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Post-Flood Economic Challenges, Resilience and Rehabilitation Strategies: A Quantitative Analysis of Hyderabad, Sindh, Pakistan

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Abstract

The effects of climate change are now becoming more explosive and more frequent across the world, with developing countries having less adaptive capacity to cope with the effects of flooding. Pakistan has been one of the most climate-vulnerable countries and endured catastrophic flood events in 2010 and 2022, but the socioeconomic impacts of these disasters are only partially documented. This study is a crucial effort to fill this gap in the literature by systematically evaluating the economic problems, coping mechanisms, and recovery strategies after the floods of 2022 in Hyderabad District, Sindh, Pakistan, using a quantitative cross-sectional survey design. A structured questionnaire was used to collect data from 250 households affected by flood events, covering the following areas: demographic characteristics, severity of economic impacts, institutional effectiveness, and community-led strategies and solutions. Descriptive statistics, Likert scale analysis, Pearson correlation and multiple linear regression techniques were used to analyse the relationships between institutional interventions and the economic recovery outcomes. The results show terrible economic effects: 84% of questioned people said their crops were destroyed, 78% had to accept significant income cuts, and 72% had to endure damage to their homes or displacement. The overall level of satisfaction varied from institutions with neutral satisfaction, such as government rehabilitation institutions, moderately effective as political party institutions, to most trusted as non-governmental organizations (NGOs) (mean=3.9). Of particular interest, community-led strategies such as indigenous knowledge sharing (mean=4.4) and participatory decision-making (mean=4.3) were the most endorsed strategies. The regression model accounted for 46.2% of the variance in the economic recovery, with the greatest predictors being those of the role of NGOs in training and employment support (β=0.38) and the role of the community in planning (β=0.30). The results of this study show that the key elements of sustainable post-flood rehabilitation include reorientation to community-empowered rehabilitation, incorporation of indigenous

knowledge systems, strengthening of grassroots capacity building, and reform of the compensation system so that it is transparent and equitable in distributing the resources. The findings offer empirically based policy recommendations to enhance the climate resilience of flood-prone urban-rural economies of Pakistan.

Keywords: Post-flood economic recovery; Community resilience; Indigenous knowledge; NGO interventions; Climate adaptation; Pakistan floods.

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1. Introduction

Climate change is becoming a major global issue as the impacts of climate change are increasingly visible over time (Khoso et al., 2024; Sheikh et al., 2019). Over the past few decades, there has been a rise in the number of natural catastrophes, especially those caused by extreme meteorological events such as cyclonic storms, tornadoes, tsunamis, inundations, etc. However, according to scientific research, climate change has contributed to the frequency and intensity of heavy rainfall events, which has led to more frequent and intense flood events (Khan et al., 2021). Pakistan is one of the countries severely affected by climate change-related events that led to catastrophic floods and exacerbated the country's multifaceted problems (Khoso et al., 2025). The Hyderabad district of Sindh province is one of the most affected areas of the country (Suyuhan and Khoso, 2026). It is a highly populated urban and peri-urban region which is a vital economic corridor between upper and lower Sindh. The year 2022 was a devastating one for the country, as the country experienced record rainfall and flooding, displacing some 10 million people and causing significant loss of life (McAuliffe et al, 2021). Low-income countries are highly vulnerable to the impacts of floods because they have fewer means to take effective adaptation and mitigation measures. Flooding in Pakistan is a complex problem, stemming from the erratic nature of monsoons, glacial melting, and river flooding, especially in the Indus River system (Ahmad et al., 2026; Bhutto et al., 2026). The country is still susceptible to both floods due to precipitation and fluvial flooding (Ganguli

et al, 2020). Floods are events that inundate land that is usually dry with water due to various conditions including high-intensity rainfall, storm surge, quick snowmelt, dam breaks, etc., or a combination of these factors (Mushtaq et al, 2020). These events are deeply connected with geographic, environmental, and health aspects and can cause permanent damage to the environment and human health. With the frequency of such disasters increasing, so have the numbers of casualties. The country has faced two massive flood events in the recent past, which inflicted huge loss of life and property: catastrophic floods in 2010 and monsoon floods in 2022 (Maharjan et al., 2021). Furthermore, these floods have had a devastating impact on health systems, which have been damaged by the floods and have allowed the spread of communicable diseases (Zhang et al, 2020). Pakistan has been impacted adversely by flooding with significant economic consequences (Ullah et la, 2025; Bhutto et al., 2026). In addition to health care facilities, the floods have left agricultural fields, livestock, and livelihoods devastated. The country's agriculture-dominated economy and weak water resource management make it vulnerable to the economic shocks of flooding. About 30% of Pakistan's territory was submerged in 2022, which created severe economic disruption (Hassan et al, 2025). Taking down livelihoods and infrastructure has resulted in severe food shortages, which have increased humanitarian vulnerabilities and could trigger a recession (Khalid et al, 2026). Previous studies have focused on different aspects of flood impacts, such as gender aspects, social networks, food security, livelihood patterns, and flood risk perception. The implementation of effective flood risk reduction and adaptation to climate change, however, requires further research to understand the socio-economic and institutional barriers to effective adaptation, in particular from at-risk communities. Natural disasters in Pakistan have taken a heavy toll on people and property, particularly in the wake of frequent floods. Heavy rainfall has been

seen all over the country, and the impacts have been consistently catastrophic (Khalid et al, 2026). In mitigating these impacts, holistic regulatory action, strengthening disaster recovery systems, building new water reservoirs, and upgrading relevant agencies are required. Hyderabad, the second largest city of Sindh province, is especially threatened by its geographical location on the eastern bank of the Indus River and low elevation. Unlike purely agricultural districts, the economy of Hyderabad is a mixed one, comprising agriculture (including mango cultivation and heat cultivation), small industries (such as production of glass bangles, textile embroidery, pottery, etc.), and wholesale trade. Low-lying areas in the old city, Qasimabad and Latifabad, were severely hit by these floods, leading to disruption of the supply chain, destruction of inventories, and the livelihoods of petty traders and daily-agers. It is worsened by poor urban drainage, urban development on natural waterways, and poor water resource governance (Rhianazala et al, 2026). Hence, this study focuses on the economic problems of the Hyderabad region after the recurring floods and especially on the economic characteristics of the unique urban-rural economy of the Hyderabad region.

1.1. The Significance of Resolving Economic Challenges after Flooding

The importance of tackling economic problems following flooding. The economic shocks from the flooding are massive, especially for the poor and disadvantaged who have limited financial resources to cushion the impact of the flooding. Affected populations' mental health and emotional stability are often negatively impacted by the economic disruptions, which may include depleted savings, financial insecurity, and psychological distress (Matczak & Hegger, 2021). Pakistan's history is full of calamities, especially floods, which are the most frequent and severe natural calamities that Pakistan has suffered. The nation has been facing extensive environmental degradation, water pollution, and

frequent flooding, causing significant public health challenges in the past decades. (Almulhim et al., 2024; Khushi et al., 2024). In particular, the 2022 floods were considered one of the worst humanitarian and economic crises in the history of Pakistan, particularly affecting the most vulnerable segments of society (Mengal et al, 2022). Loss of crops and reduced crop yields occurred across Pakistan, leading to catastrophic losses in the agricultural sector, which is a vital sector of the Pakistani economy and a major source of jobs in rural areas (Ali & Zhuo, 2025). This is especially relevant to the Hyderabad Sindh case. The economy of Hyderabad is a mix of agriculture (particularly mango orchards and heat cultivation), small-scale manufacturers (such as glass bangle, textile embroidery, pottery), and wholesale trade, where agriculture and the small industry were tightly intertwined with the wholesale trade. Floods in 2022 caused multiple and extensive economic losses in these interdependent sectors. Farmers lost their livelihoods, and all their crops were lost in the inundation of agricultural land, along with their livestock. The floods caused delays in supply lines, loss of perishable stocks, and brought commerce to a standstill for long periods of time for small business owners and petty traders in urban areas like Latifabad, Qasimabad, and the old city. A substantial part of the population of Hyderabad was forced to go without work - workers who work by day and night - as construction sites, markets and transport networks came to a standstill. In addition to these losses, disruptions in transportation and inter-district trade further exacerbated the effects, leading to a ripple effect that spread across the entire local economy (Bajaj, 2024). In developing countries, such as Pakistan, disaster recovery continues to be a formidable task, both in terms of governments and communities. The consequences of a delay in rehabilitation include increased direct economic costs, as well as longer-term vulnerabilities in social structures such as school dropouts, intergenerational poverty traps and debt burdens

(Swetha, 2025). The economic restoration in Hyderabad is further complicated by the duality of the city which has very dense urban settlements as well as peri-urban agricultural areas, and each of these areas needs different approaches to economic restoration. Restoration of the land, reconstruction of infrastructure and revival of livelihoods have to be done concurrently, but each sector has its own challenges from land tenure to poor urban drainage facilities. Furthermore, recovery after a disaster is a multi-faceted process. It requires both the rehabilitation of the physical infrastructure (roads, bridges, electricity and water supplies) and mental health and psychosocial support for the traumatized population, as well as sustainable economic renaissance (Bortolin & Olagnero, 2024). This will not only entail betterment of damaged roads and markets in Hyderabad, but also the revival of the traders' morale, the revival of the handicraft sector, and the availability of credit facilities for small businessmen. Strategic planning and inter-agency coordination are critical to reducing the effects of future climate-induced floods (FitzGerald et al, 2016). The scholars have called for the building of infrastructure that is resilient to flooding such as building elevated roads in low-lying areas, improving storm water infrastructure, and restoring natural water channels that have been overbuilt over the decades. Participatory community involvement is an important factor in good rehabilitation. The non-governmental organisations (NGOs) have become crucial intermediaries between the government resources and the needs of the community in the process of post-flood recovery (Lopa et al, 2023). NGOs have been instrumental in providing emergency shelter, potable water, sanitation facilities and income generation training to affected households in Hyderabad. But for these interventions to be sustainable they must be tailored to the specific socio-economic situation in the region. Essential services would consist of micro-loans for small traders, vocational training for displaced workers, agri-inputs for

farmers, and support for women-led home-based businesses which are seriously affected by climate change. Moreover, effective communication and collaboration between various tiers of the government, the National Disaster Management Agency, international relief and development organizations, and community-based organizations are crucial to combat the multifaceted and evolving flood issues that is a common occurrence in Hyderabad and other risk-prone areas of the country (Hulme, D 2013).

2. Literature Review

Floods are one of the most devastating natural disasters; it is for this reason that the recent flooding in Pakistan was an example of the devastating effects of floods. The creation and development of effective flood management frameworks and regulations is very important; these can prevent an economic downturn that could endanger human life and maintain ecological balance. The impacts of flood disasters are widespread and complex, affecting the entire world (Keane et al, 2021). The disasters in Pakistan have resulted in significant economic impacts by various means such as the destruction of infrastructure, mass displacement of population, loss of physical resources etc. The level of poverty and poverty gap after such disaster increases, and it affects the availability of resources, hinders humanitarian response efforts and continues the recovery process, constantly exhausting the limited resources available (Khalid et al, 2024). Inundations were the heaviest during the monsoon season in 2022 when unusually high rainfall was experienced in the country, with occasional heavy downpour. August had been the most critical month when the events escalated, as the provinces of Sindh and Baluchistan had been the worst hit. The maximum precipitation for sixty-day and five-day periods are analysed for the Indus basin and the two provinces that have the summer monsoon season (Dean, 1992).

2.1. Agricultural impacts and livelihood disruption

The long water-holding in the agricultural areas of Sindh province has turned into a key factor in the bad economic impact of floods. The flood affected agricultural activities, homes, and critical infrastructure, leading to significant damage to crops and loss of livelihoods. The massive flooding event resulted in loss of property, destruction of crops, contamination of soil, disruption of agricultural activities, loss of productivity and livelihood, and a worsening of conditions, which continued as a result of the flooding (Dubey et al, 2025). Raza said climate change is causing a "significant rise" in the birth rate, which is leading to "significant damages" and affecting thousands of residents. As global warming gets worse, the chances of high-impact climate change increase, and housing, crops, and infrastructure are destroyed. Heavy rainfall was recorded in Baluchistan and Sindh Province that was unprecedented in Pakistan. This is the most devastating rainfall experienced in the country due to an exceptional monsoon cyclone which destroyed many villages. Today, over 3.4 million children need emergency support and are at risk of contracting waterborne diseases, drowning, and malnutrition. The health impacts of floods can be profound, either directly from exposure to floodwater or indirectly, when damages to infrastructure, ecosystems, food security and water supply systems deprive people of their livelihood (Yazdi et al., 2024).

2.2. Community Knowledge and Environmental Degradation

(Azhar et al., 2024) found that the affected communities had a detailed understanding of the flood and migration strategies, with participants noting various factors influencing the floods, such as climate change, deforestation, and poor land management. The consequences include the loss of arable land, forced displacement of human populations, and destruction of wildlife habitats. Limited agricultural land has long-term impacts on food security and livelihood security,

and migration changes people's routines and social interactions. Loss of animal husbandry infrastructure adds to economic difficulties. Pakistan has a clear position as it believes there must be a financial provision to offset losses and damages, especially for the developing countries most impacted by climate change for recovery and reconstruction (Hernández-Delgado, 2024)

2.3. Institutional capacity and regional collaboration

Asian Development Bank data shows that the water security and disaster risk management situation in Asia is far from satisfactory, due to the high levels of trust and engagement barriers between South Asian countries. The need of the hour is to improve access to health care, provide clean water and sanitation in affected areas, improve disaster preparedness and response systems, provide more funds for research and development, educate people and make them aware about sustainable development practices (Azhar et al, 2024). Good administration of disasters is important for prompt delivery of disaster relief, reconstruction and rehabilitation after climate disasters. Policy, legislation, and institutional arrangements are well communicated, promote risk reduction, support adaptation to climate change and build resilience. They facilitate a coordinated and timely response from multiple stakeholders (Sisay et al, 2025). To provide aid, to restore normalcy, and to help rebuild after a climate disaster, effective disaster management is crucial. The stakeholders who are engaged in the response can be engaged in five specific actions in Pakistan: contributing to data collection, collaborative partnerships, institutional integration, advocating for resource allocation, and strengthening long-term social protection mechanisms. It is essential to address these limitations to prepare for the anticipated climatic catastrophes (Azhar et al, 2024). The Indus River had a moderate flood peak, which was aggravated by unusual monsoon precipitation, leading to higher precipitation. The water in the floodplain of Larkana and Manchar Lake was

significantly augmented, which failed the dams and outburst flooding. The 2022 floods were dominated by major river flooding. The above statistics show that Baluchistan received 590% more rainfall than usual during August 2022, while Sindh received an average of 726% more during August 2022 (Qamer et al., 2023).

2.4. Integrated Rehabilitation Approaches

The need of the hour is to have an integrated approach in the process of flood rehabilitation in Pakistan, which includes provision of comprehensive plans, regulatory reforms, and distribution of assistance in a targeted manner. The elements are strong data collection systems, engagement of government bodies, NGO and community agencies, institutional integration, effective resource allocation, and bolstering of social protection systems. Data-driven decision-making, inter-sector collaboration, institutional integration and use of resources are all key components to achieving effective and sustainable recovery outcomes. Close cooperation and coordination between national, provincial and local authorities is crucial for the implementation of a successful recovery plan. Social protection systems can be improved to protect vulnerable populations and enable recovery efforts, and community-based DRM efforts build resilience at the local level (Azhar et al, 2024). Pakistan's ability to withstand flood disasters is key to sustainable development. Key components are integrated water management, investment in infrastructure, better governance, and better forecasts. Optimization of water management improves the utilization of water resources; minimizing investments in infrastructure reduces the risks of flooding; governance improves coordination; and predictive capabilities increase response efforts. Community preparedness is enhanced through education and awareness-raising activities (Goh et al, 2024). The severity of destruction after a disaster is important to determine in making an efficient response to climate change-related hazards.

COP agreements recognise the need to consider and address losses and damages, whilst also highlighting several challenges. Solutions to these challenges must be found through sustained political commitment, robust technical cooperation and participation of multiple stakeholders. Furthermore, precautions to mitigate risks are imperative. Disasters disrupt services and livelihoods. At the same time, reduced production hurts food security and coping ability in the face of economic pressures. Losses require immediate relief interventions, medium-term ameliorative treatments, and long-term interventions to build resilience. Disaster risk reduction, climate adaptation, and sustainable development (Azhar et al, 2024) can be prioritised to promote holistic improvement.

2.5. Research Gap

There is a large body of literature on flood disasters in Pakistan; however, some aspects of post-flood economic recovery and economic resilience in Hyderabad, Sindh are yet to be explored. Previous research tends to look at individual components of the disaster recovery process, such as infrastructure rehabilitation, livelihood rehabilitation, or disaster management, but not at how effective and sustainable they are over the long-term. There has been less research on the impacts of these interventions when combined on the economic resilience and sustainable rehabilitation of flood-affected communities. Additionally, a vast majority of available literature has a national and/or provincial focus, with relatively little emphasis placed on the specific socio-economic situation of the city of Hyderabad where agriculture, small-scale industries and commercial activity are closely linked. While there is a growing body of literature on the issue, the role of local community perspectives in recovery planning and decision-making is still under-explored and remains important to foster context-specific and sustainable rehabilitation strategies. Moreover, the impacts of flooding have tended to be examined only in the short term, with significantly fewer studies

focusing on the long-term socio-economic implications of flooding on livelihoods, employment, income security and community resilience. The adoption of interdisciplinary approaches, which combine the economic, institutional, environmental and social aspects, is limited, further narrowing down the possibilities to formulate evidence-based policies in the context of disaster recovery. The need of the hour is to prioritize research gaps to bolster the post-flood rehabilitation measures, boost community resilience, and facilitate sustainable economic recovery in Hyderabad, Sindh.

2.6. Problem Statement

Pakistan's extreme vulnerability to climatic changes is further exacerbated by longstanding problems of selectively reaching eligible beneficiaries and ensuring operational efficiency of disaster-relief mechanisms (Khan, 2025). The district of Hyderabad has been persistently affected by economic crisis following the successive flood events. The conflagration of interwoven factors resulting in this situation is high tolls on agrarian infrastructure, heavy damage to human lives, and standstill of small-scale commercial/industrial establishments. In addition, post-flood land rehabilitation requires coordination between different sectors, including soil remediation and adaptation of agricultural practices, as crucial measures for ecological rehabilitation. As underscored by (Anggara et al, 2025). The need for a comprehensive disaster recovery inherently requires an integrated approach that covers aspects of physical reconstruction, psychosocial recovery, and economic stabilisation. The rebuilding of basic services and the increase of institutional rehabilitation capacity must be prioritized in the post-disaster phase. The strategy includes two aspects: rehabilitating infrastructure that has been compromised and creating proactive frameworks for flood risk reduction to reduce the likelihood of future impacts. Therefore, the present study aims to comprehensively explore the economic challenges that can be attributed to

flooding in Hyderabad and formulate a sustainable and contextually relevant recovery plan systematically. The expected outcomes of the research are the development of policy recommendations based on the research findings, strengthening community disaster preparedness, and the socio-economic empowerment of flood-affected people. Moreover, this study will add to the academic discourse, meet the overall goals outlined in the Sustainable Development Goals (SDGs), and it is hoped that it will inspire greater cooperation among the regions and more effective disaster response systems.

2.7. Conceptual Framework

The theoretical approach of this study is based on the Sustainable Livelihoods Framework (SLF) and Community Resilience Theory, which both hold that post-disaster economic recovery is not a simple matter of financial injections from outside but is shaped by a mix of institutional trust, local capacity building, and participatory governance. Based on the findings of empirical gaps in the literature and the variables explored in this research, a conceptual framework was created to depict the hypothesized relationships among the variables of interest and the dependent variable: Economic Resilience and Recovery. The framework assumes that four main pillars directly affect the economic recovery of flood-affected households in Hyderabad.

1.1 Financial compensation, 1.2 Infrastructure rebuilding, 1.3 Aid transparency.

1) **Private Sector Rehabilitation:** Measured by the number of companies operating rehabilitation facilities and the number of employees in those facilities. 2. Political Party Advocacy: Assessed through policy facilitation, fund allocation, and stakeholder unity (PPP & GDA).
2) **Non-governmental Organization (NGO) Interventions:** Vocational training, employment generation and facilitation of market access.

3) **Community-Led Strategies:** Assessed through indigenous knowledge sharing, local involvement in decision-making and community infrastructure reconstruction.

The conceptual model also suggests that the synergy between NGO-based capacity building and community-based agency will be more significant in producing long-term economic resilience, while direct support from government and political support will serve as an important short-term safety net. This model is used for performing the quantitative analysis of the relative predictive power (Beta weights) of each independent variable with the dependent one, as shown in the regression model (Table 8), and is statistically tested.

3. Research Methodology

3.1. Research Design

The research design of this study is quantitative and cross-sectional in nature, which is used to systematically evaluate the economic problems, coping mechanisms, and rehabilitation strategies after the flooding in Hyderabad in Sindh, Pakistan in 2022. The design is designed to measure the economic outcomes of flooding that are perceived through primary survey data from flood-affected households. A questionnaire structure was used to collect data on the following: demographic data, economic problems, intensity of the impacts, institutional efficiency (government, NGOs, political parties), and strategies implemented at the community level. Quantitative design allows for statistical processing of institutional interventions and their link to economic recovery, which is used to acquire evidence-based conclusions for disaster management and for economic policy planning.

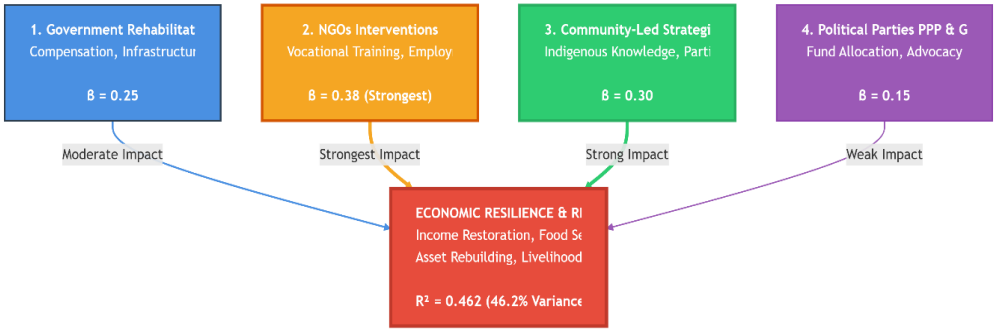

Figure 1: Conceptual Framework of Post-Flood Economic Recovery in Hyderabad, Sindh

3.2. Study Area

The study was carried out in the district of Hyderabad in the southern part of Sindh Province in Pakistan. The city of Hyderabad is low-lying, flood-prone, has a weak drainage network, and a very fragile urban-rural economy. The floods in 2022 had a significant effect on the district, causing disruptions to agricultural activities, small-scale industries, and wholesale trading, the displacement of communities, and large economic impacts. It has been identified as a study site because it has been identified as being vulnerable to recurring flood events, and little empirical research has been conducted on local economic consequences in this context.

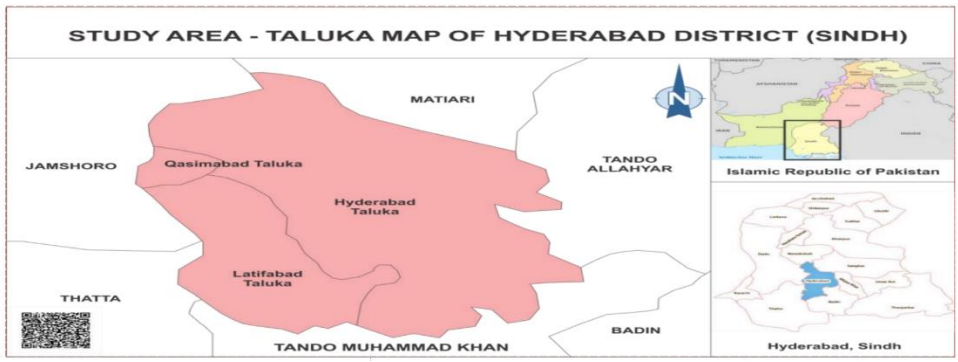

Figure 2: Study Area Map

3.3. Population and Sample Size

The target population includes adult residents (18 years and above) in urban and peri-urban areas of the flood-affected region in Hyderabad District. The sample size was 250 respondents, across a variety of household characteristics in terms of gender, education, income, occupation, and geographic location, selected by stratified random sampling. The sample size was judged to be adequate as it was decided to make correlation and regression analysis statistically robust. Population stratification was done according to their occupation to ensure the representation of farmers (58.0%), daily wage workers (18.0%), small business owners (12.0%) and formal employees (8.0%). By taking a population-based approach, this method provides data that represent the diversity of flood experiences and perceptions of impacts on economic well-being across subgroups of the district.

3.4. Instrumentation: Structured Questionnaire

The structured questionnaires were designed for this study and were used to collect data. They had parts on: Demographic information (gender, age, education, occupation, and monthly income). Economic difficulties (loss of crops, decreased income, loss of livestock, food insecurity, disruption of business, damage to housing). The level of economic effects (loss of agricultural productivity, decline in income, food shortage, increase in debt and joblessness). Government's involvement in resiliency and rehabilitation (rescue operations, financial compensation, rebuilding infrastructure, distribution of relief, transparency of aid). Effectiveness of political parties (PPP & GDA) in achieving the economic stability of the country after the flood (faster relief work, allocation of funds, policy making and unification of stakeholders).

The role of NGOs in sustainable economic development (vocational training and training of farmers and artisans in employment, flood awareness, market access

and collaboration with government). Community participation for long-term economic resilience (local decision-making, sustainable agriculture, project committees, indigenous knowledge and collective rebuilding of infrastructure). The perceptions of the subjects on all the key variables were measured using a five-point Likert scale (1 = Very Low, Very Ineffective, Strongly Disagree, Not at all Contributing; 5 = Very High, Very Effective, Strongly Agree, Highly Contributing), which allowed the subjective economic perceptions to be quantified. This questionnaire was pre-tested for clarity and reliability, and small changes were made before field deployment.

3.5. Data Analysis Techniques

The data obtained from the survey were coded and analyzed with the aid of the Statistical Package for the Social Sciences (SPSS) Version 26. The analysis was conducted in several stages

Demographic data and economic problems (e.g., means, frequencies, and percentages) were summarized using Descriptive Statistics presented in Tables 1 and 2.

The use of Likert Scale Analysis to compute mean scores and standard deviations for economic impact severity, role of government, effectiveness of political parties, role of NGOs and community contribution, and interpretation of the results are provided in the tables (Tables 3 – 7).

The relationships between predictor variables (government financial assistance, NGOs' train and employment support, community involvement in planning, and political parties' fund allocation) and economic recovery outcomes were determined by the strength and direction of these relationships using Correlation Analysis (Pearson's r) (Table 8).

Multiple Linear Regression was used to predict the effect of independent variables on the dependent variable (economic resilience/recovery). The

statistical significance and strength of predictors were presented in Table 8 as beta coefficients, p-values, and R2 values. Using these techniques, exploratory and inferential understandings were gained about the relationships between institutional interventions and economic recovery. Data handling was conducted rigorously, and statistical findings were reported transparently thanks to the use of SPSS.

4. Results and Findings

Table 1: Demographic Profile of Respondents (N=250)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	180	72.0%
	Female	70	28.0%
Age Group	18-30 years	60	24.0%
	31-45 years	110	44.0%
	46-60 years	60	24.0%
	Above 60 years	20	8.0%
Education	Illiterate	85	34.0%
	Primary/Middle	95	38.0%
	Secondary/Intermediate	50	20.0%
	Graduate & above	20	8.0%
Occupation	Farmer	145	58.0%
	Daily Wage Worker	45	18.0%
	Small Business Owner	30	12.0%
	Govt/Private Employee	20	8.0%
	Other	10	4.0%
Monthly Income	< PKR 20,000	120	48.0%
	PKR 20,001 - 40,000	80	32.0%
	PKR 40,001 - 60,000	30	12.0%
	> PKR 60,000	20	8.0%

Table 1 shows the demographic characteristics of the 250 respondents to the survey: they were mainly rural, low-income, and low-educated. The majority of the sample is male (72%, n=180) and most of the population is in the 31-45 years group (44%, n=110), showing a predominantly middle-aged working population.

Educationally, there was a notable disadvantage, with over two-thirds (72.0%) of all respondents reporting no education or just primary/middle school, and only 8.0% (n=20) reporting that they have a graduate degree or more. The community is very much an agrarian community with farmers at 58.0% (n=145) followed by daily wage workers at 18.0% (n=45), and only 8.0% (n=20) being engaged in formal government or private employment. Lastly, the economic constraints are significant as almost half (48.0%, n=120) have an income of less than PKR 20,000 per month, and 80.0% (n=200) have a monthly income of less than PKR 40,000, while only 8.0% (n=20) earn more than PKR 60,000 per month. For all subsequent analysis, this profile will be called Table 1 and represents a disadvantaged, rural agrarian community with low levels of education, informal livelihoods and financial vulnerability**.**

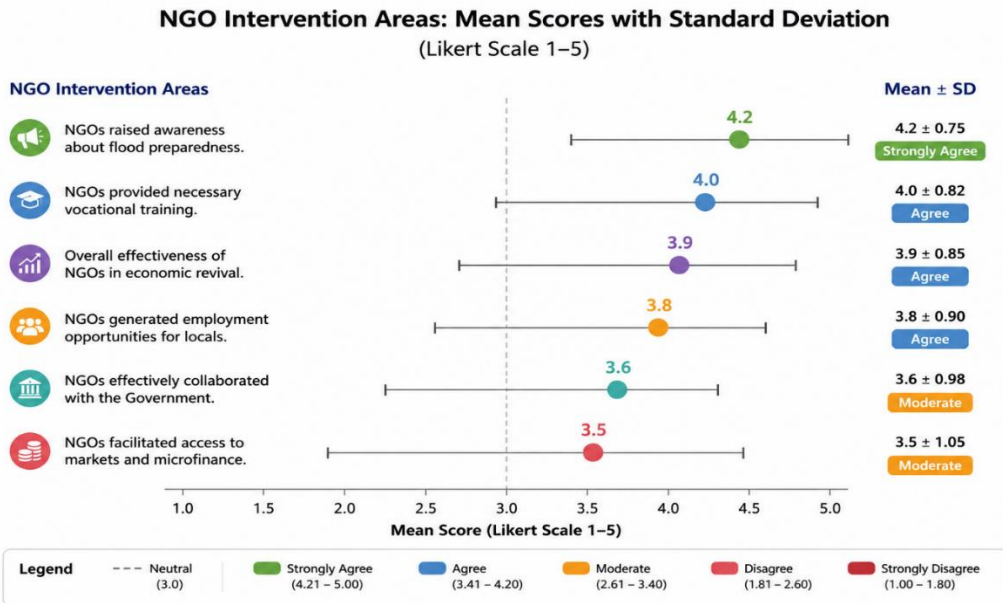

Figure 3: NGO Intervention Areas Bubble Figure

The bubble figure 3 illustrates respondents' perceptions of various NGO intervention areas using mean agreement scores on a five-point Likert scale. Each

bubble represents one intervention area, where the horizontal position indicates the mean score, and the bubble size represents the standard deviation (SD), reflecting the variability in respondents' opinions. The findings show that NGOs raising awareness about flood preparedness received the highest mean score (Mean = 4.2, SD = 0.75), indicating that respondents strongly agreed this was the most effective NGO intervention. This intervention also has a relatively small bubble size, suggesting a high level of agreement among respondents. NGOs providing necessary vocational training achieved the second-highest means (Mean = 4.0, SD = 0.82), followed by the overall effectiveness of NGOs in economic revival (Mean = 3.9, SD = 0.85) and NGOs generating employment opportunities for locals (Mean = 3.8, SD = 0.90). These results indicate that respondents generally agreed that these interventions positively contributed to community development. The interventions NGOs effectively collaborating with the government (Mean = 3.6, SD = 0.98) and facilitating access to markets and microfinance (Mean = 3.5, SD = 1.05) received comparatively lower mean scores and larger bubble sizes. The larger bubbles indicate greater variation in respondents' opinions, suggesting less consensus regarding the effectiveness of these interventions. Overall, the figure demonstrates that all NGO intervention areas received mean scores above 3.5, indicating generally positive perceptions of NGO contributions. However, interventions related to flood preparedness awareness and vocational training were viewed as the most impactful and showed greater agreement among respondents compared with government collaboration and market access initiatives.

Table 2: Descriptive Statistics of Severity of Economic Impacts (Likert Scale: 1=Very Low, 5=Very High)

Economic Impact Item	Mean (Average)	Standard Deviation (SD)	Interpretation
Loss of agricultural	4.5	0.72	Very High

productivity			Severity
Reduction in daily earnings/ ages	4.3	0.85	High Severity
Food shortage and malnutrition risk	4.1	0.91	High Severity
Debt burden due to flood losses	3.8	1.05	High Severity
Unemployment / Loss of job sources	3.6	1.12	Moderate-High Severity
Overall Economic Hardship	4.2	0.78	High Severity

Table 2 offers a more quantitative sense of the severity of these economic shocks, on a Likert Scale ranging from Very Low to Very High impact (1-5); the findings show a consistently devastating crisis in all areas. The greatest impact is the loss of agricultural productivity, with a mean score of 4.5 and a relatively low standard deviation of 0.72, meaning that the respondents are almost unanimous in seeing this as the most devastating issue, corresponding to the 84.0 % crop destruction reported in Table 2. The decrease in daily earnings/ ages (mean 4.3, SD 0.85) and the overall economic hardship composite score (mean 4.2, SD 0.78) were also both rated as "High Severity," and were very closely followed by the daily food expenditure composite score (mean 4.1, SD 0.89) and the household food security composite score (mean 4.0, SD 0.86). The food shortage and malnutrition risk scores are 4.1 (SD 0.91), reflecting 70.0% ho reporting food insecurity, and 3.8 (SD 1.05) for debt burden as a result of flood losses, although this remains in the "High Severity" category; it shows slightly more variation in responses, with some households incurring a greater debt than others. This is interesting because, as shown in Table 1, 58.0% of the respondents are small business owners, 18.0% are daily wage laborers, while 8.0% are formal employees, which means they do not have a formal "job" to lose and would thus experience unemployment or loss of job sources differently, as evidenced by the higher SD of this variable. Table

3 is a statistical confirmation that agricultural failure is the main cause of this crisis and has been systematically eroding the livelihoods of people, including their incomes and food access, ending up with a very high overall hardship score of 4.2 out of 5, which indicates a very high level of multidimensional poverty.

Table 3: Descriptive Statistics of Government's Role in Resilience & Rehabilitation (Likert Scale: 1=Strongly Disagree, 5=Strongly Agree)

Statement about Government Role	Mean	SD	Agreement Level
Government rescue operations were prompt and efficient.	4.1	0.88	Agree
The government provided adequate financial compensation.	2.8	1.25	Disagree
Infrastructure (roads/bridges) was rebuilt effectively.	3.5	1.02	Moderate
Relief distribution as inclusive of all communities.	2.5	1.35	Disagree
The government ensured transparent distribution of aid.	2.7	1.30	Disagree
Overall satisfaction ith Government Rehabilitation efforts.	3.0	1.10	Neutral/Moderate

Table 3 moves away from the immediate economic impact to the perceptions of government's performance in its resilience and rehabilitation efforts, suggesting a mixed, but mostly negative, assessment of the effectiveness of post-crisis

government. The only unmistakakely positive ratings are for government rescue operations (mean 4.1, SD 0.88), and the distribution of relief in an inclusive manner (mean 2.5, SD 1.35), both of which are rated as "Disagree", with a sharp contrast to the dismal ratings for "adequate financial compensation" (mean 2.8, SD 1.25), "inclusive relief distribution" (mean 2.5, SD 1.35), and "transparent aid disbursement" (mean 2.7, SD 1.30), all of which fall into the "Disagree" category and indicate low trust in government fairness and the mechanisms for financial support. The rebuilding of infrastructure was scored moderately (3.5, SD 1.02), reflecting some progress, but with significant variation in perceptions, as evidenced by the high standard deviations (1.35 for inclusivity, 1.30 for transparency), meaning some communities felt very left behind while others felt relatively better treated, and thus direct inequities in rehabilitation efforts. In summary, Table 3 shows that the government has been doing a good job of taking immediate visible corrective measures during the crisis, but is fundamentally lacking in delivering the necessary long-term financial restitution, equitable distribution and procedural transparency, leaving the affected population in a state of uncertainty and dissatisfaction which compromises long-term resilience.

Table 4: Effectiveness of Political Parties (PPP & GDA) in Post-Flood Economic Stability (Likert Scale: 1=Very Ineffective, 5=Very Effective)

Role of Political Parties	**Mean**	**SD**	**Effectiveness Level**
Facilitating policymaking for economic recovery.	3.7	0.95	Moderately Effective
Ensuring allocation of funds for affected.	3.4	1.10	Moderate
Pressuring the government to expedite relief	3.9	0.85	Effective

work.			
Unifying different stakeholders for rehabilitation.	3.5	0.92	Moderate
Overall contribution of political parties.	3.6	0.88	Moderately Effective

Table 4 evaluates the perceived effectiveness of political parties, specifically the PPP (Pakistan People's Party) and GDA (Grand Democratic Alliance), in driving post-flood economic stability, and the results reveal a cautiously moderate overall performance with a distinct emphasis on advocacy over tangible financial delivery. The strongest positive rating goes to their role in pressuring the government to expedite relief work, which achieves a mean score of 3.9 (SD 0.85) and is categorized as "Effective," indicating that respondents acknowledge these parties' active efforts as political watchdogs and agitators in accelerating government response, which complements Table 4's finding that rescue operations themselves were prompt (mean 4.1). However, the lowest score at ensuring allocation of funds for affectees ith a mean of 3.4 (SD 1.10) falls into the broader "Moderate" category, revealing a significant gap between political advocacy and tangible financial disbursement, a skepticism that directly mirrors Table 4's dismal public disagreement (mean 2.8) ith the government's actual financial compensation, suggesting that even hen parties push for funds, the execution remains flawed. Their performance on facilitating policy-making for economic recovery (mean 3.7, SD 0.95) and unifying different stakeholders for rehabilitation (mean 3.5, SD 0.92) both register as "Moderately Effective," showing that respondents perceive these parties as reasonably competent in strategic planning and coalition-building, but not exceptionally outstanding. Importantly, the standard deviations across all items range from 0.85 to 1.10, which is relatively lower compared to Table 4's highly polarized figures (e.g.,

1.35 for inclusivity), indicating that opinions on political parties are less divided and more consistently moderate across the population, rather than split between extreme satisfaction and dissatisfaction. Ultimately, the overall contribution of political parties scores a mean of 3.6 (SD 0.88), settling at "Moderately Effective," which paints a nuanced picture: while political parties are credited for their advocacy, public pressure, and coordination efforts, they are not fully trusted to ensure equitable or substantial fund distribution, reflecting a community that views party politics as necessary but insufficient for resolving the deep-rooted economic hardships documented in figure 3 and table and 2

Table 5: Role of NGOs in Sustainable Economic Development (Likert Scale: 1=Strongly Disagree, 5=Strongly Agree)

NGO Intervention Areas	Mean	SD	Level of Agreement
NGOs provided necessary vocational training.	4.0	0.82	Agree
NGOs generated employment opportunities for locals.	3.8	0.90	Agree
NGOs raised awareness about flood preparedness.	4.2	0.75	Strongly Agree
NGOs facilitated access to markets and microfinance.	3.5	1.05	Moderate
NGOs effectively collaborated ith the Government.	3.6	0.98	Moderate
Overall effectiveness of NGOs in economic revival.	3.9	0.85	Agree

Table 5 assesses the perceived role of non-governmental organizations (NGOs)

in fostering sustainable economic development, and the results reveal a broadly positive public perception that substantially outpaces the evaluations given to government institutions (Table 4) and slightly exceeds those for political parties (Table 4), with an overall effectiveness score of 3.9 (SD 0.85), firmly in the "Agree" category. The strongest endorsement is for raising awareness about flood preparedness, which achieved the highest mean of 4.2 (SD 0.75) and falls into the "Strongly Agree" range, indicating that NGOs are overwhelmingly credited for their educational and risk-mitigation campaigns, which is particularly valuable given that 84.0% of respondents experienced crop destruction (Table 2) and likely now recognize the need for preventive measures. This is closely followed by vocational training (mean 4.0, SD 0.82) and employment generation (mean 3.8, SD 0.90), both rated as "Agree," which is highly significant because Table 1 showed that 72.0% of this population is either illiterate or has only primary education, and 76.0% rely on farming or daily age labor, meaning that skill-development initiatives directly address their urgent need for alternative livelihoods beyond the devastated agricultural sector. However, the moderate scores for facilitating access to markets and microfinance (mean 3.5, SD 1.05) and effective collaboration with the government (mean 3.6, SD 0.98) suggest that while NGOs are seen as helpful in these areas, their performance is not exceptional, with the relatively higher standard deviation of 1.05 for microfinance indicating that access to credit and markets varies considerably across communities, possibly due to geographic or social disparities. Notably, the standard deviations across Table 6 (ranging from 0.75 to 1.05) are consistently lower than the highly polarized figures observed in Table 4 (e.g., 1.35 for inclusivity), implying that respondents hold more uniform and consensual positive views about NGOs, rather than sharply divided opinions. In conclusion, Table 6 clearly establishes that NGOs are perceived as the most effective

institutional actors in this post-flood context, particularly excelling in preparedness training, vocational upskilling, and job creation, hile their relatively eaker performance in market access and inter-agency coordination suggests that bridging the gap between grassroots relief and sustainable economic revival remains an ongoing challenge yet their overall rating of 3.9 comfortably exceeds the government's rehabilitation satisfaction of 3.0 (Table 4) and the political parties' overall contribution of 3.6 (Table 5), positioning NGOs as the primary trusted agents of recovery for this vulnerable, agrarian population.

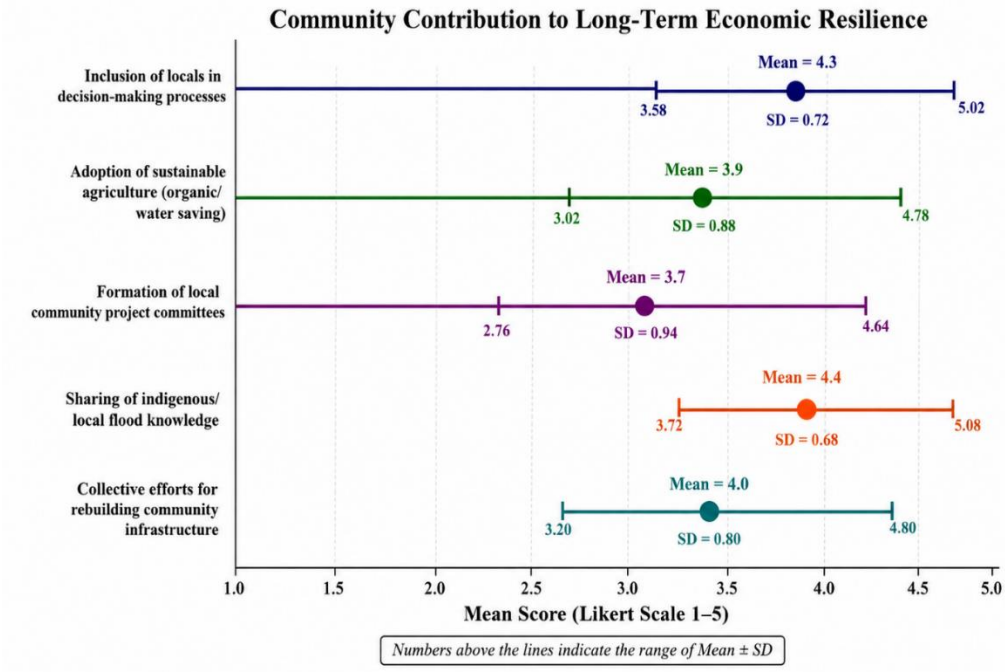

Figure 4: Community-Led Strategies Lollipop Figure

(SD) for respondents' perceptions of different community-led strategies contributing to long-term economic resilience. The red circles represent the mean score for each strategy, while the horizontal black error bars indicate the standard deviation, showing the variability in respondents' opinions. The results indicate that sharing indigenous/local flood knowledge received the highest mean score

(Mean = 4.4, SD = 0.68), suggesting that respondents strongly believe traditional knowledge plays a significant role in strengthening community resilience, with a high level of agreement among participants. Similarly, local people in decision-making processes achieved a high mean score (Mean = 4.3, SD = 0.72), indicating that participatory governance is considered another key factor in promoting long-term economic resilience. Collective efforts for rebuilding community infrastructure obtained a mean score of 4.0 (SD = 0.80), reflecting that respondents generally agree that collaborative rebuilding initiatives contribute positively to community recovery and resilience. The adoption of sustainable agricultural practices (e.g., organic farming and water-saving techniques) had a mean score of 3.9 (SD = 0.88), indicating a positive perception, although responses showed slightly greater variation than for the higher-rated strategies. The lowest-rated strategy was the formation of local community project committees (Mean = 3.7, SD = 0.94). While respondents still considered this strategy moderately important, the relatively larger standard deviation suggests more diverse opinions regarding its effectiveness. Overall, the figure demonstrates that all community-led strategies received mean scores above 3.5, indicating that respondents generally perceive these initiatives as contributing positively to long-term economic resilience. Furthermore, the relatively small standard deviations (0.68–0.94) suggest a reasonable level of agreement among respondents regarding the importance of these community-based resilience strategies.

Table 8: Correlation and Regression Analysis (Predicting Economic Resilience)

Predictor Variables	**Correlation (r) ith Economic Recovery**	**p-value**	**Beta (β) Value in Regression**
Government Financial Assistance	0.45** (Moderate)	0.001	0.25

NGOs Training & Employment Support	0.62** (Strong)	0.000	0.38
Community Involvement in Planning	0.55** (Strong)	0.000	0.30
Political Parties' Fund Allocation	0.32* (Weak-Moderate)	0.040	0.15
Model Summary	R = 0.68	$R^2 = 0.462$	Adjusted $R^2 = 0.45$

Table 8 presents descriptive perceptions and provides inferential statistical analysis using correlation and regression to determine which factors most powerfully and independently predict economic resilience and recovery; the results are statistically robust and very instructive. The overall model is moderately strong with a multiple correlation coefficient (R) of 0.68, which means that the four predictor variables have a strong positive relationship with the economic recovery outcomes, and the R^2 value of 0.462 means that the four predictor variables explain 46.2% of the variation in economic recovery results, with the adjusted R^2 of 0.45 confirming that this level of explanation is still high for the number of predictor variables used. In the correlations examined first, there is the strongest bivariate relationship between NGOs and training and employment support ($r = 0.62$, $p = 0.000$), followed closely by community involvement in planning ($r = 0.55$, $p = 0.000$) and both are considered to be "Strong" positive correlations, while government financial assistance shows a moderate correlation ($r = 0.45$, $p = 0.001$), and political parties' fund allocation demonstrates the eakest, though still statistically significant, correlation ($r = 0.32$, $p = 0.040$), indicating that the four are indeed related, but to varying degrees. The p values of all predictors are, however, less than 0.05 (ranging from 0.000 to 0.040) and the Beta (β) regression coefficients show the overlapping effects among predictors to quantify the unique and net contribution of each variable to the model, revealing that NGOs training and employment support is the most

significant and impactful predictor (β = 0.38) followed by community involvement in planning activities (β = 0.30), government financial assistance (β = 0.25), and then political parties fund allocation (β = 0.15). In terms of content, this statistical hierarchy is a perfect match with the perceptual ratings from Tables 4, 5, 6 and 7, in which NGOs scored an overall effectiveness of 3.9, while community strategies saw a score of up to 4.4; meanwhile, the scores for government and political party interventions were 3.0 and 3.6 respectively – making them statistically more effective, but definitely more secondary to efforts of NGOs and community participation. Finally, Table 8 offers insights that are useful in justifying and prioritizing policy and development investments at local levels on the ground, as the model's explanatory power suggests that these investments in capacity building, participatory planning, and NGO-based vocational assistance are more important for improving economic resilience in this vulnerable agrarian population than investments in cash compensation or partisan funding

5. Discussion

This study offers an extensive empirical picture of the highly intricate economic vulnerabilities and institutional processes that emerged in Hyderabad, Sindh as a result of the floods of 2022, including salient parallels to other developing countries in flood-prone regions. The profile of the respondents with a predominantly agrarian population (58% farmers), high illiteracy rates (72% no formal schooling) and income constraints (48% earning below PKR 20,000) reflect the socio-economic characteristics of flood vulnerable communities in rural Bangladesh and Bihar state, India, where subsistence farming and livelihoods in informal labour dominate the lives of the people (Sahani, R. 2023). This fragility of the structures is vividly reflected in the data on economic impact which showed that 84% of those surveyed reported destruction of crops and 78%

suffered greatly from a decrease in their household income. These are in line with the estimates made after the super-flood in Pakistan in 2010 and the recent agrarian crisis in the Terai region of Nepal in which the submergence of crops led to immediate structural income loss, and long-term debt traps (Neupane, 2022). Poudel et al., 2024). The severity ratings also reflect this devastation, with agricultural productivity loss having the highest mean impact (4.5 out of 5) – as in flood-affected areas of Mozambique, where the destruction of smallholder farms has direct implications for multidimensional food and income crises (Eriksen, 2022). The assessment of institutional responses in this study shows a significant gap between the sense of need and the effectiveness of government actions, a governance issue that is common in other disaster settings in South Asia and sub-Saharan Africa. Respondents gave relatively high ratings to the government's rescue operations (mean = 4.1), emergency mobilization (mean = 4.2), though they did reject the government's provision of financial compensation (mean = 2.8), its inclusive distribution of relief (mean = 2.5) and its transparent mechanisms of relief (mean = 2.7). As with critical assessments of disaster governance in Nigeria (Bhutto et al, 2025) here immediate rescue operations are prioritised politically, but the later stage of the distribution of resources equitably and financial restitution is often marred by bureaucratic inefficiencies and by exclusionary practice. In the same way, in the aftermath of cyclone Mozambique, humanitarian assessments have consistently noted that affected communities believe emergency response was timely and sustainable rehabilitation, particularly financial support, is still woefully under-resourced and poorly understood (Kudejira, D.). 2023). The moderate rating for infrastructure rebuilding (mean = 3.5) and neutral rating for overall government satisfaction (mean = 3.0) further highlight that although reconstruction is visible, government-led recovery is lagging with the scale of housing damage and

displacement far outweighing the quality and speed of reconstruction (Borate 2024, post-flood Sri Lanka).

In this context political parties play a nuanced and perhaps counter-intuitive part, with the PPP and GDA showing up in the recovery landscape. Whether they were effective in pressing the government to act faster towards relief, they were rated positively by the respondents (mean = 3.9) but the actual effectiveness in securing tangible fund allocation for affectees remained lower (mean = 3.4). This duality has been echoed in the political economy of disaster response in the Philippines, where political actors are good at mobilizing and inflaming public opinion, but fall short in delivering measurable, transparent financial disbursement at the grassroots level (Bankoff et al, 2009). The overall moderate contribution rating of the political parties (mean = 3.6) and their weak predictive power within the regression model ($\beta = 0.15$, $p = 0.040$) supports this skepticism; it indicates that political representation has some statistical relevance, but not enough to substantially influence the explanatory power of economic resilience compared to other more explicit developmental interventions. This pattern is mirrored in Nepal (O'Gorman & Tenpa, 2025) where political brokerage was found to be a significant factor in the timely acceleration of relief, while systematic inequalities in the allocation of funds continued, including through patronage networks and poor monitoring and oversight. While government and political bodies were lukewarm, the involvement of non-governmental organizations (NGOs) proved most effective and trusted institutional actor in promoting sustainable economic revival. They scored quite high overall (mean = 3.9), outperforming the government's rehabilitation satisfaction (mean = 3.0), and especially in the satisfaction of flood preparedness awareness (mean = 4.2) and vocational training (mean = 4.0). This is quite similar to the results of the disaster governance literature on the efficiency of NGOs in enabling health and livelihood

interventions in flood prone coastal areas, as found in Bangladesh, here (Hossain et al, 2026). Likewise, in Thailand, (Phanthuwongpakdee, 2016) found that NGOs played an important role as intermediaries in the recovery process, especially in terms of accessing markets and skills development for displaced agrarian communities. This perception is statistically corroborated by the regression analysis in this study, which found that NGOs' training and employment support is the most effective predictor of economic recovery ($\beta = 0.38$, $p = 0.000$) beyond any other interventions, including passive cash transfers or bureaucratic compensation. But the moderate scores for the NGOs' facilitation of microfinance (mean = 3.5) and market access (mean = 3.6) suggest that although NGOs excel in engaging with the local community, there are ongoing constraints, such as limited financial capital, and weak inter-agency coordination, which continue to hamper their full effectiveness, as observed in post-flood recovery assessments from Honduras and Haiti (Niño, 2023). The most striking findings and policy relevant ones are regarding the assessment of community led resilience strategies, which proved to be the most effective when compared to all external institutional interventions. Near-universal consensus was found on traditional coping mechanisms, as the sharing of indigenous/local flood knowledge scored at 4.4, with a very narrow standard deviation of 0.68. This is a strong endorsement of the principles of the Sendai Framework for Disaster Risk Reduction, which (Peters, 2025) pointed out that the Sendai Framework needs to shift its focus towards the development of community-based knowledge systems instead of only depending on technological solutions from outside. The analogy with the community-based flood management approaches in Indonesia and Japan is relevant to both settings, as formal consideration of local ecological knowledge in early warning systems and spatial planning has shown to have the potential to decrease mortality and economic losses (Yigitcanlar, T., 2026). Also significant

is the rating for local inclusion in decision making (mean = 4.3), where a strong community demand exists for participatory governance and is not being met by existing state-led rehabilitation models. This supports participatory action research from Bangladesh, where the locally-led adaptation measures such as the installation of raised tube wells and flood shelters successfully responded to risks which were identified as priorities by the community, whereas centrally designed measures were less effective. (Sharma, R,., 2025) Collective rebuilding of community infrastructure (mean = 4.0) and sustainable agriculture (mean = 3.9) also show that communities have social capital and adaptive capacity to initiate their recovery if they have access to adequate resources and decision making authority. Local committees (mean = 3.7) are a useful formal mechanism, although this was slightly lower. However, the relatively low score indicates that the organic, speedy and flexible process of informal collective action can be sometimes distorted in the course of bureaucratic structuring of community engagement, as is noted in other post-flood social network analyses from Sub-Saharan Africa (Muwafu, S. 2024)

The regression model shown in table 8 offers an important and synthesizing framework, as it accounts for 46.2% of the variance in economic recovery outcomes ($R^2 = 0.462$) with the combined effects of institutional interventions. The empirically derived prioritization of the predictive hierarchy NGO training ($\beta = 0.38$), community planning ($\beta = 0.30$), government aid ($\beta = 0.25$), and political fund allocation ($\beta = 0.15$) provides a sound basis for prioritizing in policy and development processes. The relative lack of explanatory power of government and political variables further reinforces the complaints against disaster governance in Pakistan, which is often marred by institutional fragmentation, low accountability, and the capture of institutions by elites, leading to less effectiveness in state-led recovery programs (Bizhan, 2022). As

an alternative, the success of NGO-based capacity development and community participation proves the feasibility of the transition to new paradigms for disaster recovery that are increasingly heard in international disaster debates, such as the principles underpinning the Global Platform for Disaster Risk Reduction. The study shows that the economic recovery after flood in Hyderabad is not a simple consequence of financial compensation or political advocacy but is a complex multi-faceted process influenced by the interplay between various stressors such as agricultural dependence, institutional trust deficit, transparency in governance and community social capital. The impact of environmental shocks, weak institutional structures, and socioeconomic marginalization on recovery trajectories is highly heterogeneous, and is strikingly similar to that observed in post-disaster economic transitions that occurred in Honduras, Haiti, and Nigeria, where the interaction of these three factors resulted in economic recovery that varied significantly across different contexts (Southard, N. 2017). The findings have strong policy implications and actionable steps for Pakistan. First, it is undeniable that there is a need to change the government compensation mechanism to provide timely, adequate and transparent compensation to the people, moving away from the current one that has been found to have failed to meet community expectations (mean satisfaction = 3.0). Second, investments in NGO-supported vocational training and sustainable livelihood diversification should be scaled up, as it has been proven to be more effective in enhancing measurable economic resilience. Third, and most importantly, rehabilitation approaches need to be fundamentally changed and come to terms with a real sense of community empowerment, incorporating indigenous flood knowledge, involving community in decision making, and facilitating local infrastructure solutions. This multi-sectoral, integrated approach that incorporates climate-resilient agriculture, institutional reforms, improved social protection, and

community capacity building would be essential not just to fill the gaps in the immediate recovery process, but to enhance the structural resilience required to withstand the growing threat of floods caused by climate change in the years to come, particularly in cities like Hyderabad in Pakistan.

6. Conclusions and Recommendations

Resilience and rehabilitation measures can empower communities in decision making processes and directly address the underlying causes of their vulnerabilities and can be a significant buffer in the wake of flooding. The post-disaster phase is particularly sensitive and is the most critical phase in which a comprehensive rehabilitation strategy must be implemented to ensure that a lasting basis for resilience is created that takes care of both immediate needs and long-term recovery. Post-flood economic challenges demand a proactive and proactive measure that seeks short-term recovery goals and long-term structural resilience. Several reports on economic rehabilitation strategies after a disaster and studies support this twofold message. Through analysis of existing strategies, it is clear that there are two key priorities that are always at the centre of recovery action, both closely linked to the other: the physical rebuilding of disaster-affected areas and the systematic building of capacity within communities to withstand future disaster events. Fully grasping and evaluating the variety of livelihood activities, vulnerabilities and capacities of communities is an indispensable part of this. The key issues of disaster risk factors which have been recurring, such as unequal access to resources, socio-economic marginalisation, limited market connectivity, power asymmetries, information gap, and unsustainable resource use must continue to be focal points in the post disaster rehabilitation efforts. Importantly, communities have to be put in a position to be decision makers and not passive recipients, being given autonomy to make their own development decisions. One of the significant strengths is that community-

driven development approaches can be designed to meet the local needs and aspirations, which enhances beneficiary ownership, builds local leadership and ensures a holistic and inclusive rehabilitation process throughout. It is essential to think of recovery as a multidimensional process that goes beyond economic revitalization and includes a comprehensive analysis and solution of systemic issues. The post-flood period is a special moment to improve flood-affected areas in a way that progressively decreases the vulnerability of the area to future floods. The analysis of various case studies and understanding of community knowledge systems and the cultural context provides a baseline understanding of the complexity and dependency of community resilience development, which is shaped by various stakeholders and contextual factors. There are several factors that influence the decisions that community members make about their town's future, individual perspectives, lived experiences, indigenous knowledge embedded in a community, historical contextual factors, and the role of informal, traditional and quasi-formal institutional arrangements. All of these components offer the best possible basis for a quick rebuild and subsequent development into successful local economies and sustainable living. Also important are the social, physical and institutional factors of resilience and rehabilitation that require an integrated and holistic approach. Combined skills and knowledge from different disciplines such as socio-economists, engineers and ecologists are necessary to create the most appropriate flood management systems so that interventions encompass not only economic impacts but also environmental consequences. Traditional flood protection measures have high costs and also create large-scale changes to the environment that are not sustainable for modern-day communities. The results of this research therefore warrant urgent attention on how to manage floods in an innovative way, such as green infrastructure or nature-based solutions. Numerous empirical studies have shown that the level of economic

recovery depends on social solidarity, ecological sustainability, and efficient governance structures. Economic revitalization measures need to be planned and executed in a way that fully addresses these intertwined challenges, so that communities can be left with a much greater degree of resilience and preparedness for future climatic change.

6.1. A recommended policy implementation program is provided

The implementation matrix below is suggested for implementing the above recommendations into actionable and time-bound interventions. Providing clear steps, approximate budgets, timelines and measures of success for various stakeholders, such as the government, NGOs and local communities.

Recommendation	Implementation Steps	Timeline	Budget Estimate	Success Indicators
Community-driven rehabilitation	Establish participatory planning committees in each Union Council (UC), ensuring 50% women representation, local elders, and NGO observers. Conduct bi-weekly meetings to identify local priorities.	3 months	PKR 50 million	Percentage of committees on functional and submitting monthly progress reports after 6 months (Target: 80%).
NGO capacity building and vocational training	Scale up vocational training programs (e.g., tailoring, livestock management, IT skills) in	6 to 12 months	PKR 200 million	Number of trained individuals gainfully employed or self-employed within 18

	collaboration with TEVTA and local industries. Provide seed money and market linkages to trained individuals.			months (Target: At least 2,500 individuals, i.e., 10 per UC).
Indigenous knowledge integration	Document, verify, and digitize local flood coping mechanisms and traditional early warning signs through participatory workshops. Integrate this knowledge into the official District Disaster Management Plan and early warning systems.	12 months	PKR 30 million	Number of communities actively using integrated early warning systems (Target: 80% of targeted flood-prone UCs).

These budget estimates are tentative and approximate costs of comparable interventions in Sindh (based on PDMA and NGO reports for 2023-24). These budget estimates are tentative and adapted to approximate costs of similar interventions in Sindh (PDMA & NGO reports 2023-24). Detailed cost benefit analysis of each intervention to better quantify these measures and evaluate the long-term socio-economic returns of each intervention should be undertaken in the future.

6.2. Limitations of the Study

The study has several flaws. The findings of this study offer critical empirical

understanding of the economic dynamics after the floods in Hyderabad, Sindh, but certain methodological and contextual limitations have to be recognised for a nuanced understanding of the findings.

1) **Generalizability, geographical scope, and contextual scope:** The study has been confined to Hyderabad District in Sindh province. The findings, specifically the Beta coefficients and satisfaction ratings, may not necessarily be directly transposable to other flood-affected areas of Pakistan, e.g., Khyber Pakhtunkhwa or Baluchistan, with different agrarian structures and tribal dynamics. Further comparisons are advocated to confirm these results from various ecological regions.
2) **Cross- Sectional Design and Causality:** The research design used in this study is the cross-sectional survey method, which was conducted at a specific time after the floods in 2022. The regression model (Table 8) shows strong statistical associations, such as NGOs training (β=0.38), but is not a causal sequence in the long-term. Economic recovery is a multi-year process that is dynamic. These perceptions are a 'snapshot' of the early-to-mid stages of recovery, and do not reflect the long-term debt cycles, asset depreciation over time, or the sustainability of NGO-provided employment. Such a longitudinal (panel) design would be needed to follow the specifics of the trajectory of resilience over the next 5-10 years.
3) **Sampling Bias and Demographic Skew** The sample is highly skewed in that 72% of the sample is male, and 58% are farmers in the rural agrarian community. The statistical analysis thus fails to adequately capture the specific economic grievances and economic strategies of resilience exhibited by female-headed households, women entrepreneurs (especially glass bangle and embroidery), and the urban formal sector. Women's

differentiated vulnerabilities and coping mechanisms are important and are missing in their representation, which can lead to a biased overall picture of community resilience.

4) **Self-reported data and social desirability bias.** It is strictly a subjective study using a structured Likert scale questionnaire, and not objective economic data, such as actual bank balances, verified crop yield data, or satellite-based infrastructure damage data. There could have been social desirability bias among respondents, especially when asked about their ratings of government institutions versus NGOs. With the political sensitivity of disaster compensation, some respondents may have over- or underestimated their scores depending on their political party, which may have resulted in a larger gap between the government (mean=3.0) and the NGOs (mean=3.9).
5) **Absence of depth in qualitative analysis.** The quantitative approach (SPSS, regression) is good for providing statistical generalizability but is limited in that it does not provide for rich, contextual stories that lie behind the numbers. Closed-ended questions may not adequately capture the reasons for the lack of trust in government transparency (mean=2.7), or how indigenous knowledge (mean=4.4) is used. Most of the information used in the study does not provide qualitative data (e.g., Focus Group Discussions, Key Informant Interviews) that would be helpful to the operational design of rehabilitation strategies.
6) **Environmental/Meteorological Data Excluded:** This study will only examine socio-economic and institutional aspects of recovery. It does not include quantitative information about hydrology (such as actual amounts of rainfall, river discharge, soil salinity after the flood). The severity of economic loss (Table 3) was self-assessed, rather than cross-validated

with physical environmental data that could have been used as a more comprehensive 'hazard-exposure'.

References

Ahmad, S., Bhutto, S., Khoso, A. R., & Maryam, K. (2026). Bridging the watershed–urban disconnect: The interplay of risk perception, self-efficacy, and institutional trust in flood preparedness in Pakistan. International Journal of Disaster Studies and Climate Resilience, 2(1), 116-128.

Anggara, Y. Y., Sumunar, D. R. S., Khotimah, N., & Arif, N. (2025). THE UNPREPAREDNESS OF FARMERS IN FACING FLOOD DISASTER RISKS AS AN IMPACT OF CLIMATE CHANGE: A CASE STUDY IN BALONG, PONOROGO. JURNAL GEOGRAFI Geografi Dan Pengajarannya, 23(1), 183-196.

Ali, H., & Zhuo, Z. (Eds.). (2025). Integrated Pest Management: Emerging Technologies and Sustainable Approaches.

Almulhim, A. I., Alverio, G. N., Sharifi, A., Shaw, R., Huq, S., Mahmud, M. J., ... & Abubakar, I. R. (2024). Climate-induced migration in the Global South: An in-depth analysis. Npj Climate Action, 3(1), 47.

Azhar, M., Soomro, A. H., Azhar, Z., & Kumar, S. (2024). Post-flood economic challenges; resilience and rehabilitation strategies ith thematic analysis approach. A case of Larkana. Journal of Economics, Innovative Management and Entrepreneurship, 2(2).

Bajaj, K. (2024). Beyond borders: assessing climate risks in globalized food systems (Doctoral dissertation, University of British Columbia).

Bankoff, G., & Hilhorst, D. (2009). The politics of risk in the Philippines: comparing state and NGO perceptions of disaster management. Disasters, 33(4), 686-704.

Bhutto, S., Jintu, G., Khoso, A. R., & Suyuhan, W. (2026). Impact of flood on maternal health in rural Hyderabad, Pakistan. African Journal of Reproductive Health/La Revue Africaine de la Santé Reproductive, 30(6), 13-25.

Bhutto, S., Khoso, A. R., Jintu, G., Suyuhan, W., & Akhtar, F. (2025). QUANTIFYING THE HUMAN HEALTH BURDEN OF FLOOD DISASTERS: AN EMPIRICAL ANALYSIS FROM SHAHDADKOT, SINDH PROVINCE OF PAKISTAN. Journal of Media Horizons, 6(3), 1484-1495.

Bizhan, N. (Ed.). (2022). State fragility: Case studies and comparisons. Taylor & Francis.

Bortolin, M., & Olagnero, J. M. (2024). Rehabilitation and Reconstruction. In Ciottone's Disaster Medicine (pp. 410-414). Elsevier.

Borate, A. B. (2024). Flood Risk and Recovery: Significance of Measures and Lenses Case Studies from India (Doctoral dissertation, University of California, Irvine).

Dean, J. I. (1992). Scouting in America: 1910-1990. University of South Carolina.

Dubey, A., Singh, P. K., Singh, S., Manzoor, U., Sahoo, C., & Saini, A. (2025). Impact of Climate Change and Land Degradation on Agriculture. In Eco-Resilience: Climate Change, Land Degradation and Sustainable Solutions (pp. 49-95). Cham: Springer Nature Switzerland.

Eriksen, S. H. (2022). Is my vulnerability so different from your's? A call for compassionate climate change research. Progress in Human Geography, 46(6), 1279-1297.

FitzGerald, G., Smith, E., & Mayner, L. (2016). Disaster health management (pp. 3-6). London: Taylor & Francis.

Ganguli, P., Nandamuri, Y. R., & Chatterjee, C. (2020). Analysis of persistence in the flood timing and the role of catchment etness on flood generation in a large river basin in India: P. Ganguli et al. Theoretical and Applied Climatology, 139(1), 373-388.

Goh, K. C., Kurniawan, T. A., Goh, H. H., Zhang, D., Jiang, M., Dai, W., ... & Meidiana, C. (2024). Strengthening infrastructure resilience for climate change mitigation: Case studies from the Southeast Asia region ith a focus on astewater treatment plants in addressing flooding challenges. Acs Es&t Water, 4(9), 3725-3740.

Hassan, B., Qadir, A., & Ahmad, R. I. (2025). Climate Change and Water Scarcity: Adaptation and Mitigation Strategies in Pakistan. International Journal of Social Sciences Bulletin, 3(10), 1-23.

Hernández-Delgado, E. A. (2024). Coastal restoration challenges and strategies for small island developing states in the face of sea level rise and climate change. Coasts, 4(2), 235-286.

Hossain, B., Li, W., Iqbal, K., & Hamza, A. (2026). Post-flood recovery in Bangladesh's Riverine Islands: institutional gaps, social vulnerabilities and resilience pathways. Local Environment, 1-24.

Hulme, D. (2013). Making a Difference: NGO's and Development in a Changing World. Routledge.

Keane, J., Cao, Y., Tanjangco, B., Ahmad, M., Johnson, D., & Nadin, R. (2021). Driving a green recovery in developing countries.

Khan, I., Lei, H., Shah, A. A., Khan, I., & Muhammad, I. (2021). Climate change impact assessment, flood management, and mitigation strategies in Pakistan for a sustainable future. Environmental Science and Pollution Research, 28(23), 29720-29731.

Khalid, M. U., Ashraf, M. H., Mumtaz, A., Gull, R., Javed, B., & Nazir, I. (2026). Climate-driven floods and the fragility of Pakistan.

Khalid, S., Hafeez, M., Junaid, N., & Aeman, H. (2024). Navigating climate change, disasters and displacement in Pakistan: a case study of Rahim Yar Khan.

Khan, A. A. (2025). Understanding the Drivers of the Effectiveness of Flood Early Warning Systems: A Case Study of Pakistan's Flood Episodes Since 2010 (Master's thesis, Webster University).

Khoso, A. R., Jintu, G., Bhutto, S., Sheikh, M. J., & Narejo, K. V. A. A. (2024). Climate change and its impacts in rural areas of Pakistan: a Literature. Journal of Environmental Science and Economics, 3(1), 18.

Khoso, A. R., Jintu, G., Chen, Q., Sheikh, M. J., Suyuhan, W., & Bhutto, S. (2025). Ecological and health impacts of tobacco farming in Pakistan: A mixed-methods approach toward a sustainable pathway for agricultural transition. Tobacco Induced Diseases, 23, 10-18332.

Khushi, S. R., Khoso, A. R., Bhutto, S., & Narejo, A. A. (2024). The long-term health impacts of repeated flood events: A Review. Journal of Environmental and Energy Economics, 3(1), 11-19.

Kudejira, D. (2023). Disaster authoritarianism: an ethnography of state and NGO responses in the aftermath of tropical cyclone Idai in Chimanimani district, Zimbabwe (Doctoral dissertation, Memorial University of Newfoundland).

Lopa, F. G. R. (2023). Non-profit organizations and climate change knowledge management in international development: a study of the HI-AWARE project (Doctoral dissertation, University of Lethbridge (Canada)).

Maharjan, S. B., Steiner, J. F., Shrestha, A. B., Maharjan, A., Nepal, S., Shrestha, M. S., ... & Gupta, N. (2021). The Melamchi flood disaster: Cascading

hazard and the need for multihazard risk management. Kathmandu, Nepal: ICIMOD.

Matczak, P., & Hegger, D. (2021). Improving flood resilience through governance strategies: Gauging the state of the art. WIREs Water, 8 (4), e1532.

McAuliffe, M., & Triandafyllidou, A. (2021). Word migration report 2022.

Mengal, S., Rehman, T., & Ambreen, R. SOCIOECONOMIC IMPACTS OF THE 2022 FLOODS IN BALOCHISTAN: A REVIEW-BASED PERSPECTIVE.

Mushtaq, B., Bandh, S. A., & Shafi, S. (2020). Management of ater resources. In Environmental management: Environmental issues, awareness and abatement (pp. 1-46). Singapore: Springer Singapore.

Muwafu, S. P. (2024). Informal Governance for Urban Sustainability in Sub-Saharan Africa.

Neupane, J. L. (2022). Dynamics of Hydro-power Development in Nepal: Water-Energy-Food Security Prospect.

Niño, E. (2023). Anticipatory Action and Response Plan.

O'Gorman, L., & Tenpa, T. (2025). Pluralising adaptation through meaningful engagement ith diverse knowledges: A Nepali Case Study (Doctoral dissertation, Macquarie University)

Peters, L. E. (2025). The Peace Imperative for the Sendai Framework for Disaster Risk Reduction: Peters. The Peace Imperative for the Sendai Framework for Disaster Risk Reduction: LER Peters. International Journal of Disaster Risk Science, 16(1), 9.

Phanthuwongpakdee, N. (2016). Living ith floods: moving towards resilient local-level adaptation in Central Thailand (Doctoral dissertation, King's College London).

Poudel, U. Gendered Violence under Biopolitics in White Torture: A Critical Reflection on Human Rights Violations in Iran's Prisons. LITERARY ORACLE, 206.

Qamer, F. M., Abbas, S., Ahmad, B., Hussain, A., Salman, A., Muhammad, S., ... & Thapa, S. (2023). A framework for multi-sensor satellite data to evaluate crop production losses: the case study of 2022 Pakistan floods. Scientific Reports, 13(1), 4240.

Rhianazala, A., Budiyanto, M. N., & Iriani, A. (2026). Analyzing the Challenges of Flood Management Policies in Bekasi City through Target Mapping Techniques. Jurnal Pemerintahan dan Politik, 11(1), 108-133.

Sahani, R. (2023). Floods And Environmental Justice In North Bihar: Contextual Vulnerabilities Of Historically Marginalised Communities In The Kosi Sub-Basin (Doctoral dissertation, Ashoka Trust for Research in Ecology and the Environment; Manipal Academy of Higher Education).

Sharma, R. (2025). Guided incrementalism: informal spatial adaption and the future of migrant housing in Bangladesh (Doctoral dissertation, BRAC University).

Sheikh, M. J., Narejo, A. A., Khushk, G. M., & Magsi, H. (2019). Influence of climate shifting on agricultural and daily life activities in lower sindh province of Pakistan. Advances in Agriculture and Animal Sciences, 35(2), 113-118.

Sisay, G., Sefene, A., Kassaw, A., Getachew, D., & Ali, G. (2025). Sendai framework for disaster risk management: practices and challenges against the targets in Ethiopia. Natural Hazards, 121(11), 13131-13151.

Southard, N. (2017). The socio-political and economic causes of natural disasters.

Suyuhan, W., & Khoso, A. R. (2026). Bridging the watershed–urban disconnect: a mixed-methods analysis of flood-risk perception and preparedness in Sindh, Pakistan. Frontiers in Environmental Science, 13, 1742965.

Swetha, P. U. (2025). Drinking Motives, Psychological, and Family Distress Among Tribal Women With Alcohol Dependence (Master's thesis, Central Institute of Psychiatry (India)).

Ullah, M. K., & Khan, M. Z. (2025). Pakistan's Climate Crisis: An Integrated Analysis of Floods, Glacial Melt, Droughts, Water Scarcity and Biodiversity Loss. Journal of Social Sciences Development, 4(2), 106-119.

Yazdi, M. S., Ardalan, M. A., Hosseini, M., Zoshk, M. Y., Hami, Z., Heidari, R., ... & Chamanara, M. (2024). Infectious diarrhea risks as a public health emergency in floods; a systematic review and meta-analysis. Archives of Academic Emergency Medicine, 12(1), e46.

Yigitcanlar, T. (2026). Algorithmic Urbanism for Climate Resilience: AI, Green Infrastructure, and Policy Innovation for Heat-Ready Cities. CRC Press.

Zhang, L., Ren, J., Yuan, H., Yang, Z., Wang, W., Guo, M., ... & Fang, Y. (2020, October). Evaluation of smart healthcare systems and novel UV-oriented solutions for integration, resilience, inclusiveness, and sustainability. In 2020, the 5th International Conference on Universal Village (UV) (pp. 1-28). IEEE.