ACADEMIA International Journal for Social Sciences
Volume 4, Issue 2, 2025 ISSN-L (Online): 3006-6638

Role of the Military in Disaster Management: A Case Study of Flood 2022

Dr. Tahira Mumtaz
tahira.mumtaz@gcwus.edu.pk
Lecturer, Department of Politics and International Relations, GC Women University, Sialkot, Punjab, Pakistan

Dr. Ammara Tariq Cheema
ammara.tariq@gcwus.edu.pk
Lecturer, Department of Politics and International Relations, GC Women University, Sialkot, Punjab, Pakistan

Ramisha
ramishaqureshi50@gmail.com
MS Scholar, Department of Politics and International Relations, GC Women University Sialkot, Punjab, Pakistan
Corresponding Author: * Dr. Tahira Mumtaz tahira.mumtaz@gcwus.edu.pk

Received: 09-03-2025 **Revised:** 10-04-2025 **Accepted:** 07-05-2025 **Published:** 29-05-2025

ABSTRACT

This study aims to examine the primary challenges in disaster management in Pakistan, with a focus on the military's role in flood response. Identifying the administrative, institutional, and structural barriers to catastrophe preparedness and response is its goal. Floods in Pakistan are more frequent and severe, particularly during the monsoon season, and they inflict a lot of damage. Even with the implementation of disaster management regulations, the response is inadequate due to a lack of accountability, limited institutional competency, and poor coordination. The inadequacies in civilian disaster management are reflected in the increasing military involvement in crises. Floods affect socioeconomically disadvantaged groups and undermine public confidence in government institutions, according to the study. A qualitative method is used to investigate how military and civilian institutions respond to catastrophes, drawing on academic research articles, policy briefs, and case studies of previous floods. The findings highlight serious shortcomings in Pakistan's disaster management system, such as inconsistent efforts, a lack of technological capacity, and reactive rather than preventative actions. Increased financial strain, infrastructure destruction, poverty, and displacement have all resulted from floods. Strategic improvements are required to increase resilience, according to the research. Implementing innovative early warning technologies, inter-agency collaboration, specialized training, institutional capacity building, and clearly defining roles for both military and civilian partners are among the solutions suggested.

Keywords: *Floods, Disaster Management, Military, Climate change, Natural Hazards, Disaster Risk Reduction.*

INTRODUCTION

In the 2022 rainy season, Pakistan was dealing with catastrophic floods that were brought on by unexpected monsoon rains all over the country. Roads, railroads, and power lines have all sustained significant damage, and millions of people have been forced to relocate. In this disastrous situation, civil–military cooperation has become a catch-phrase in the disaster and crisis management agendas of the 21st century. The Pakistani army, as an institution, has contributed in several ways to the nation's progress. History demonstrates that the army has been crucial in helping the country deal with its crises. In Pakistan, civil governments frequently resort to the military in the event of a natural or man-made calamity. The Pakistani army is well-prepared and managed to serve the government in times of need by providing medical assistance, conducting rescue missions, and carrying out support tasks. The Army has competent,

well-trained people who can work with the National Disaster Management Authority to help in the nation's emergency crisis.

The army has played a crucial role in assisting the Pakistani government in responding to disasters by supporting rescue and recovery efforts amid devastating floods caused by unusual monsoon rainfall. Search and Rescue Operations over 300 medical camps have been established by the military to offer free medical aid and supplies; thus far, over 566,089 people have been treated. Military-Civil Coordination, the military brass has been travelling to flood-affected areas to offer consolation and assistance to those in need. The Authority for National Disaster Management (NDMA) coordinated the activities of numerous groups and provided relief supplies (Baig, M. N. A., et al., 2024). In a nutshell Military has always played a pivotal role in the management of disasters, and once again military provided aid to the civilian Government in rescue and relief activities when the Indus River unleashed its fury in 2022 due extreme monsoon season.

LITERATURE REVIEW

Pakistan had catastrophic floods that impacted millions of people and resulted in a serious humanitarian crisis with far-reaching effects on the nation's economy and security. Alan, 2010, Pakistan Army steps come to assist with rescue and recovery activities following the massive catastrophe. The existing literature points out how the Army as an institution has carried out rescue and relief operations. Most of the research focused on the ability of the Army in disaster management, but did not focus on its role in the active participation of the Army in the Flood relief of 2022. This chapter of the research report will be comprised of a discussion on previous literature published on the topic of the military's role in 2022 flood management.

According to Majeed (2023) Federal and Provincial Governments have to take the help of non-representative institutions in flood situations due to their organized activities and the trust of citizens in the non-representative institutions.

Mohmand, Loureiro & Sida (2023), several factors came together to cause the 2022 floods that impacted 33 million people in Pakistan. It was discussed that the vital reason behind the flood is climate change, but the government did not make any reforms to deal with climate change; political and economic crises have played their role. In such a situation military has to play a role in the management of crises.

Arshad, Ashraf & Murtaza (2023) discussed the aviation and the air force play a vital role in disaster management by responding quickly and giving impacted areas vital support. Given its mobility and accessibility, particularly in places where road linkages have been disrupted by disaster strikes, the ability to quickly rescue injured people via air ambulance, and the ability to drop logistical help, aviation plays a critical role in disaster management in Pakistan. Natural and hydro-meteorological elements contribute to floods, but human activity has given them additional dimensions in recent years. Regretfully, no significant decrease in the flood-to-damage ratio has been documented. (Shah, Mustaffa, Teo, Imam, Yusof, & Al-Qadami, 2020). According to a study by Zarmina, Farooq, and Naeem (2014), flood management calls for consideration at the local and national levels. To follow an integrated framework that brings together all stakeholders, including local, federal, military, and victim organizations, to construct an organized management system, the decentralized style of operation should be modified from the national to the regional level.

Pakistan must take action to lessen its exposure and susceptibility, lessen the effects of disasters, and prepare for them so that it can react appropriately when they happen. To do this, it requires more financial support, political resolve, and military cooperation (Sayed & González, 2014)

According to a study, local institutions continue to manage flood risk ad hoc and with reactive methods, even in the face of disaster risk reduction measures. (Rana, Asim, Aslam, & Jamshed, 2021) Managing flood hazards is becoming more challenging due to inadequate governance and a lack of remedial actions for current growth patterns. Under the tenets of disaster risk reduction and climate change adaptation, it is imperative to conduct multi-hazard vulnerability and risk assessments and create targeted strategies.

Sultan &Haider (2023) discuss how threats from climate change threaten Pakistan's military security. Most notable threats, in severity and frequency, are sea level rise, cyclone risks, drastic floods, warming patterns, and glacial melting. Naval infrastructure and equipment are impacted by cyclones and sea level rise, while troop movements, deployments, and logistics are impacted by warming trends and glacier melting. As a result, operational readiness, force capacity, and military training are impacted.

Historic Context

The disaster and problems the population will face due to the flood in 2022, how the military will provide first aid, rescue, and relief efforts, and how it will address post-flood challenges. In order to improve comprehension of the research problem, this chapter has offered a variety of insights about what has been said about flooding disasters both locally and globally, theories that influence floods becoming disasters, and the role of the disaster management department in preventing floods from becoming disasters. The response phase of the disaster management cycle has seen a significant involvement from the military. These responsibilities include relief efforts, transportation, communication, medical attention, security, provision of food and water, infrastructure rehabilitation, and other tasks.

Recently, the military has become more involved in responding to natural disasters for a variety of reasons. The magnitude and frequency of natural disasters are rising, and there is a trend towards the militarization of humanitarian aid in times of conflict. Additionally, the military is becoming more interested in disaster response. Military actors are becoming more interested in disaster response for a variety of reasons, including public opinion, staff morale, possibilities for relevant training, and the desire to broaden their role and competence by using humanitarian operations. The 1991 storm in Bangladesh, Hurricane Mitch in 1998, Hurricane Katrina in 2005, the 2005 Asian tsunami in Indonesia, the 2007 flooding in the United Kingdom, and the 2008 earthquake in China's Sichuan province all required the use of military personnel. The US military, in particular, was instrumental in the reaction to the 2010 Haitian earthquake. As a result of the military's expanded involvement in humanitarian response to natural disasters and conflicts, there is now greater interaction between military and humanitarian organizations.

This has highlighted issues with coordination and civil-military cooperation, as well as worries about the overall efficacy of armed emergency support. The military was used in Hurricane Mitch (1998), Hurricane Katrina (2005), the Asian tsunami in Indonesia (2005), the UK flooding in 2007, and the Sichuan province earthquake in China (2008). US troops played a major role in the response, especially in the aftermath of the 2010 Haitian earthquake. The military's increased engagement in providing humanitarian aid in the wake of natural catastrophes and armed conflicts has led to a rise in communication between humanitarian and military organizations. Due to this, issues with coordination and civil-military collaboration have come to light, along with worries regarding the overall efficacy of armed emergency support, while many more were injured, experienced family separation, or experienced various forms of trauma. 42 Disasters that struck suddenly displaced millions of people and caused $108.5 billion in losses. 92% of all disasters in 2010 were caused by climate change. (EM-DAT, C.R.E.D., 2016).

All attempts to address catastrophic disasters are supervised by a global organization. The United Nations Disaster Assessment and Coordination (UNDAC) is part of the global emergency response system for sudden-onset catastrophes. UNDAC troops can be sent anywhere in the world with as little as 12 to 48 hours' notice. On request from the UN Resident or the humanitarian coordinator for the impacted government, they are given to the disaster-affected nation at no cost. The goal of UNDAC, according to Van de Walle, B. (2009), is to assist the UN and the governments of countries affected by catastrophes during the early phases of sudden onset situations. Coordination of the influx of foreign aid at the national level and/or the disaster site is also beneficial (Sayed & González, 2014)

Several causes have led to an increase in the role played by armies in reacting to natural disasters in recent years. These include an increase in the frequency and size of natural disasters, a trend toward the militarization of humanitarian assistance in times of conflict, and a rise in military interest in disaster relief. Military actors are becoming more interested in disaster response for a variety of reasons, including public opinion, staff morale, chances for appropriate training, and the desire to broaden their function and area of expertise through humanitarian operations (Cârstea, L.I., 2019).

Pakistan's Geographic Location and Meteorological Systems

Based on its physical characteristics, three regions can be distinguished within Pakistan. The Baluchistan Plateau (242,683 km2), the north and north-west mountains (241,647 km2), and the Indus River plains (311,766 km2) comprise the three land areas.

The precipitation that can lead to flooding in the nation is caused by three different types of weather systems.

a) The Bay of Bengal is the primary source of monsoon pressures.

b) The westerly waves from the Mediterranean Sea that bring on the winter rains.

c) The Arabian Sea provides the seasonal lows that give rise to cyclones.

The nation experiences four distinct climate seasons. The months of April, May, and June are hot and dry. During the hot and muggy months of July, August, and September, there are severe heat waves and a lot of rain (monsoon). October marks the start of the chilly, dry season, which lasts until November. The following three months are the coldest of the year: December, January, and February. Pakistan comprises three hydrological units: the Makran Coastal drainage area, the Kharan Basin, and the Indus Basin. These basins have a wide range of flooding characteristics that call for a thorough study (Gasper, 2011).

Causes of the 2022 Devastating Flood in Pakistan

Multiple reasons, such as heavy precipitation, melt from glaciers, and the placement of a strong low-pressure system over the land area as a result of May and June heat waves, have been attributed to the August 2022 flood event (Jones, 2022; Mallapaty, 2022). The monsoon troughs that are largely restricted to the Indian subcontinent are not very related to the summer monsoon season precipitation in Pakistan. In 2022, Pakistan experienced very extended heat waves during the arid summer months of March to May. Temperatures over 51°C were recorded in most areas of the country in May (Mallapaty, 2022). More precipitation during the upcoming monsoon season might be due to summer heat waves. A monsoonal depression formed early in the Arabian Sea travels and deepens as a result of the elevated land surface temperature, which makes the low-pressure system overland more intensified and produces premature rain over the coastal areas of Pakistan (1995, Bansod and Singh).

Since June 2022, Pakistan has experienced several instances of heavy monsoonal rainfall, mainly caused by the powerful low-pressure system (Mallapaty, 2022). Pakistan also receives high amounts of rainfall, which is attributed to La Nina. (Adnan et al., 2021; Ali et al., 2020). In 2022, the eastern Pacific witnessed a cold sea surface temperature, and the presence of La Nina strengthened the precipitation event and made low-pressure systems stronger. The rate of flow in the upper tributaries of the Indus River rose due to more than seven glacial lake outbursts triggered by heat waves during summers (UNDP, 2022). The 2010 floods in Pakistan where catastrophic as far as peak flow rate was concerned, and the 2022 floods overtook them. (Bhutto, 2022). Another similarity between the events of 2010 and 2022 is the occurrence of the La-Nina and Rossby formations within the high-altitude jet streams. (Di Capua et al., 2021; Hong et al., 2011). In 2010, an upper tropospheric trough that was associated with the mid-latitudinal jet stream developed over northwest Baluchistan and Khyber Pakhtunkhwa. In August 2022, a similar system was established in northwest Pakistan. It has been explored how human-caused warming played a role in the severe floods in 2010 and 2022. Hirabayashi et al. (2021), for instance, suggested that human influence enhanced the 2010 flood event, while the precipitation event that led to the flood could not be reasonably attributed to climate change. Knowledge of the primary cause of flooding is critical in the estimation of the role played by global warming in the incidence of destructive events. This information is critical in the development of future adaptation strategies well in advance.

As per different research, Pakistan is experiencing several issues related to climate change, such as floods, droughts, waves, abnormal precipitation, and glacier melting (Khan et al., 2019). Pakistan ranks in the top 10 globally in the climate risk index, showcasing the vulnerability of the country towards extreme weather conditions, particularly when the floods during 2000-2019 are taken into account (Eckstein et al., 2021).

Health Crisis Caused by Flooding and Its Implications

The nation of Pakistan is the second-largest worldwide hotspot for hepatitis C infections due to the high frequency of infectious illnesses like the disease, which affects around one in every 20 persons in the country, and has presented serious challenges for the Pakistani healthcare system (Mahmud et al., 1186). In addition, the healthcare system was even more overworked after the COVID-19 pandemic in January 2020 (WHO, 2020). By severely damaging 1,460 medical facilities, destroying 243 bridges, and demolishing 5000 km of roads, the already serious health situation has been made worse by the most recent floods. This has disrupted transport networks and made it more difficult for the affected population to access healthcare services. Researchers think that by placing mobile medical units in the impacted areas, people who most need medical attention can get it quickly and effectively. These units may have the medical professionals, tools, and supplies required to offer basic healthcare. Healthcare professionals may require extra training and resources in flood-affected areas in order to respond to the community's unique health needs and provide high-quality care.

Challenges during Natural Disasters

Research on the catastrophic effects of natural disasters on their victims has been conducted frequently. Some common short- and long-term negative outcomes for victims include physical health problems, property damage, mortality, and negative psychological Despite a sizable corpus of research concentrating on the victims of such events, the challenges that professionals confront in responding to natural disasters on a structural, interpersonal, psychological, and resource level cannot be overstated. Personnel working in the military, medical field, public safety, and disaster management are frequently placed in strange, hazardous, and possibly psychologically traumatizing circumstances where they are exposed to a variety of risks both psychologically and physically (Gaddes, et al., 2022).

It is critical to comprehend the difficulties involved with catastrophe deployments in order to minimize detrimental effects on the physical and emotional health of public safety, medical, and military personnel. Organizing the variety of difficulties associated with disaster response can aid in spotting chances to reduce negative consequences on one's emotional or physical health. In order to provide more efficient replies, it might also encourage cooperation and communication between units. A thorough review was carried out by researchers to assess the mental and physical health issues that emerge after disasters. However, the review did not examine any issues related to structural, resource, or societal determinants; instead, it focused only on the mental and physical health issues related to calamities, such as war.

In addition, the evaluation failed to identify the challenges that differ between natural and man-made disasters (such as those related to war), each of which calls for different responses with multifaceted effects. The potential for beneficial or transformative outcomes such as self-fulfilment, resilience, or posttraumatic growth associated with deployments to natural catastrophes is one example of these distinctions (Brooks et al., 2020; Clukey, 2010). Regulators and healthcare professionals can better prepare for the effects that military, disaster management, medical, and public safety personnel will encounter if researchers can pinpoint and comprehend the most significant obstacles related to natural disaster deployments that go beyond issues with physical and mental health. For instance, the proactive implementation of therapeutic interventions for staff members will be possible with an understanding of a variety of issues. This is particularly crucial because prior studies have demonstrated that psychological interventions given to staff members after disaster deployments are insufficient because of things like unclear funding allocation, problems with efficiency and manner of delivery (Søvold et al., 2021).

Disaster Management System in Pakistan

As required by the Constitution, the National Disaster Management Authority is an autonomous government agency tasked with managing disasters of all kinds across the country. At the federal and interim levels, national disaster policies are developed and carried out by the National Disaster Management Authority (NDMA). In order to coordinate efforts to carry out its disaster management, search and rescue, and various humanitarian activities both domestically and abroad, it also works closely with a number of government departments, the military, and organizations linked with the United Nations. The NDMA aims to develop professional competence and sustained operational capability to fulfill its humanitarian duties to the best of its ability (National Disaster Management Act, 2010).

Disaster Management Policy

The National Disaster Management Act, enacted by Parliament in 2010 partly as a response to the massive floods that year, sets out the broad outline of disaster preparedness and response legislation. National, provincial, and district-level disaster management agencies are assigned responsibilities and functions relating to “preparedness, response, recovery and rehabilitation and reconstruction” by adopting a three-tiered disaster management structure. There is no disaster risk management implementation plan in local or community environments in this institutional framework. As Fernandez et al. (2012) observe, Pakistan’s paradigm of disaster risk is centralised, just like the case of countries such as Bangladesh or the Philippines, with little chance for local hazard or vulnerability mapping. Conversely, community-based disaster risk management and participatory disaster risk management used to be prevalent. The resultant gap between “voices at the bottom” and “policies at the top” has been established in research (Khan, 2005).

Pakistan’s 10-year national disaster management plan, published in 2012 after the Act, included riverine, flash, and glacial lake outburst floods. Among other aspects, a multi-hazard EWS was to be formulated.

(Mukhtar, 2018; NDMA, 2012). The World Bank initiated a $120 million project in the Sindh province in 2016 to enhance drought and flood resilience.

Setting up a Sindh emergency service, expanding the number of individuals receiving early warning signals in a timely and more accurate manner, and building institutional capacity for managing disaster and climate risk are some of the project's objectives (World Bank 2021). Its completion is scheduled for 2024. So far, it has reinforced and upgraded the emergency operations center of the disaster management association and established integrated disaster management plans for the province of Sindh. Yet, the World Bank (2021) asserts that, up to 2021, the Sindh emergency service did not have an identifiable emergency response capability.

The reviews over the coming months will determine the extent to which these investments are succeeding in mitigating the impact of the 2022 floods.

Civil–Military Services in the Disaster-Prone Areas

Civil-military operations are any military operation where the military co-operates with the civilian population to reach a mutual objective through the achievement of their fullest possible cooperation. Civil-military activities may be performed when there is a period of national disaster or normalcy. (Dynes, R.R., 1994). These civil-military operations may be done in the local government areas. Among those military units within the country's defense forces that have been trained on disaster handling of man-made and natural disasters (terrorism, insurgency, civil war, floods, landslides, earthquakes, etc.) are the Pakistan Air Force Service, the RDF marine regiment, and the engineering regiment of the Army. These military units have the human resources, machinery, and expertise to either prevent or reduce disasters if and when they occur.

Pakistan's Socioeconomic Impact of Floods and Flood Management

Flooding is one of the most catastrophic natural disasters, as seen by the most recent floods in Pakistan. Flood prevention and management policies are essential for protecting the environment and reducing the risk of a financial crisis that could claim lives. The severity of flood disaster events is one major and enduring issue in the world. Every year, floods are longer and more intense, which hurts the social and economic climate of the impacted nation. Floods cannot be avoided, but with the right planning and training, their detrimental impacts can be greatly reduced.

Flooding is a major factor in both ecological and human damage. Allaire (2018) asserts that it affects the environment, public health, unemployment, and socioeconomic circumstances. Following urban floods, public and commercial organizations are currently facing difficulties in developing and accessing risk management and adjustment plans that include land use planning, urbanization patterns, early warning systems, and flood preventive measures. Pakistan's colonial-era land adjudication and administration system, which lacks judicial augmentation and allows for unstable urbanization, is a major contributing factor to this. However, reducing the effects of natural disasters presents major obstacles for governments everywhere. As a result, countries with stable economies and governments have lower death and socioeconomic damage rates than developing countries. (Kahn, 2005).

Floods can be managed to lessen the harm they do. Effective risk avoidance in this situation entails having a thorough understanding of how floods impact the economy, the populace at large, and the efficacy of disaster relief efforts. Realistic methods place a high priority on considering potential risks and rewards. Currently, preventative measures are usually established by ongoing expert study of floods.

However, a lack of empirical data spanning a wide range of loss scenarios may be the reason for the poor use of cost-benefit analysis in mitigation planning. The government and non-governmental sectors are redirecting their resources from production to restoration and rehabilitation projects, which is causing the GDP and HDI to develop more slowly overall. (Isik et al., 2021).

Government Institutional Support

A proactive response from public institutions is required in response to disaster events because flooding has caused extensive and varied damage. According to MacManus and Cutter, Mitchell& Scott, (2012). Routledge cohesive and efficient approach is required to lessen the effects. According to Collins and Kapucu (2008), a government institution's operational role should be divided into multiple streams and responsibilities that are carried out at all levels. For example, Plans and strategies for disaster risk management encompass both planning and evaluation. Unfortunately, reports after the floods confirm that the appropriate government agencies did not take any of these steps. Thus, the primary and occasionally the only mechanism for reducing the negative effects of flooding is limited community response.

Natural disasters are becoming more frequent and more frequent, threatening the doorsteps of South Asian countries due to the lack of both proactive and reactive government response, as well as the poor rural community's limited ability to handle such events. Around one-fifth of the world's population lives here. (Memon 2012; Hirabayashi et al. 2013). This area, which has a large population, is also very susceptible to flooding disasters. Due to its mid-latitude location, South Asia is prone to regular shocks related to flooding. These shocks are having an impact on people in the form of illnesses, injuries, and deaths, in addition to destroying material possessions like homes and fodder storage facilities and livelihood assets like livestock and agricultural output, which are essential for rural survival. This concerning circumstance causes already impoverished communities' economic standing to worsen and their rates of poverty to increase. Thus, the impoverished neighbourhood's economic aspects are at risk (Ahmad 2005; Memon 2012).

CONCLUSION

In Pakistan, the flood tragedy is a complex problem. Caused by human activity, the recent floods in Sindh province and throughout Pakistan resulted in enormous losses. Beyond the nation and government of Pakistan, the natural cause of the extraordinary monsoon rains was uncontrollable, and it will still be a driving cause behind floods in the future, given climate change. For instance, even though there was more precipitation than usual in July, the impact in August 2022 was unheard of in the nation's history. Nearly two million people nationally were impacted by the massive flooding of thousands of acres of agricultural land, villages, and towns caused by eight major levee breaches in the southern Punjab and Sindh provinces. A few of the long-standing problems included poverty, centralized governance, and poor land-use planning. In addition, a complex and difficult problem throughout the 2022 flood relief phase was the inadequate coordination and lack of capability between the government, the province, the interagency, and the UN.

Pakistan has regular flooding due to its abundant monsoon rainfall. Considering the extent and intensity of the recent floods in Pakistan, difficulties would have arisen in any country. The recent large-scale floods have highlighted poor coordination among flood control groups. This is partly due to the limitations of current technical capabilities, such as systemic flood protection measures, preparation activities, warning signals, and catastrophe response. Flood monitoring and warning systems need to be continuously improved in order to reduce the damage that floods do in the future. Pakistan has shown that its flood warning and detection systems are operational, but the network's forecasting capabilities are still insufficient.

The national and provincial levels of operation of the NDMA and PDMA organizations delegate the rehabilitation work to local bureaucracy rather than creating a grassroots structure that takes into account small cities and villages. Additionally, it usually makes rehabilitation methods weak and ineffective. However, it was still imperative that the Pakistani community respond as a unit and that all relevant domestic and foreign bodies work together. The solution is to solve this issue; compensating flood victims for their losses alone would not suffice. To prevent floods, Pakistan's water management system must also build more reservoirs, such as lakes and dams. Effective public awareness campaigns should be created and carried out by the government to educate the public about flood hazards and flood preparedness.

This study evaluated how Pakistan's Punjab province's socioeconomic and housing sectors might be affected by the flood in 2022. One of the worst natural disasters of 2022 was the flood, which had a significant impact on Punjab's socioeconomic and housing sectors. All of the rivers that drain the province's catchment areas experienced significant and persistent rainfall, but the Jhelum and Chenab Rivers in particular had the maximum discharge that exceeded the channel's capacity, which is why the flood happened. According to this estimate, the 2022 flood destroyed the socioeconomic conditions of every person living in 16 districts of the Punjab province. An analysis of the province's agricultural land showed that the 2022 flood damaged over 10 million acres. Over 2.3 million people were displaced and 2,519 villages were severely damaged by the 2022 flood in Punjab province. The investigation also showed that district Jhang, then district Muzaffargarh, had the greatest losses to the agricultural sector. Furthermore, the housing industry was severely harmed by the disastrous flood in 2022. Consequently, the most severely affected districts were identified as Jhang, Sargodha, Gujranwala, Sheikhupura, and Hafizabad by the provincial Disaster Management Authority. This was mostly due to the devastating effects of the flood in 2022, which left millions of people homeless and severely damaged the housing and agricultural industries in these districts. Subsequent analysis indicated that 185 people had died as a result of the 2022 flood, with the highest number of deaths recorded from the Sialkot district. In addition, thousands of animals died, and the nation's economy suffered enormous financial losses totalling millions of dollars. Effective flood risk reduction strategies are therefore required in the province in light of this tragic incident.

Pakistan's physiographic, climatic, hydrologic, demographic, and socioeconomic characteristics vary widely from one another, making flood control a difficult topic requiring a thorough grasp of the subject. Despite the utilization of both structural and non-structural methods, their combined efficiency and interlinkage needed to be maximized. As the first responders and those most impacted, indigenous knowledge is essential to minimizing flood damage through a bottom-up strategy.

The nation's approaches to water management require a paradigm change. The nation is in dire need of new dam construction because it can produce electricity, lessen the damage caused by flooding, and guarantee food security. For the time being, the locations of the small dams that are not under dispute should take precedence over the contested hydropower projects, such as the Kalabagh dam. The provinces ought to be trusted and ensured that the water quota stipulated by IRSA is followed. In Pakistan's central and southern regions, the monsoon weather pattern has shifted from Kashmir to the southwest of the country, and increasing the country's water storage capacity is imperative

RECOMMENDATIONS

- To help flood victims, there is also an urgent need for effective coordination between the federal and provincial governments. Flood victims lack the necessary financial resources to handle their

various issues and are homeless. Numerous non-governmental organizations and public welfare foundations do their business in an orderly manner during this natural calamity.

- The Pakistani government gave money to several states and foreign relief donors in response to the 2022 floods. Here, however, it is important to remember that flood victims did get assistance from the federal government and the relevant provincial administrations. The government of Pakistan should develop a watchful system to provide aid to the impacted population in the event of a natural disaster.

- For public safety, medical, and military personnel, natural disasters pose a variety of special difficulties. The current results have contributed to the identification of the most frequent difficulties faced by public safety, medical, and military personnel while providing relief for natural disasters. This has allowed government agencies, humanitarian relief organizations, and researchers to focus on developing policies and programs that will lessen the negative effects of natural disaster deployments.

- In the event of flooding, provide training to nearby farmers on how to protect their farms with flood-resistant techniques such as terrace farming, walls, gabion and stone constructions, etc.

- Increasing the ability of the communities that are at risk to evacuate with their animals and other valuables will help to reduce the number of resources lost.

- Water-absorbing plants, like eucalyptus, can be carefully planted in riverine water sheds to help manage floodwaters.

- It is recommended that the government use a reactive strategy to risk mitigation and strive towards the provision of non-agricultural job prospects to avert an abrupt loss of employment chances and the consequent increase in poverty.

- Proactive government response to long-term/sustainable adaptation measures in flood-prone areas, such as building small dams or water channels, to prevent similar natural disasters in the future.

- All levels of government, from local to federal, should be committed to cooperating to guarantee that land planning regulations are being followed to the letter, allowing people to use their property for the intended purposes and discouraging construction in or close to valleys.

- People should receive serious training regarding the dangers of developing in undesirable locations. The government must build adequate infrastructure to allow people to disperse evenly throughout the country, rather than concentrating in small areas to find facilities that could be found elsewhere. The local government ought to use its authority responsibly, showing no partiality toward any individual.

- It seems that preventing flood mortality primarily depends on raising awareness and providing warnings through general education. People should be warned, for instance, not to drive or walk through floodwaters.

- Relief personnel should be provided with a physically safe environment to lower the hazards connected with structural problems, such as damaged or insufficient infrastructure or the inability

to rescue victims. (For instance, safe places should be noted, and evacuation rules and procedures should be spelt out.)

- Encouraging efficient communication, planning, preparation, and sufficient staffing is also noteworthy. Professional relief workers, volunteer personnel, and government agencies will need to coordinate well enough to accomplish this. To enable a quick and efficient organizational response, disaster management planning should be widely shared, for example, through online channels.

- Relief personnel should be given evidence-based mental health treatment in addition to training in disaster planning, coordination, and management. Research indicates that most organizations have previously regarded psychological treatments and support as insufficient. This is often due to a lack of funds and ambiguity about the most effective location, delivery mode, and scale. The rise in psychological problems emphasizes the necessity of evidence-based mental health therapies, more education and understanding of mental health concerns (including PTSD), and the implementation of these interventions both before and following participation in natural disaster relief operations.

- Apart from collaborating with coworkers, relatives, and friends, relief workers must to be motivated and assisted in engaging in self-care activities (such as maintaining a nutritious diet and sleeping habits). In a similar vein, when official mental health therapies are not accessible, humanitarian workers should be encouraged to connect with their colleagues and share their experiences connected to natural disasters. The likelihood that stressors experienced during the disaster relief process may result in the development of mental health concerns can be reduced by sharing experiences with peers.

REFERENCES

Ahmad, F., Kazmi, S. F., & Pervez, T. (2011). Human response to hydro-meteorological disasters: A case study of the 2010 flash floods in Pakistan. *Journal of Geography and Regional Planning, 4*(9), 518

Akhtar, A. (2013). *Indus basin floods: Mechanisms, impacts, and management*. Asian Development Bank

Allaire, M. (2018). Socio-economic impacts of flooding: A review of the empirical literature. *Water Security, 3,* 18-26.

Arshad, A., Ashraf, M., & Murtaza, G. (2023). Logistics and Rescue Operations, Role of Aviation in Disaster management in Pakistan: Logistics and Rescue Operations, Role of Aviation in Disaster management in Pakistan. *Journal of Geography and Social Sciences (JGSS)*, *5*(2), 91-106.

Baig, M. N. A., Khan, N., Naseer, R., Akhter, S., Shaikh, A. J., & Razzak, J. A. (2024). Pakistan's Emergency Medical Services (EMS) system & out-of-hospital-cardiac-arrest (OHCA): A narrative review of an EMS system of a low-middle-income country in the context of OHCA. *Resuscitation Plus*, *18*, 100627.

Brooks, S., Amlôt, R., Rubin, G. J., & Greenberg, N. (2020). Psychological resilience and post-traumatic growth in disaster-exposed organisations: Overview of the literature. *BMJ Military Health, 166*(1), 52–56.

Bukhari, S. I., & Rizvi, S. H. (2017). Impact of 2010 floods on Pakistan's Agriculture. J. Environ. Anal. *Toxicol, 7*(1), 1-4.

Cârstea, L. I. (2019). The Humanitarian Aid of the Joint Relief Commission of the International Red Cross in France to the civil population: children, women and internees (1940-1946). *Culture & History Digital Journal*, *8*(2), e022-e022.

Cutter, S. L., Mitchell, J. T., & Scott, M. S. (2012). Revealing the vulnerability of people and places: A case study of Georgetown County, South Carolina. In *Hazards Vulnerability and Environmental Justice* (pp. 111-142). Routledge

Gasper, R., Blohm, A. and Ruth, M., 2011. Social and economic impacts of climate change on the urban environment. Current Opinion in Environmental Sustainability, 3(3).

Geddes, L. (2022). Pakistan floods: Six ways in which flooding affects health, Gavi, the Vaccine Alliance.

Hirabayashi, Y., Alifu, H., Yamazaki, D., Imada, Y., Shiogama, H., & Kimura, Y. (2021). Anthropogenic climate change has changed the frequency of past floods during 2010-2013. *Progress in Earth and Planetary Science*, *8*(1), 1-9.

Işık, C., Ahmad, M., Ongan, S., Ozdemir, D., Irfan, M., & Alvarado, R. (2021). Convergence analysis of the ecological footprint: theory and empirical evidence from the USMCA countries. *Environmental Science and Pollution Research*, *28*, 32648-32659.

Işık, C., Ahmad, M., Ongan, S., Ozdemir, D., Irfan, M., & Alvarado, R. (2021). Convergence analysis of the ecological footprint: theory and empirical evidence from the USMCA countries. *Environmental Science and Pollution Research*, *28*, 32648-32659.

Kahn, M. E. (2005). The death toll from natural disasters: the role of income, geography, and institutions. *Review of economics and statistics*, *87*(2), 271-284.

Majeed, G. (2023). Good governance, institutional capacity and challenges: Case study of floods in Pakistan. *Orient Research Journal of Social Sciences*, *8*(1), 01-08.

Mohmand, S. K., Loureiro, M., & Sida, L. (2023). What Lies Beneath Pakistan's Disastrous Floods. *Current History*, *122*(843), 149-154.

Rana, I. A., Asim, M., Aslam, A. B., & Jamshed, A. (2021). Disaster management cycle and its application for flood risk reduction in urban areas of Pakistan. *Urban Climate*, *38*, 100893.

Sayed, S. A., & González, P. A. (2014). Flood disaster profile of Pakistan: A review. *Science Journal of Public Health*, *2*(3), 144-149.

Shah, S. M. H., Mustaffa, Z., Teo, F. Y., Imam, M. A. H., Yusof, K. W., & Al-Qadami, E. H. H. (2020). A review of the flood hazard and risk management in the South Asian Region, particularly Pakistan. *Scientific African*, *10*, e00651.

Søvold, L. E., Naslund, J. A., Kousoulis, A. A., Saxena, S., Qoronfleh, M. W., Grobler, C., & Münter, L. (2021). Prioritizing the mental health and well-being of healthcare workers: an urgent global public health priority. *Frontiers in public health*, *9*, 679397.

Sultan, A., Haider, F., & Jamy, S. H. (2023). INTEGRATED DETERRENCE: RELEVANCE & IMPLICATIONS FOR SOUTH ASIA. *Margalla Papers*, *27*(2), 71-84.

Ulaş, S. C., Açıl, D., Büyük, D. Ş., Durgun, S. K., & Açışlı, F. U. (2024). Risk Perceptions Regarding COVID-19 and Compliance with Protective Measures of Midwifery and Nursing Senior Students. *Revista da Escola de Enfermagem da USP*, *58*, 20230303.

Zarmina, A., Farooq, S. H., & Naeem, S. (2014). Flood Management System in Pakistan. In *1st MEDITERRANEAN INTERDISCIPLINARY FORUM ON SOCIAL SCIENCES AND HUMANITIES, MIFS 2014, Vol. 2* (p. 116).