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The Disaster Profile of Pakistan & Its Management Strategies

Nousheen Hameed[1], Sumera Ishrat*[2]

[1]Research Scholar, Department of Social Work-Faculty of Arts & Social Sciences, University of Karachi, Karachi, Sindh, Pakistan.

[2*]Assistant Professor, Department of Social Work-Faculty of Arts & Social Sciences, University of Karachi, Karachi, Sindh, Pakistan.

Corresponding author: sumeraishrat@uok.edu.pk

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Natural Disaster is a harsh truth from which nobody can escape and Pakistan has been generally powerless against natural disasters by its novel geo-climatic conditions. Floods, cyclones, tsunamis, droughts, earthquakes, and landslides have been an intermittent peculiarity. Among these floods, earthquakes, and droughts risk are very high. These disasters undermine a huge number of lives and cause enormous scale financial, framework, horticulture, and productivity losses that genuinely block Pakistan's overall development. To limit the harm brought about by disasters, different endeavors have been taken by the government, society, NGOs, and worldwide networks. Disaster management possesses a significant spot in this country's policy framework. The research paper covered the Disaster profile of Pakistan and the Disaster management system in Pakistan in subtleties and concluded with Suggestions.

1. Introduction

Natural disasters including heat waves, droughts, floods, extreme colds, and earthquakes are common in Pakistan. According to the Climate Risk Index 2020, Pakistan is ranked fifth among the countries most affected by extreme weather events. Millions of lives are at risk due to these dangers resulting in significant losses in financial, infrastructure, agriculture, and productivity that seriously impede Pakistan's overall development. (Eckstein et al., 2021) As per information gathered by Verisk Maplecroft, a UK-based risk executives' organization, Pakistan positions at seven with around 136 million (70% of its populace) individuals presented to regular dangers. Pakistan is situated inside a risk-inclined region and is presented to different cataclysmic events. The most common reasons why more people are now at risk from natural disasters than ever before are rapid population growth, unchecked development, and unmanaged infrastructure expansion. (Islamic Relief, 2022)

Pakistan has faced several hazards over the past few years Drought-like circumstances, which got started in the last months of 2018 and continued through 2019, impacted over five million individuals, of whom more than two million individuals focused on compassionate help. A winter emergency that impacted a million people across much of the country's western region ensued afterward. In January 2020, the government declared a public crisis over the most egregiously awful desert locust infestation in 27 years of existence. A drop in education, an increase in malnutrition, and shocks to the health and economy were caused by the COVID-19 pandemic, which started in February 2020. In September 2020, the government declared a national emergency in response to prolonged monsoon rainfall that resulted in significant floods in the province of Sindh, affecting approximately 2.4 million people.

A disaster is described by the World Health Organization (WHO) as "an unexpected ecological condition of sufficient magnitude to require external assistance." Landsman (2001) and Cookeet al. (2022) defined a disaster as any unexpected event that exceeds the ability of the affected community to the point where it requires external support, damages property, disrupts the environment, kills people, and deteriorates health and health services. Natural disasters are outrageous occasions inside the world's framework (lithosphere, hydrosphere, biosphere or air) which contrast considerably from the mean, bringing about death or injury to people, and harm or loss of important great, like structures, correspondence frameworks, horticultural land, woods, regular habitat (Sharma et al., 2021; Hassan et al., 2023; Ahmad et al., 2023; Farrukh et al., 2023). They have a significant impact on the socioeconomic system as a result of the natural environment (Alexander, 1993; Sanderson & Alexander, 2020). This impact may be rapid, as with earthquakes, or gradual as with drought. Understanding the difference between a hazard and a disaster is crucial (Merz et al., 2020). A potentially dangerous phenomenon (hazard), such as an earthquake, is not regarded as a disaster in and of itself when it happens in unpopulated areas (Wei, 2021). When

something bad happens in a populated area and causes destruction, harm, or misfortune, it is referred to as a disaster (Clarke, 2021).

1.1 Classification of Disaster

Disasters can be grouped in more than one way. A possible division lies in the area between:

1.1.1 Natural Disaster

Events that wreak havoc on human societies are known as natural disasters. They are caused by entirely natural events (Singhet al., 2023). Geological (Such as volcanic eruptions, and earthquakes), Hydrological (such as tsunamis, droughts, landslides), Meteorological (such as typhoons, heat waves, cold waves, freezing rains), and Biological (such as AIDS, TB, COVID-19) are the four expansive kinds of natural hazards (Okolo, 2023).

1.1.2 Man-Made Disaster

Man-made disasters have a component of human expectation, carelessness, or blunder including a disappointment of a man-made framework, rather than natural hazards coming about because of regular risks (Farazmand & Danaeefard, 2021). Such man-made disasters are crimes, illegal conflagration, common confusion, psychological oppression, war, natural/substance danger, digital assaults, and so forth. Followings are the research objectives of the current study.

1. To Study Disaster Profile of Pakistan.
2. To examine Disaster Management in Pakistan.

2. Literature Review

There is a long history of cataclysmic disaster events in Pakistan. Pakistan's geological area uncovered more pornography of various kinds of cataclysmic events like earthquakes, avalanches, floods, and so forth. Pakistan is extremely susceptible to natural disasters, and a significant number of Pakistanis reside in disaster-prone areas. (Rafiq et al., 2012) Pakistan has experienced many tragedies both before and afterwards its independence in 1947. i.e., earthquakes, tsunamis, droughts, floods, landslides, and cyclones. (Rahim, 2019)

2.1 Earthquake

When the ground shakes as a result of slipping along a fault plane, earthquakes occur. Tensions build up along the edges of active tectonic plates as a result of friction at their margins, which causes them to become stuck (Hanks, 1977; Xu & Zeng, 2022). Ground shaking brought about by seismic tremors is a significant supporter of foundation harm and the event of optional dangers such as floods, landslides, tsunamis, liquefaction, heat, and surface deformation. (McKenzie & Jackson, 2012; Aykurt Vardar et al., 2023) Pakistan is located in one of the world's most seismically active regions, with the evolving mountain range of the Himalayas to the north, the Hindu Kush range of mountains to the northwest, and the Suleiman Mountain ranges to the southwest (Bernard et al., 2000). The Indian tectonic plate is sliding underneath the continent of

Eurasian at a rate of 31 mm/year, which puts Pakistan and the adjacent Indian and Afghan territories at high seismic risk (Ruler, 2015). The collision of the Indian and Eurasian plates gave rise to the world's most prominent mountain ranges, including the Hindu Kush, the Himalayas, and the Karakoram. (Searle et al.,2016) In addition to unfavorable structural development, the slopes of the mountains of the Karakorum, Hindu Kush, and Koh-e-Suleiman are especially powerless and can experience enormous destruction as a result of erosion. (Bothara & Hiçylmaz, 2008) The following are the deadliest earthquakes in Pakistani history.

2.1.1 1935 Quetta Earthquake

It struck Quetta at 02:33 on the 31st of May. The epic magnitude 7.7 earthquake claimed about 60,000 human lives (Rahim, 2019).

2.1.2 1974 earthquake in Hunza

At 12:11 on the 28th of December, 1974, the Hunza Valley was struck by an earthquake of magnitude 6.2. The entire northern region of Pakistan felt the effects of the earthquake. It affected 97,000 people, caused 17,000 injuries, and killed about 5,300 people. The town of Pattan in the North-West Frontier Territory was destroyed by its catastrophic effects (presently Khyber Pakhtunkhwa). (Rahim, 2019, DAWN, 2011)

2.1.2 The year 2005 Earthquake in Kashmir

The deadliest earthquake ever recorded, measuring 7.6 on the Richter magnitude scale, caused chaos throughout the city and created extremely dangerous zones in Khyber Pakhtunkhwa, Islamabad Capital Domain, and Azad Jammu and Kashmir. The earthquake caused billions of dollars worth of damage and misfortune, leaving 73,338 people dead, 128,304 injured, and 3.5 million affected. (Shafiq & Ahsan, 2014)

2.1.3 April 2013 Washuk (Mashkel)Earthquake

An earthquake with a magnitude of 7.8 struck a portion of the Balochistan region on the Iran-Pakistan border, in Washuk (Mashkel) in April 2013. Numerous houses were destroyed by the earthquake, leaving thousands of people homeless in neighboring far-off towns. The earthquake smoothed over nearly 90% of Mashkel, a fairly measured town in the area. (CFE-DM, 2021)

2.1.4 September 2013 Awaran Earthquake

An enormous earthquake struck the territory of Balochistan in a remote, hilly segment of the district. 7.7 magnitude was measured as the initial intensity. Several days afterward, the southwest region of Balochistan was struck by a 7.2-magnitude convulsion. The earthquake resulted in 599 injuries and 399 death tolls. Due to the remote, rural location, any additional deaths, wounds, or widespread harm were turned away (CFE-DM, 2021).

2.1.5 2015 Earthquake in Khyber Pakhtunkhwa

At 14:09 on the 26th of October, 2015, an 8.1-magnitude earthquake struck the Hindu Kush Mountain ranges, resulting in significant destruction and losses in Gilgit-Baltistan, Khyber Pakhtunkhwa, Azad Jammu and Kashmir, and federal Managed Ancestral Regions (at present, a part of KP). The earthquake caused approximately 272 deaths, 853 injuries, and the destruction of 96,047 homes (Rahim, 2019).

2.1.6 2019 Mirpur Earthquake

On September 24, at 16:01 hours, a 5.8-magnitude earthquake struck the districts of Jhelum in Punjab, and Mirpur and Bhimber in Azad Jammu & Kashmir. The earthquake caused significant damage, killed 39 people, and injured 746 more (CFE-DM, 2021, Rahim, 2019).

2.2 Tsunami

Tsunami is one of the main oceanic hazards commonly set off by seismic tremors and submarine landslides. It is possible for a tsunami to cause damage not only in the region where it is generated but also in areas that are far removed from the generation region. It is accepted that innovation alone can't safeguard the coast's living spaces in the event of a close source tsunami. A tsunami brought about by an earthquake around here in November 1945 guaranteed many lives. (Nawaz & Naeem, 2016)

2.2.1 1945 Makran Tsunami

A powerful 8.1-magnitude earthquake near Pasni on the Makran Coast caused a tsunami that slammed into Pakistan's shores at, Gwadar, Pasni, Ormara, Karachi, and Keti Bandar, with waves as high as 15 meters. It is estimated that the tsunami claimed the lives of up to 4,000 individuals. (DAWN, 2011, Rahim, 2019)

2.3 Cyclone

Pakistan has a 1,046-kilometer (650-mile) coastline that runs along the Arabian Sea and the Gulf of Oman. Gwadar is the main port city in Pakistan's extreme southwest. Even though the Arabian Sea, which is a part of the North Indian Ocean, rarely experiences cyclones, most of those that do form tend to move toward Western India rather than Pakistan. According to Kidwai et al. (2019), the monsoon season plays a crucial role in the formation of cyclones in this basin. Cyclones typically form in the Arabian Sea from May to June and then from September to October. The cyclones that killed the most people in Pakistan's history are listed below.

2.3.1 1944 Karachi Cyclone

On the 27th of July, a powerful cyclone made an appearance in Karachi, resulting in extensive damage and leaving roughly 20,000 individuals destitute.

2.3.2 1964 Indus Valley Cyclone

On the 12th of June 1964, a powerful cyclone made landfall along the coast of Sindh, causing immense damage, 450 setbacks, and the destitution of 400,000 people. (Rahim, 2019)

2.3.3 1965 Karachi Cyclone

On the 15th of December in 1965, the deadliest cyclone in Pakistani history made landfall in Karachi, resulting in an estimated 10,000 deaths and leaving many people without homes.

2.3.4 1970 East Pakistan Cyclone

On the 12th of November 1970, a cyclone hit the former East Pakistan (Bangladesh). Due primarily to the tempest flood that submerged a significant portion of the low-lying islands in the Ganges delta, it was the deadliest cyclone to have ever been recorded in East Bengal, with an estimated 500,000 fatalities. (DAWN, 2011)

2.3.5 1992 Cyclone in Sindh

On the 16th of November a cyclone from Indian Gujarat moved into Sindh and started to spread near the border between Sindh and Gujarat. However, it resulted in massive flooding and rainfall in Badin, Thatta, and Karachi, fatally shooting 609 inhabitants and displacing 200,000 more. (Rahim, 2019, DAWN, 2011)

2.3.6 1998 Gujrat Cyclone

In June 1998, leftovers of the Classification 3 1998 Gujarat cyclone (the fifth most grounded cyclone of the Middle Eastern Ocean killed 12 individuals in Karachi.

2.3.7 The 1999 Pakistan Cyclone

The 1999 cyclone was a destructive cyclone that carried further decimation to a region struck by a strong storm almost a year earlier. It destroyed 73 towns and uprooted more than 600,000 individuals. Disasters involving property and landscapes valued at up to the United States dollar 12.5 million have also been reported.

2.3.8 2007 Cyclone Yemyin

Cyclone Yemyin, which occurred in June and affected coastal areas of Sindh and Balochistan, caused fire floods that resulted in approximately 730 deaths. Over 2 million domesticated animals died, 2.5 million people were affected, and about 350,000 people were uprooted. (DAWN, 2011)

2.4 Floods

Flooding is one of the most frequent natural disasters in Pakistan. They happen when water from heavy rainfall or liquefying snow from the Himalayas. The water may overflow onto floodplains, and low-lying areas adjacent to rivers when this occurs. When dams or levees break, flooding can also occur. Pakistan ranks among the top ten nations in the world for frequent and

severe natural disasters such as heat waves, cyclones, floods, and heavy rains. One of the countries in South Asia most prone to flooding is Pakistan. Pakistan is among the five countries in South Asia where the average annual number of flood victims is highest. (Friedlinstein et al., 2011) Floods happen essentially every year, affecting and uprooting a large number of people while destroying vast tracts of land and standing crops. Since its inception in 1947, it has been one of the most frequent regular risks in the nation. Due to rapid environmental change and global temperature shifts, flooding has become increasingly prevalent in recent years. Pakistan has experienced several catastrophic floods since its founding. The following are the flood risks that Pakistan faces between 1970 and 2022:

2.4.1 1950 Punjab Floods

When the River Ravi exploded its banks and flooded, about 2,190 people died, 10,000 villages suffered damage, and 900,000 people were left penniless. The city that was most severely damaged was Lahore. (DAWN, 2011; Rahim, 2019)

2.4.2 Floods in 1973

Individuals from Sialkot and Gujranwala were reported dead as a result of the August 8 start of the floods. On August 11, a large number of Lahore and Wazirabad villages were submerged. On August 21, Indus water from flooding reached Larkana, and on September 2, Sadiqabad's rural areas were submerged. Massive misfortunes and injuries were reported. The deluges affected over 4.8 million people.

2.4.3 1992 Floods

September saw a lot of rain, which caused the 1992 floods. On September 12, a flood caution was issued. At the height of the flood on September 14, River Jhelum was there and flooded numerous villages. On September 15, high flood conditions were observed in streams, and to save Multan, water had to be diverted via dike breaks. The floods affected 12 million people, and about 1,400 people lost their lives (Rahim, 2019).

2.4.4 2003 Sindh flood

In 2003, Sindh territory was severely affected by flooding brought on by above-average monsoon rains. Karachi also experienced metropolitan flooding, with two days of 284.5 millimeters (11.20 in) of rainfall causing havoc in the city. The Thatta area was particularly hard hit, with 404 millimeters (15.9 in) of rainfall causing streak floods in the area. In the area, nearly 4,476 villages were affected and 484 people lost their lives (Rehman et al., 2016**).**

2.4.8 2007 flood

Sindh, Khyber Pakhtunkhwa, and coastal Balochistan were badly hit by the monsoon rains in 2007. Cyclone Yemyin affected Sindh and coastal Balochistan in June and beyond, bringing with it heavy rains in July and August. Meanwhile, melting glaciers affected Khyber-

Pakhtunkhwa, bringing with them heavy rains in July and August. In July and August, approximately 130 people perished and 2,000 were displaced in Khyber-Pakhtunkwain, while 815 people drowned in Balochistan and Sindh as a result of explodes and flooding (PWP, 2011).

2.4.9 2010 Pakistan Super Floods

On the 22nd of July 2010, Pakistan experienced the most outrageously horrible example of flooding. Twenty million people in Khyber Pakhtunkhwa, Punjab, Sindh, Balochistan, and Azad Jammu & Kashmir were impacted by the floods. The flood claimed the lives of about 1,985 people, injured 2,946 others, and resulted in losses and damages exceeding $10 billion. (IFRC, 2013; DAWN, 2011; Hashmi et al., 2012)

2.4.10 2011 Sindh Floods

Approximately 27,581 square kilometers were submerged due to unusual rainfall in Sindh that occurred over about a month in August. As a result, 9.3 million people were affected and 516 lives were lost. (IFRC, 2013)

2.4.11 2012 Balochistan Flood

Punjab, Sindh, and Balochistan regions experienced extensive flooding due to the seasonal monsoon rains. The first monsoon rains arrived later in the season, but a powerful eruption in the latter part of the season resulted in flooding, destruction of infrastructure, and fatalities. The territory around the town in Balochistan was most severely damaged, with animals and quaint residences being carried away by the flood (IFRC, 2013; CFE-DM, 2021).

2.4.12 August 2013 Flood in Balochistan

In Balochistan, a few days of intense monsoon rains resulted in widespread flooding. To begin work on the overflowed foundation, authorities concentrated on clearing the sewage framework. Suffering damage affected important street grids and uprooted populations temporarily residing on trench banks (CFE-DM, 2021).

2.4.13 September 2014 Floods

In early September 2014, Punjab, Gilgit Baltistan, and Azad Jammu and Kashmir were affected by streak floods. Extreme flooding brought on by the monsoon rains damaged homes and severely damaged farmland and livestock. Over 2.5 million people were impacted by the floods, and over 250,000 farmers lost over a million acres of farmland as a result. The floods are said to have killed 367 individuals; nonetheless, the complete doesn't consider thump on well-being impacts coming about because of the floods. In the wake of getting back to their places of the beginning, the uprooted populace experienced respiratory ailments, diarrhea, and skin sicknesses (CFE-DM, 2021).

2.4.14 April 2015 Floods

Unseasonably heavy rainfall fell on several parts of Pakistan from a severe storm. Balochistan, Sindh, Gilgit-Baltistan, and Punjab were the most severely hit, with widespread infrastructure damage and population displacement. Owing to the unusual force of the tempest early in the season, the storm—which occurred before the monsoon season—was termed a "mini cyclone". The combination of heavy rains, quickly melting snow, and runoff from glacial lakes resulted in flash floods and significant flooding of the Indus River in Pakistan. Approximately 285,000 individuals were impacted with 238 passings and 232 wounds (Gul et al., 2022; CFE-DM, 2021)

2.4.15 2022 flood

Pakistan's 2022 monsoon season created critical rainfall, obliterating floods, and landslides, and influencing a large number of individuals. During the monsoon season in 2022, In 94 districts, floods and flash floods impacted about 33 million people (OCHA, 2022).

2.5 Landslide

For a considerable amount of time, earth material with varying sizes and origins has been described by the term "landslide." From small weather zone aggravations to the well-established relocation of large stone sections, landslides can take many different forms. (Hungr, 2007) Several factors, including their nature, the depth of the substance, the rate of development, ecological tensions, the amount of material attacked, and proximity to that slide, all influence their impact in part. (Causes, 2001) Apart from the massive flowing Indus Basin, which is prone to sporadic catastrophic floods and desertification (counting waterlogging), a sizable portion of the country is covered in steep and geomorphologically dynamic mountains (Owen & Britain, 1998).

2.5.1 2010 Hunza Lake Disaster

In September 2009, the NDMA declared Attabad town, located in Gilgit-Baltistan's district Hunza, unsafe due to a review that the Geological Survey of Pakistan (GSP) had accepted. A total of 103 families were evacuated before the incident. A massive landslide on the fourth of January blocked the Waterway Hunza's natural flow, which led to the extremely durable creation of Attabad Lake. When the town of Attabad was covered, twenty people were killed and twenty houses were destroyed. The landslide blocked the Hunza River, and the exponentially growing waters of the newly created lake threatened the networks even further below or beyond the supply (Chen et al., 2017; Aamir et al., 2022; Hassan et al., 2022; Khan et al., 2022).

2.5.2 March 2016 Floods and Landslides

A sudden storm ahead of the normal monsoon season claimed the lives of at least 262 people and injured 223. Most of the deaths occurred in Khyber Pakhtunkhwa, where landslides and flooding damaged over 2,700 residences. During the storm and its aftermath, announcements were made regarding food shortages and disruptions in media transmission. Merely 50% of the over 300,000 families that were internally uprooted managed to return to their original locations.

2.5.3 Landslides and Floods in June 2016

A severe windstorm destroyed homes with streak flooding and landslides, brought intense rainfall to Peshawar, Rawalpindi, Islamabad, and Lahore, and killed 226 people. It additionally injured many more. Flood damage caused Lahore to lose electricity for a few days (CFE-DM, 2021).

2.5.4 2017 January Floods and Record-Breaking Snowfall

During a week in January 2017, the Balochistan region experienced flooding due to heavy rainfall and surpassing records of snowfall. More than 60,000 individuals in the territory looked for government help, however, just 6,000 were offered help. Approximately 13 deaths and 650 wounds were accounted for, with extra passings and wounds detailed after a landslide and avalanche happened following the floods (CFE-DM, 2021).

2.5.5 2019 July Landslides and Floods

A series of landslides and floods occurred in northeastern Pakistan due to heavy rainfall. Throughout two months, mudflows, landslides, and floods resulted in 225 fatalities and 166 injuries, steadily raising the human death toll. Over 200 homes were destroyed by torrential rain (CFE-DM, 2021).

2.5.6 Floods and Landslides in August 2020

In August and September, heavy monsoon rains caused urban areas to flood. The most severely affected state was Sindh, where 409 people lost their lives and 402 were injured. The area's main crops were destroyed by the flood, which also unfairly affected the women who worked on the ranches. Consequently, food weakness has spread widely. Following the floods in October, an enormous landslide occurred in the Gilgit-Baltistan location, causing damage to streets and killing sixteen people (OCHA, 2020, Hassan et al., 2022; Hassan et al., 2023; Mughal et al., 2023; CFE-DM, 2021).

2.6 Drought

One of the likely consequences of global warming is drought, which causes wetlands to evaporate and a significant drop in groundwater levels. One of the nations that is most likely to be severely impacted by a global temperature shift is Pakistan (Campbell & Pradesh, 2005) Devastation has been unleashed on areas in Pakistan's east and south due to drought. 60% of the country is classified as semi-bone-dry to dry due to low rainfall and drastic temperature fluctuations, with Balochistan, Sindh, and the southern portion of Punjab being the most notable regions. Less than 200 millimeters of precipitation fall on arid regions each year, leaving them especially susceptible to even small changes in rainfall patterns or overuse of water. Every ten years, the regions with the least number of resources endure a protracted drought (Anjum, 2012). In areas lacking surface water and with low or saline groundwater, environmental change is

powerless. Drought is a confused anomaly closely linked to its economic situation (Ghaffar & Javid, 2011).

Drought has different intense and long-haul ramifications for the environment of Pakistan's influenced regions. In most of Pakistan, rainfall has a significant impact on agricultural productivity. Pakistan's vast and distinctive network of canals has helped to alleviate drought in many areas of the country.

In any case, drought keeps on being an issue in the spots where there are no irrigation networks. Balochistan Territory, for instance, is incredibly parched, and there could be no appropriate frameworks for canal networks to manage this network. Close to half of Balochistan gets under 125 mm of downpour each year, and the excess regions get minimal more than 250 mm of downpour (Ashraf & Routray, 2015). Droughts are also severe and frequent in the Thar Desert, which is located beyond the left-bank floodplains of the Sutlej and Indus Rivers (Siddiqui, & Safi, 2017).

2.6.1 The 1998–2002 drought in Pakistan

Almost 2 million people nationwide were affected by what is regarded as the worst drought in Pakistan's history. In Balochistan, the drought affected at least 1.2 million people, and over 100 of them lost their lives—mostly from dehydration. Numerous animals perished. One of the hardest hit areas was the town of Nushki, which is near the Afghan border (DAWN, 2011).

2.6.2 2014–2017 Drought

Beginning in the year 2013, the Sindh region of Tharparkar recorded an increase in deaths linked to persistent hunger. Low rainfall brought about broad yield disappointment and the loss of domesticated animals. Access to consistent sources of water became increasingly difficult as the drought worsened, and the prevalence of illnesses caused by water in the area increased. Simultaneously, an episode of sheeppox killed a large number of little creatures. Due to a lack of food and water, malnutrition rates among adults and children increased, with children accounting for the majority of deaths and hospitalizations. From the rustic area, families need to travel a normal of 17 km to get to wellbeing offices. The districts of Tharparkar, Umarkot, and Sanghar were visited by an integrated UN assessment team when the drought subsided. Based on mission findings, it appeared as though needs hadn't been fulfilled and the amount of rainfall continued to be low, the situation could quickly escalate into a "humanitarian emergency". Over several years, tens of thousands of people were hospitalized and hundreds of adults and children died as a result of the drought, according to estimates (CFE-DM, 2021).

2.6.3 2018-2019 Drought

A delayed, far and wide drought impacted more than 5 million individuals across Sindh, Punjab, Balochistan, and Gilgit Baltistan territories. The monsoon season brought less rain than anticipated, which led to the drought. It was reported that over 30% of households in the affected

areas were malnourished, with over 70% of households experiencing food insecurity. The circumstance became quite possibly the most terrible disaster in Pakistan. Insignificant or no rainfall continued across the impacted locales, decreasing the amount of water available through springs and wells and completely evaporating supplies of drinking water (CFE-DM, 2021).

2.6.4 Drought, Pandemic, Floods, and Locust Invasion in 2020–2021

Between 2020 and the middle of 2021, Balochistan's population, which as of now encounters the most elevated pervasiveness of food uncertainty, unhealthiness, and destitution in Pakistan, confronted various shocks including high food costs, beetle episodes, downpours, snowfall, flooding, and other circumstances made worse by the coronavirus pandemic. Most of the regions designated as arid and heavily dependent on precipitation didn't get downpours in April and November 2020. In the southern and western parts of Balochistan, a moderate drought-like condition developed as a result of a lack of pre-winter and winter rainfall. Around 760,000 individuals are assessed to confront elevated degrees of intense food uncertainty during the period the month of March to June of 2021, as opposed to the beginning of the gathering period and the furthest point of the harvest period. It is projected that there will only be roughly 30,000 drops in the population in the Crisis and Emergency phases during the July–September 2021 post-harvest season. (CFE-DM, 2021) In Pakistan, from 3 January 2020 to 12:14 pm in 2023, there have been 1,580,631 confirmed cases of Coronavirus with 30,656 passing (IFRC, 2022; WHO, 2023).

2.7 Pakistan's Administrative System for Disaster Management Institutional Structure

Since Independence, different regulations and institutional bodies were proclaimed/laid out. A summary of these significant milestones can be found below:

2.7.1 The Civil Defense Act of 1952

The Civil Defense Act of 1952 was enacted to help the general public defend themselves against hostile acts and natural disasters. This Act has been revised after some time considering national prerequisites (Maqbool et al., 2017).

2.7.2 The Calamities Act 1958

The Calamities Act of 1958 was primarily centered around sorting out crisis reactions (support and reclamation of requests in regions impacted by catastrophes). In 1971, the formation of the four provinces resulted in an amendment to this Act (UNDRR,2019).

2.7.3 Emergency Relief Cell

The Emergency Relief Cell was set up within the Cabinet Division in the year 1971 with the responsibility of minimizing national disasters. In the event of major disasters, it offered financial and material assistance to supplement the provincial governments' resources. ERC converged with NDMA in 2015.

2.7.4 The Federal Flood Commission

In response to the floods of 1973 and 1976, the Federal Flood Commission was established in 1977 which unleashed destruction all through the country. The task of assisting in the national coordination of flood prevention measures was assigned to FFC (Maqbool et al., 2017).

2.7.5 The National Crisis Management Cell

By the Anti-Terrorist Act, the National Crisis Management Cell was established in July 1999 in the Service of Inside to coordinate with Provincial Crisis Management Cells and to collect information regarding various crises throughout the nation.

2.7.6 Punjab Emergency Service

The skeleton of the Punjab Emergency Service was conceived in 2004. To supply the regulatory and executing unit the service of 1122 was sent off. From there on, the governing legislation was endorsed in 2006. The service is assigned to various assignments including sensitive emergency response, clinical evacuation, checking disaster response, undertaking capacity building, and organizing crisis response.

2.7.7 Earthquake Reconstruction and Rehabilitation

To provide input on how to organize the recovery and reconstruction of the earthquake-affected areas in the Kashmir Territory in 2005, the Federal Mitigation Commission and the Earthquake Reconstruction and Rehabilitation Mandate (ERRA) were passed in 2005. This mandate was then put into Act in 2011 (PPAF, 2015).

2.7.8 National Disaster Management Act (2010)

It is a fundamental reason to set out a far-reaching structure for DRM, encompassing every stage of the cycle of disaster management (replacing the DM ordinance of 2009) (UNDRR,2019).

2.7.9 National Framework of Disaster Risk Management (2007-2012)

Its fundamental reason to Plan is to distinguish core values and needs for decreased risk of disaster (NDMA, 2012).

2.7.10 National Disaster Management Plan (2012-2022)

Its principal reason is to guide and standard institutional and specialized DRM needs, in acknowledgment of the requirements of pre-disaster stages (NDMA, 2012).

2.7.11 National Disaster Risk Reduction Policy (2013)

Its principal reason is to outline needs and directions for risk reduction according to a proactive viewpoint, with a unique accentuation on prevention, mitigation, and preparedness (NDMA, 2015).

2.7.12 Implementation Road Map for the National Disaster Management Plan (2016–2030)

Its primary reason is to Set up boundary exercises for the time of 2016-2030, with an emphasis on multi-danger risk evaluations, capacity building, community resilience, and raising awareness (NDMA, 2016).

2.7.13 The National Disaster Response Plan (2019)

Its principal reason for Layouts the system for disaster response in light of the identified roles and responsibilities of different partners (UNDRR, 2019).

2.8 Evolution of National Disaster Management Authority

Pakistan initiated national efforts to establish a disaster management framework that prioritizes prevention, relief, and response integration. This was prompted by the severe damage caused by the 2005 earthquake, which prompted a review of conventional disaster management systems and emergency crisis response tactics. Proclamation in 2006, the National Disaster Management Ordinance (NDMO) became the National Disaster Management Act in 2010 after being approved by Parliament. The National Disaster Management Commission (NDMC) was established by the Prime Minister to expedite the process of creating all-encompassing national policies. The focal point in charge of disaster management at the federal level is the National Disaster Management Authority (Irshad & Iqbal, 2015).

Organizations at the federal and state levels are granted specific guidelines by the NDMA regarding the development of plans, strategies, and initiatives for disaster risk reduction. The NDMC is responsible for formulating the regulations, decisions, and suggestions of the NDMA. The NDMA chairman serves as the NDMC secretary. On October 26, 2011, the Pakistani government placed NDMA under the Ministry of National Disaster Management. On April 18, 2012, the Ministry of Climate Change was renamed (NDMA, 2012). In 2018, the Ministry of Climate Change was directly placed according to the Prime Minister's office (CFE-DM, 2021; NDMA, 2012).

The importance of creating the National Disaster Management Plan was recognized by the NDMA. It is a thorough, long-term national disaster risk management policy document (DRM). A national hazard and vulnerability assessment, human resource development, community-based disaster risk management, a multi-hazard early warning system, and disaster management operations by type of disaster—such as earthquake, tsunami, flood, drought, cyclone, and so on—are just a few of the policies, strategies, and actions that fall under this umbrella. Programs and activities aimed at disaster management. The general protocols for disaster management in Pakistan will be determined by the National Disaster Management Plan.

Pakistan has three administrative levels of government; National level, provincial level, and district level. At the federal government level, the National Disaster Management Authority (NDMA), at the province level, the Provincial Disaster Management Authority (PDMA), and at the district level, the District Disaster Management Authority (DDMA) are the points of convergence for disaster risk management initiatives. In the event of a disaster, DDMA will be the

first rescue squad, and if required, the incident may be concentrated at the provincial or national level. The prime minister of the state will lead the NDMC, which will define national policy, while the chief minister of each province will lead the PDMC and serve as its director. The DC of the district is in charge of the disaster management system in Pakistan, which is called DDMA (Mehmood, 2015; Swathi, 2015).

2.9 The Function of Different Wings

Three wings of NDMA are assigned the following tasks to carry out the delegated undertakings/capabilities:

1. **A**dministration and Finance Wing**:** Provide everything financial and legal support necessary for NDMA's day-to-day operations.
2. Disaster Risk Reduction Wing: It manages all DRR procedures and strategies for all types of disasters, risk insurance, NDMC, including the implementation and progress of the National Disaster Management Plan (NDMP), and disaster awareness. Moreover, the DRR wing coordinates all matters in the designated area with UN offices, reciprocal/multilateral associations, INGOs, and NGOs.
3. Operations Wing: Under all disasters (both within and foreign), it oversees the management of the National Emergency Operations Center (NEOC), rescue, and relief operations. Additionally, it coordinates aid projects and humanitarian relief efforts with the military, federal and provincial authorities, and other organizations. The Operations wing is also responsible for developing contingency plans and emergency responses for various disasters (Rahim, 2019).

2.10 Disaster Relief and Emergency Response

In both emergency and non-emergency situations, the Emergency Operation Center (EOC) is operational. In times of disaster, the Emergency Operation Center assists with relief efforts and prompt recovery; in other circumstances, it handles readiness and contingency planning. In affected areas, the Emergency Operations Center serves as the hub for information, collaboration, and the administration of disaster relief efforts. The Emergency Operation Center (EOC) will be made up of the following offices: Fireplace and Salvage, Pakistan Red Crescent Society, civilian defense, Ambulance Services, Pakistan Military, and other humanitarian organizations (CFE-DM, 2021).

2.11 Armed Forces Role in Disaster Relief

Pakistan's military is very familiar with all parts of humanitarian help and disaster response. The NDMA Act of 2010 allows the National Disaster Management Association (NDMA) to request assistance with disaster management from any individual or group, including the police, all armed forces, and other agencies. If the military is needed, NDMA has the authority to decide when to use what resources. The kinds of military help that can be mentioned include:

- Prepare for emergency response

- Conduct rescue, damage control, and cleanup operations with DM specialists
- Giving assets or equipment (helicopters, planes, ships, machinery, and so on.)
- Helping DM experts in setting up camps and putting together clinical camps collaborating with wellbeing pioneers
- Assisting DM experts during evaluations.
- Assisting DM professionals during the stages of recovery as well as reconstruction, or spearheading recovery and recuperation on their own when necessary giving security during a disaster, as needs be.

2.12 Disaster Management Partners

One important partner in disaster response and preparation is the Pakistan Red Crescent Society, which is supported through various Red Cross or Red Crescent National Societies. It is linked to providing relief, supporting capacity building, and assisting with wellness and the reconstruction process. Through the efforts of fifty thousand volunteers and a thousand staff members, it is accessible in over eighty districts across the nation. When national and international associations get involved in Pakistan's disaster response, the National Humanitarian Organization and Pakistan Humanitarian Forum serve as the organizing bodies for those associations. With NDMA, the National Humanitarian Organization and Pakistan Humanitarian Forum communicate openly and cooperatively. There are other regional charitable organizations, community-based organizations, and humanitarian organizations with staff members who are either nationwide generalists or trained professionals.

The entirety of the reduction of disaster risks and disaster management in the nation is connected to UN organizations. The UN delegation in the country is in charge of organizing random UN-NGO meetings to track response and of establishing the Between Inter-Agency Standing Committee. UN agencies are essential to building capacity because they provide the federal, provincial, and district governments of Pakistan with specialized assistance in formulating policies and organizing disaster relief.

A large number of the UN organizations work in Pakistan; they include: UNICEF (United Nations Children's Emergency Fund), ILO (the International Labor Organization), FAO (the Food and Agriculture Organization), UNESCO (United Nations Educational, Scientific and Cultural Organization), UNDP (United Nation Development Program), UNODC (United Nations Office on Drugs and Crime), IFAD (International Fund for Agricultural Development), IOM (International Organization for Migration), UN AIDS, UNEP (United Nations Environment Program), UN Department of Safety and Security (DSS), OCHA (Office for the Coordination of Humanitarian Affairs), UNCTAD (United Nations Conference on Trade and Development), UNIDO (United Nations Development Organization), UN Women, WFP (the World Food Program), WHO (The World Health Organization), UN Volunteers, and UNOPS (United Nations Office for Project Services).

One of the most active organizations assisting Pakistan in reducing the risk of disasters is UNDP. NDMA receives specialist assistance from UNDP to create a national Sendai Framework plan. Through an organization procedure involving public-private partnerships, UNDP is assisting the provincial authorities of Sindh and Punjab in gaining access to resources for disaster risk management. UNDP has established four District Emergency Operation Cells and set up Disaster Risk Management Plans for districts that are particularly vulnerable in these corresponding regions. Furthermore, the organization has assisted in implementing community-based disaster risk management in 130 networks that are considered to be at risk in Khyber Pakhtunkhwa, Balochistan, and Sindh. UNDP assisted in identifying vulnerable areas in Sindh and Punjab so that district DRM plans and Emergency Operation Centers could be created. It supported the implementation of sixty plans for relief. Almost 10,000 members of the community have received CBDRM training.

United States Agency for International Development (USAID) drives endeavors to prevent fatalities, help people escape life-threatening situations, and support them after assistance ends. The agency's programs help Pakistan become a more secure, prosperous, and peaceful nation. USAID has extended assistance to WFP in the form of emergency food assistance (locally, provincially, and nationally acquired food assistance and money transfer for food) to vulnerable families in Balochistan and Sindh, as well as to temporarily displaced individuals in Khyber Pakhtunkhwa. Meanwhile, UNICEF, a partner of USAID, has provided nutrition services, including ready-to-use healing food sources, to nearly 50,000 children under five years old as well as expectant and nursing mothers in Balochistan and Sindh. More than 250,000 people affected by the drought in Balochistan and Sindh received this assistance in 2019 in the form of cash grants, animal feed transportation, nutrition assistance, and WASH intervention.

The International Federation of Red Cross (IFRC) is an international relief organization that supports the National Societies' philanthropic efforts to prevent and lessen suffering among people. There are 192 nationals in the IFRC, which was founded in 1919. IFRC carries out relief efforts to assist victims of disasters and combines these with enhancement efforts to fortify the capabilities of its member nations (CFE-DM, 2021).

3 Methodology

The articles on natural hazards and disaster management were examined. A precise literature review has been directed at understanding disaster management according to the viewpoint of Pakistan. Literature was obtained from databases like Google, PubMed, Google Scholar, and Web of Science utilizing Keywords, for example, "disaster management". Besides, secondary information was obtained from national and international reports, for example, "NDMA, IFRC, OCHA, PDMA", books, newspapers, and Published articles.

3.1 Material and Methods

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4. Results and Discussion

Pakistan Is One of The Most Risk-Inclined Nations on The Planet. Vulnerability Has Increased In Pakistan due to demographic growth, poverty, fast urbanization, degraded environment, and inadequate disaster information. While hazards cannot be avoided, mitigation and preparedness measures can reduce vulnerability. Regarding these few important points, we want to examine disaster management in Pakistan

4.1 Communication

Communication is harmed first in major disasters like earthquakes, so alternative modes like satellite phones and radio must be promoted.

4.2 Effective System of Warning

Scattering of information is however significant as estimating which may be as yet deficient with regards to behind. An effective warning system is vital which gives additional opportunities for preparedness.

4.2 Insurance

The gap between economic loss and insurance property is more. Our framework doesn't have an impulse for it.

4.3 Focus on Mitigation

The current system prioritizes disaster response over mitigation and preparation. As we know, if houses are constructed by standards, there will be fewer casualties and fewer financial losses in natural disasters like earthquakes. However, the system suffers from a lack of strict laws and, frequently, from poor law enforcement.

4.4 Awareness

Extremely poor awareness level in the local area. Normal conviction among individuals that overseeing calamity or safeguarding their life is the liability of the Government as it were. Additionally, disasters are only prioritized after they occur, and there are no ongoing efforts to reduce vulnerability or raise awareness.

5. Conclusion

Disasters are sudden, adverse, and extreme events that cause great damage to humans, plants, and animals. Disaster management (DM) has become a useful branch of knowledge in the present times, but lack of resources, bad planning and focus render the process weak and unresponsive. Pakistan has established laws and formulated policies on Disaster risk management, adjusting to global norms and practices. Coordination strategies have been developed to ensure that DRR procedures and regulations are developed. However, these policies and plans have not been carried out due to poor administration, a lack of political accountability, pervasive corruption, budgetary constraints, and overly ambitious plans. Thus, the Pakistani government must return to its original policies and provide the foundations necessary to manage these numerous circumstances and put them to the best possible use.

5.1 Recommendations

- There is a need for legitimate coordination between various departments and partners for the effective execution of disaster management.
- Strict implementation of construction regulations and laws is significant for decreasing vulnerability. We can lessen financial vulnerability by safeguarding public as well as confidential properties. High-level early warning and Communication systems for effective implementation of Disaster Management are likewise expected to be set up in Pakistan, especially for the flood and quake figures.
- The legal construction of disaster management in Pakistan should be moved along. All the provincial assemblies ought to order laws keeping in view the quirks of their particular domains.
- The technique of concocting disaster management plans ought to be redesigned at all levels. Inclusion of specialized specialists, normalization of the plans, coordination with all partners, and use of hazard maps are the actions that can positively improve the effect of disaster management plans.
- The DMAs ought to guarantee the accessibility of advanced rescue apparatuses and machinery at such places from where they could be moved to the calamity hit points right away.
- The staff of PMD ought to be given unique preparation phases to empower them to skillfully play out their obligations more.
- The special focus ought to be on Disaster risk reduction rather than simple disaster management as reducing the adverse impacts of disasters can be more useful than answering the tragedies brought about by them.
- Community sensitization can likewise be useful in reducing disaster-related harms. Rushed missions ought to be sent off through media and in instructive organizations and individuals ought to be taught concerning the most ideal quick reaction in the hour of calamity.

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