaster Management Authority) vans.

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