Pakistan Floods 2022 Report

PAR
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Email:
contact@par.com.pk

Website:
www.par.com.pk

Phone:
+92308-9333445

Social Medias:
https://linktr.ee/par.com.pk

Linkedin:
www.linkedin.com/company/pakistan-agriculture-research/

Abstract

Imagine if the overflowing River Indus becomes a permanent feature in Pakistan's landscape. With more than 7000 glaciers melting fast and climate changes intensifying, this has become a real threat. Pakistan faced enormous calamity in the floods of 2022. Record monsoon rains coupled with fast melting glaciers and lack of preparation caused unprecedented devastation with over 30 million people having been displaced. With rising temperatures and the La Nina effect further compounding the issue, different sectors were impacted with agriculture being at the forefront of the damages. With 1508 deaths and 12,718 recorded, health concerns, millions of refugees, food security issues and a lack of planning to tackle the aftermath, Pakistan reels from the after-effects. The constant politicking amongst political parties did not help the situation.

This report gives an in-depth account of the destruction caused and contextualizes the floods for readers in terms of the history and the short and long term consequences, as well as the response of local and international players. The report also brings attention to the ways in which Pakistan's authorities have been deficient in their efforts to implement appropriate structural and non-structural measures in place, especially in light of the 2010 floods and the potential reforms that could have taken place since.

KEYWORDS:

FLOODS | MONSOON | REFUGEES | LA NINA | FOOD SECURITY | CLIMATE CHANGE | URBAN IMPACT | AGRICULTURE | PLANNING | RELIEF EFFORTS | REHABILITATION | GLACIERS | DISEASE | GLACIERS

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Authors:
Amna Haq, Ghasharib Shoukat, Fatima Bokhari

Design:
Zahra Azhar

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PAR is Pakistan's one stop agri data shop.

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1.0 Introduction

Pakistan, a developing country in South Asia, has time and again been flooded to an extent that a national emergency has had to be declared with the 2022 floods being the most recent example. Pakistan has received 190% more rain over June-August 2022, compared to its 30-year average. The government had to declare a national emergency on 25th August, 2022 following the catastrophic flooding which led to one-third of the country being underwater, more than 30 million people affected and at least 1,600 civilians killed. Half a million people were pushed to seek shelter in relief camps and the spread of water-borne diseases has been rife. The situation is unprecedented in its scale and impact.

In the context of Pakistan, deadly flooding is common in the monsoon season, where the systems last from June to September.

Flooding is defined as an overflow of water onto land that is normally dry. This can happen during heavy rains, when ocean waves breach the shore, when snow and glaciers melt rapidly, or when dams or river embankments break. There are two basic types of floods: ***flash floods***; and the more prevalent; ***river floods.***

The continuous rains fill up the Indus river basin with huge volumes of unmanaged water, leading to riverine flooding. Riverine floods are generally more common for larger rivers in areas with a wetter climate, such as that of the Indus River Basin. Surplus runoff from extended monsoons and melting glaciers due to extreme heat waves were recorded all over Pakistan and caused a gradual water-level rise spanning the entirety of the Indus basin and adjoining areas. Streams, tributaries and rivers exceeded the cubage of their channels to contain the water flow and hence, water overflowed the banks, discharging into bordering low-lying, dry land.

Flash floods are very dangerous and common in Pakistan as the offset of such flooding is very sudden with little or no warning after heavy rainfall, thunderstorms, or a dam failure. Dangerous floods come due to the cracks of river, canal or dam walls, which occur frequently in most parts of Pakistan. Flash floods are more common in areas with a dry climate and rocky terrain, where the ground fails to absorb rain water, hence causing it to flow overland. A prime example of dry, rocky terrains in Pakistan experiencing flash floods are the districts of Khyber Pakhtunkhwa (Mardan, Swabi, Nowshera, Lower Chitral, Haripur, Karak and Hangu). When runoff from excessive rainfall causes an instantaneous rise in the water level of shallow or normally dry channels, flash floods occur.

Floods are a natural phenomenon with both negative and positive impacts and generally are not a significant threat to economic development. They play a crucial role in the recharging of groundwater level, support agriculture and replenish wetlands. However, continual and excessive flooding pose risks of great consequence to development and have adverse impacts on livelihoods, economic activity and can instigate occasional disasters. These disasters are of unfavorable interaction amongst extreme hydrological events as well as environmental, social and economic protocols. Developing countries and their economies are particularly vulnerable to natural disasters, like the 2022 Pakistan floods, as they are capable of thrusting development back by decades.

2.0 Background

The Indus Valley Civilization is one of the oldest continuously inhabited regions in the world. The Indus River has supported this region's agricultural practices and its agri-dependent economy for centuries. Flowing southward through Pakistan and emptying into the Arabian Sea, the Indus River is fed by glaciers in the Himalaya and Karakoram mountain ranges and by Asian monsoon rains experiencing substantial fluctuations every year

According to the Federal Flood Commission, Pakistan has witnessed 28 super riverine floods in its 75-year history as shown by the table on the right. These floods collectively affected 616,558 square kilometres of land, stole 13,262 precious human lives and caused damage worth over Rs39 billion to the national economy.

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In the 19th and 20th century, the area comprising modern day Sindh was hit with floods at least 18 times according to the 2020 report released by the Government of Pakistan Ministry of Water Resources. It is not surprising to note that even though the province has a well documented centuries-old history of natural disasters, governments have been neglectful towards these recurring phenomenons, hence failing to act in a proactive fashion. The governments have repeatedly displayed disaster management priorities, focused on immediate visible results rather than the less tangible and long-term goals of stable peace, good governance, resilient disaster-management systems and sustainable development over the years.

Table 3.2: Major Flood Events Witnessed in Pakistan

Sr. No.	Year	Direct losses (US$ million) @ 1US$= PKR 86	Lives Lost (No)	Affected villages (No)	Flooded area (Sq-Km)
1	1950	488	2,190	10,000	17,920
2	1955	378	679	6,945	20,480
3	1956	318	160	11,609	74,406
4	1957	301	83	4,498	16,003
5	1959	234	88	3,902	10,424
6	1973	5134	474	9,719	41,472
7	1975	684	126	8,628	34,931
8	1976	3485	425	18,390	81,920
9	1977	338	848	2,185	4,657
10	1978	2227	393	9,199	30,597
11	1981	299	82	2,071	4,191
12	1983	135	39	643	1,882
13	1984	75	42	251	1,093
14	1988	858	508	100	6,144
15	1992	3010	1,008	13,208	38,758
16	1994	843	431	1,622	5,568
17	1995	376	591	6,852	16,686
18	2010	10,000 @ 1US$= PKR 86	1,985	17,553	160,000
19	2011	3730* @ 1US$= PKR 94	516	38,700	27,581
20	2012	2640** @ 1US$= PKR 95	571	14,159	4,746
21	2013	2,000^ @ 1US$= PKR 98	333	8,297	4,483
22	2014	440^^ @ 1US$= Rs 101	367	4,065	9,779
23	2015	170 1US$= PKR 105.00	238	4,634	2,877
24	2016	6# 1US$= PKR 104.81	153	43	-
25	2017	-	172	-	-
26	2018	-	88	-	-
27	2019		235		
28	**2020**		**409**		
Total		**38,169**	**13,262**	**197,273**	**616,558**

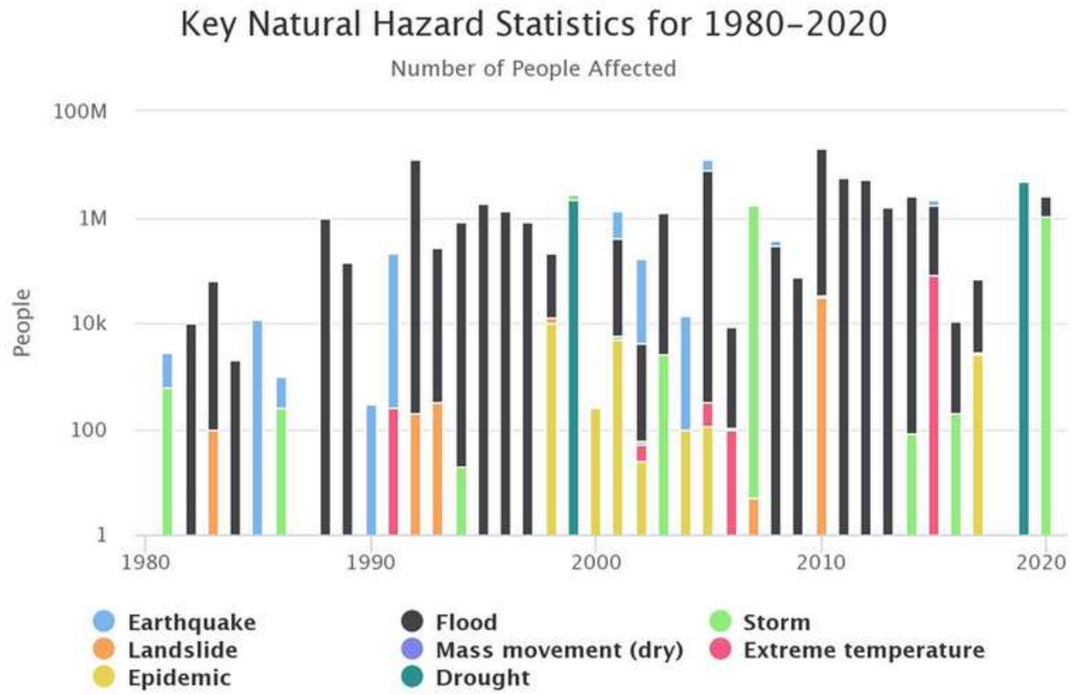
* Economic Survey of Pakistan 2011-12
** NDMA (http://www.claimsjournal.com/news/international/2012/10/05/214891.htm)
^ Thomson Reuters Foundation (http://www.trust.org/item/20130909134725-rm708/)(Agriculture sector)
^^ Economic Survey of Pakistan (2014-15)

Major Flood events witnessed in Pakistan.

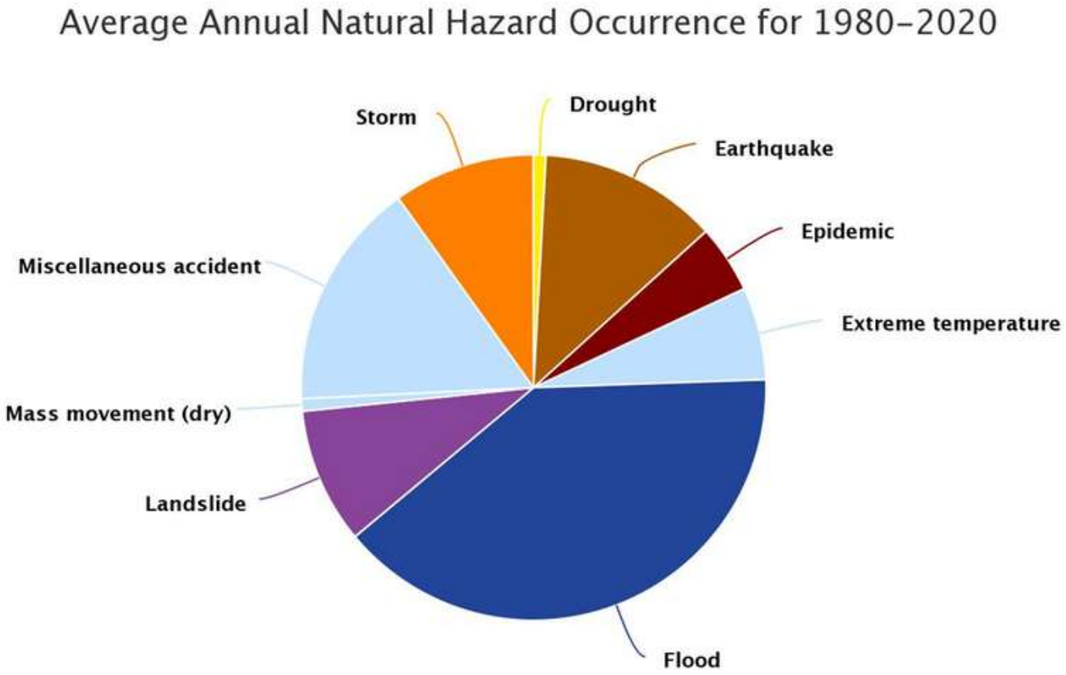
2010 Floods:

Countries and regions are often naturally predisposed to natural disasters. Pakistan for instance faces some of the highest disaster risk levels in the world, and is ranked 18 out of 191 countries by the 2019 Inform Risk Index.

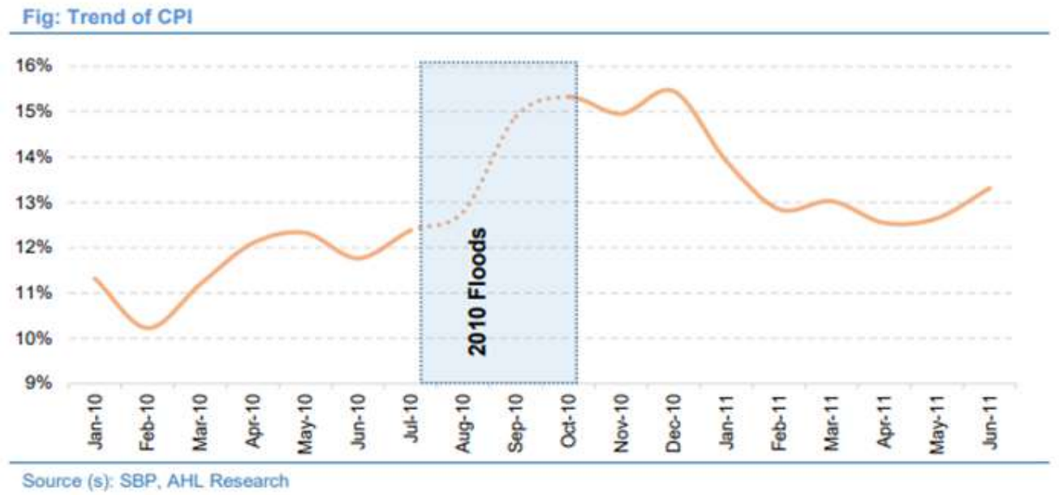
This risk is determined particularly by the nation's vulnerability, as well as exposure to earthquakes and flooding. However, it is not only about its susceptibility to disasters beyond its domain, but how the regime mitigates the disaster's onset as well as subsequent losses.



Key Natural Hazard Statistics in Pakistan 1980-2020



Natural Hazard Occurrence 1980-2020 shows that floods are the most underwent natural disaster by Pakistan.



Trend of CPI following the floods.

Record breaking monsoon rains began to fall in Pakistan's high-altitude northwest region on July 22, 2010. The subsequent flooding affected 79 of the 124 districts. The excessive volume of rainwater overpowered flood defenses, damaged roads and bridges and submerged large areas of land. By August 1, 2010; at least 1,000 people had been killed by the floods while 1,000,000 people were forced our of their homes. By mid-August, one-fifth of Pakistan was affected as the floodwaters surged.

Ali Tauqeer Sheikh, an Islamabad-based independent expert on climate change in an interview with al Jazeera explained: "In 2010, the floods were riverine in nature, which means they mostly impacted areas around the Indus River and they were mostly predictable. This time, there are multiple types such as urban flood, flash flooding and floods caused by glacier burst. What we are seeing here in the country is a development deficit.

It is not only the excessive rain which is causing the issue, but rather the inadequate preparation and infrastructure."

The economic losses inflicted by the floods were estimated at $43 billion, almost equal to the expenditures incurred on the war on terror over the past decade. The national economy that was expected to grow 4 percent ended up growing 2.5 percent only - leading to job losses and incomes being affected country-wide. Compromised incomes were followed by an inflation of 20 percent (as opposed to the targeted 9.5 percent) due to the damaged crops. The National Disaster Management Authority estimates suggested that crops over 2.1 million acres were washed away and this reduced market supply. About one-fifth of the irrigation infrastructure, livestock, and crops in the country had also been destroyed (destruction that amounted to Rs 350-500 billion)

The particularly catastrophic inundation of Pakistan left behind a legacy of lessons and takeaways in its destructive wake. An interesting point to note here would be the report released by the National Disaster Management Authority (NDMA) in April 2011, titled; "Pakistan 2010 Flood Relief – Learning from Experience: Observations and Opportunities". This nine page summary contained an in depth analysis of NDMA's response to the 2010 flood as well as a series of recommendations covering the legal, institutional, policy, and recovery domains.

Some of the recommendations outlined by the NDMA report included the establishment of strategic planning networks, increasing cooperation between the government and humanitarian community, establishment of early warning systems for disease outbreaks etc. Anyone following the 2022 floods and the scale of subsequent destruction would know that the recommended steps were discernibly not taken. The gaps between recommendations and implementations were large enough to cause an even bigger set of damages to the county after the passage of twelve years.

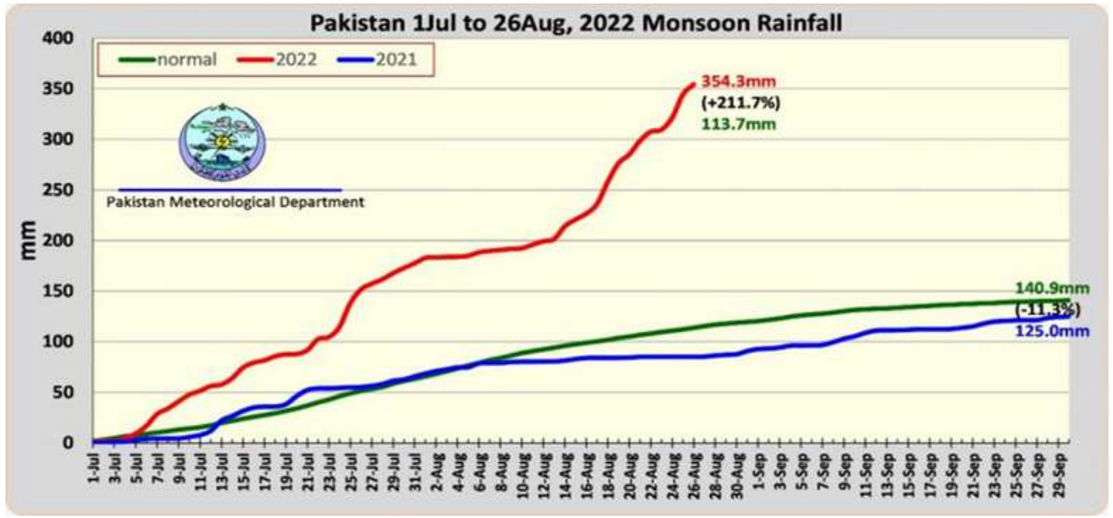
Flooding forced millions of Pakistanis to flee their homes in July and August 2010. (Photograph ©2010 Abdul Majeed Goraya/IRIN.)

3.0
Climate Changes

Temperatures are rising all across the world, with calls for considerable climate action. The science is evident, students are striking, and people around the globe are demanding a new standard of leadership to tackle the climate crisis before it is too late. According to the Global Climate Risk Index, Pakistan is the eighth most vulnerable country to climate crisis despite its very low carbon footprint, and the devastating effects of climate change are extensively obvious with the 2022 floods being the most recent disaster.

Even though Pakistan is responsible for the emission of less than 1% of the world's global warming gases, between 1952 and 2009, the temperatures in the country have risen by 0.3°C per decade – higher than the global average. This gradual rise in temperatures caused the abnormal heatwaves in April and May this year where temperatures soared above 40°C for extensive periods with no rainfall in places that historically witnessed rainfall during these months. Cities like Jacobabad and Dadu even recorded scorching temperatures above 50°C

To explain: Warmer air holds almost 7% more moisture per °C. Based off this, meteorologists had warned early on in the year that the extreme temperatures, compounded with the La Niña climate event, would be troublesome for Pakistan. The La Niña effect is a weather phenomenon that refers to cooler than normal ocean surface temperatures in the Eastern and Central Pacific Ocean; which in turn causes heavy monsoon in South Asia. This resulted in "above normal" levels of rain during the country's monsoon season from July to September.



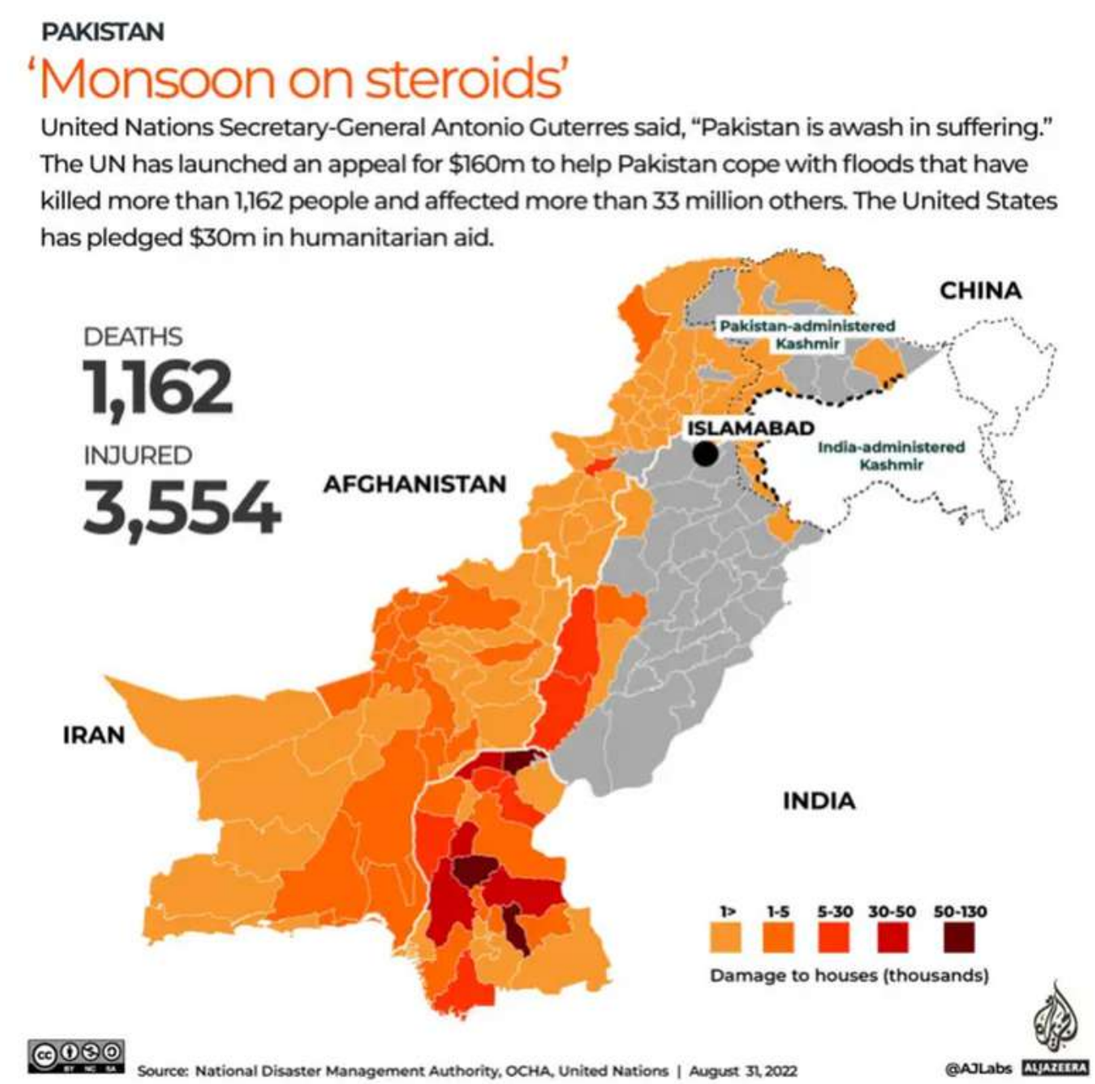
Average monsoon rainfall over the months of July and August 2022

These "above normal" levels of rain during the country's monsoon resulted in torrents and flash floods. The evidence mentioned above indicates that the catastrophic floods were fueled by the unrelenting rainfall across Pakistan. Another factor that worsened the situation is the melting of glaciers and snow due to rising temperatures. Pakistan is home to over 7,200 glaciers, more than anywhere outside the poles. Rising temperatures linked to climate change, are making many glaciers melt faster and earlier, adding water to rivers and streams that are already swollen by increased rainfall. The country is a glacier hot spot, and according to a 2021 study; accelerated melting in the Himalayas (one of Pakistan's main mountain ranges) has painted a very bleak picture for Pakistan's future.

Another unusual occurrence caused due to the heatwaves was the depression (i.e. a system of intense low air pressure in the Arabian Sea), which brought about torrential rain to Pakistan's coastal districts in June, earlier than the monsoon season. This early offset of the monsoon exacerbated the situation.

Therefore, Pakistan received the highest amount of rainfall in at least three decades.

Many activists across the world have used this disastrous event as the prime example of climate justice, arguing that the Global North should compensate for the loss and damage claims by the Global South under the Paris Agreement, which was signed in 2015 and currently has 175 signatories, including the European Union.



Damage to houses across Pakistan due to the floods of 2022.

During the floods of 2010, Pakistan's Meteorological Department recorded 70 to 102% above normal rains nationwide. This time in just one city, Khanpur (Punjab), the downpour was 1,483% above normal. The USAID estimated 1.7 million damaged homes, and over 20 million people were affected. And with a fifth of the country under water, the economic losses were calculated to be over $11 billion. The death toll from the current disaster could yet surpass that of 2010, and experts suggest the damage this time is much worse. "If you compare it to 2010 floods, we've had four times more land inundated," said geoscientist Hassan Aftab. "It has affected twice as many people as it did in 2010, and there has been four times as much economic damage to crops and livestock."

Comparison of Damages		2010 Flood	2022 Floods
1.	Area Hit	20 percent	33 percent
2.	People Affected	20 million	33 million
3.	Deaths	1,985	1400 (till now)
4.	Houses Lost/Damaged	1.1 million	1.7 million
5.	Crops Damaged	4.9 million acres	8.3 million acres
6.	Livestock Lost	1.2 million	0.75 million
7.	Monetary Damages	$10 billion	Over $18 billion (till now)

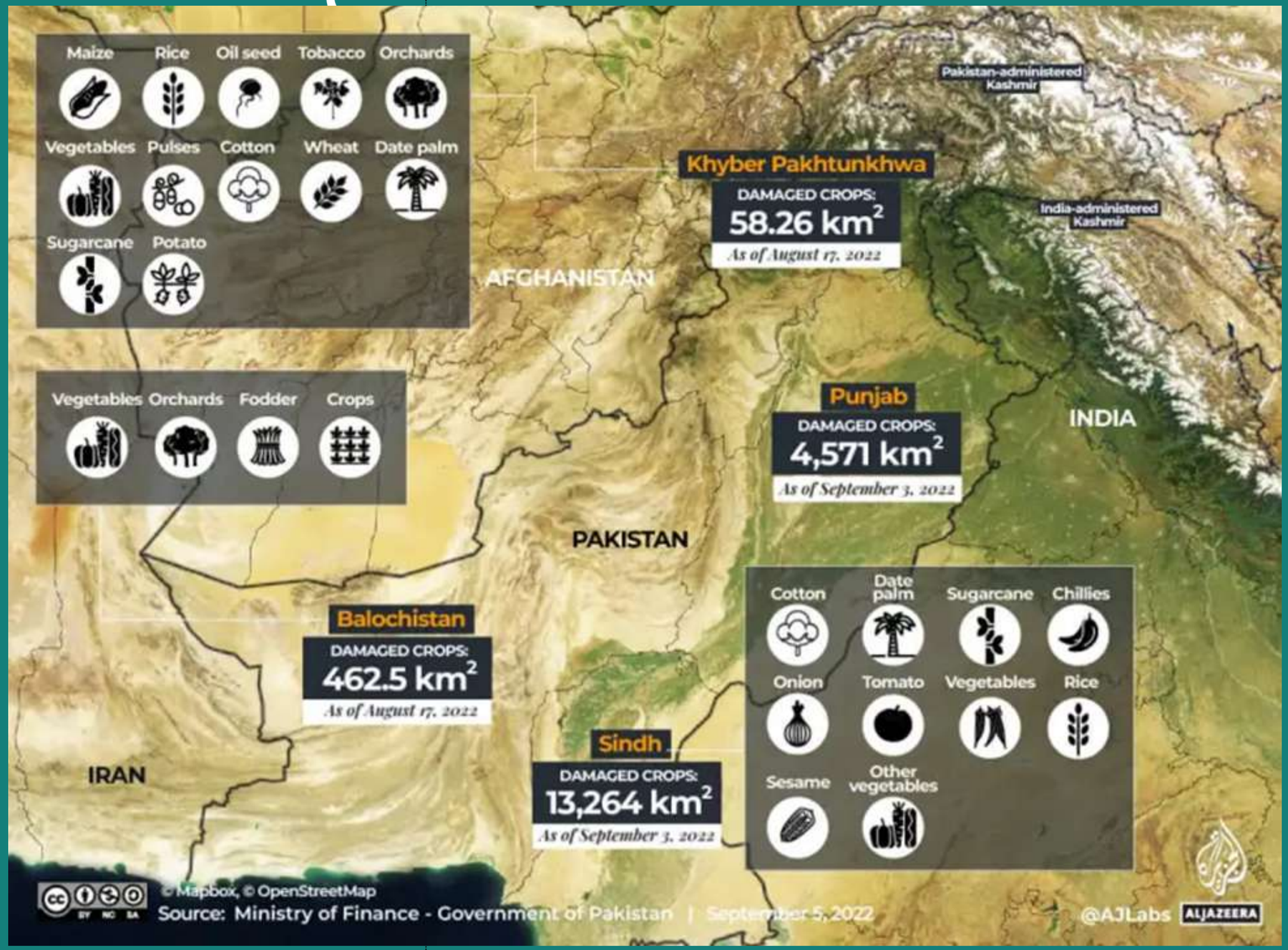
Comparison of damages between the two major flooding disasters of Pakistan.

4.0
Flood 2022
Overview

Recent floods in Pakistan have wiped out at least 18,000sq km of agricultural land, adding to skyrocketing inflation and a financial crisis. The government estimates it needs at least $10bn to rebuild and rehabilitate more than 33 million people.

- 10 Million children need immediate life-saving support
- Over 1 in 9 kids (1.6 Million total) have severe acute malnutrition
- 7 Million kids & women require immediate access to essential nutrition services
- UN has only met 15% of its aid appeal

LOSS OF CROPS AND LIVESTOCK IN PAKISTAN



An overview of agricultural losses in Pakistan following the historic floods of 2022.

Exhibit: Cumulative Flood Report 2022*

Province / Region	Roads (km)	Bridges	Shops	Houses			Livestock
				Partial Damage	Full Damage	Total	
Punjab	121	12	100	29,730	16,590	46,320	202,593
Sindh	2,328	60	45	596,603	244,120	840,723	15,008
KPK	7	7	-	21,403	21,764	43,167	8,771
Balochistan	1,000	18	-	43,960	17,528	61,488	500,000
GB	2	60	8	257	458	715	-
AJK	-	-	17	185	273	458	772
Islamabad	-	-	-	-	-	-	-
Total	**3,458**	**157**	**170**	**692,138**	**300,733**	**992,871**	**727,144**

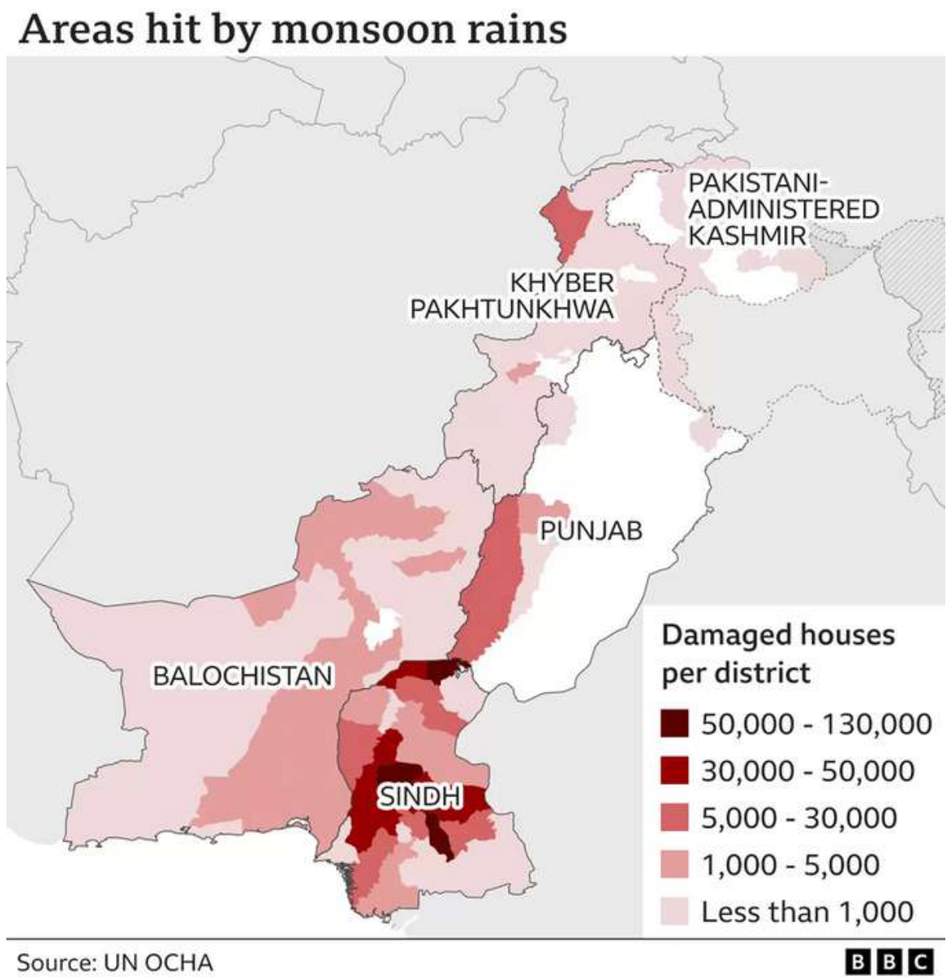
Cumulative damage caused by 2022 floods.

Pakistan is reported to have received more than 3 times its usual rainfall in August 2022, making it the wettest August since 1961. Over the months of June till August 2022, Pakistan received nearly 190% more rain than its 30-year recorded average. The southern provinces of Sindh and Balochistan were the most adversely affected – receiving 726% and 590% of their normal August rainfall, respectively. The Indus river, which runs the length of the country, burst its banks across thousands of square kilometers, while the intense rainfall also led to urban flash floods, landslides. Hill torrents transpired in Balochistan, Sindh, and South Punjab, with the majority of the districts overwhelmed with water unlikely to regress anytime soon.

On August 25th, the government declared a national emergency. Damages likely exceed preliminary estimates of around US$30 billion with further economic disruption certainly expected in the months to come. The rains and resulting flooding displaced over 33 million people (33 million is the entire population of Malaysia), destroyed 1.7 million homes, and killed nearly 1500 people. Around 6700 kilometers of road, 269 bridges and 1460 health facilities were destroyed, 18590 schools were damaged, around 750 thousand livestock were killed, and around 18,000 square

kilometers of cropland were ruined, including roughly 45% of the cotton crop – one of the nation's key exports.

The impact of the 2022 floods on Pakistan's rural communities and agriculture has been devastating, resulting in the loss of crops, livestock, and essential infrastructure including storage facilities with millions of tons of grain spoiled. Unfortunately, the floods struck before the harvesting stage of key crops, including cotton, rice, and sugarcane hence the country is now facing a consequential food security crisis.



Areas hit by monsoon rains and the damages caused to houses..

4.1
Khyber Pakhtunkhwa (KPK)

Among the flood video clips being widely shared on social media, the collapse of Zarmat Shinwari's hotel, the New Honeymoon Hotel, on the bank of River Swat in Kalam into the raging water, is most telling of the ravages wreaked by the current floods. Of all the times the recent floods have been described as "unprecedented", there is a glaring realization that the devastation caused was not as "unprecedented" as we would like to believe. Said Nabi, the general manager of the hotel for the past 27 years had a striking sense of deja vu when he witnessed the building crumble before his eyes, exactly like he did 12 years ago, in the floods of 2010. The destruction of the establishment is a glaring example of encroachment, for the law deems any construction within 200 feet of the river illegal. Perhaps the destruction was a repetitive instance of lessons not learnt.

Flooding from the Swat River on August 27, forced the government to take evacuation measures overnight — especially in the Charsadda and Nowshera districts — tens of thousands of people had to leave their homes behind and instead seek shelter in relief camps set up in government buildings. According to Kamran Bangash, spokesperson for the provincial government, some 180,000 people were evacuated from Charsadda and 150,000 from Nowshera district villages.

The Khyber Pakhtunkhwa government (KP) had to declare a rain emergency in several districts till August 30 with immediate effect after flash floods wreaked havoc in Swat, Shangla, Mingora, Kohistan and other areas. Videos circulating on social media show hotels, link roads, suspension bridges, houses, hospitals, schools, mini power stations, and water mills being completely washed away as residents scramble to find refuge. Additional Deputy Commissioner of Swat- Ibrar Wazir- confirmed that at least 24 bridges and 50 hotels were washed away by floods.

The damage to roads and bridges totals Rs18.6 billion, agricultural damage was Rs14 billion and irrigation damage was Rs19 billion. Documents show that the province's agricultural sector was worst hit by the monsoon disaster with initial estimates putting the damage at around Rs14 billion. Records also show that the floods killed 13, 228 cattle heads (a loss of over Rs1.5 billion to their owners) and damaged 60,752 cultivated acres all over the province ultimately destroying 97,063 metric tons standing crops and inflicting Rs9.16 billion losses on farmers.

Initial estimates depicted that major and minor crops in KPK including cotton, rice, maize, sugarcane and oil seeds standing over 14,397 acres were damaged. The recent floods also damaged vegetable farms, fruit orchards and potato crops, besides destroying oil seeds crops and over 328 big and small animals. Maize was reportedly cultivated over 482,767 acres, where about 4,794 acres were damaged by rains and flood (a loss of Rs368.09 million).

Rice was cultivated over 40,029 acres out of which 3,482 acres have been damaged i.e. 6% of the total area (a loss of Rs11.81 million). About 6% vegetables yield spreading over 938 acres out of 15,930 acres was damaged causing financial loss of around Rs145.28 million, adding that about 2% of the total area under orchard cover was also damaged with accumulative financial losses equivalent to Rs5.35 million.

Moreover, 2,248 watercourses and water storage tanks were washed away, costing over Rs3 billion losses to the province. The damages caused to three of the government owned agricultural research centres added up to around Rs3 billion. Furthermore, numerous irrigation systems were damaged across the region where the highest number of irrigation systems destroyed was in Chitral (146), followed by Swat (106), Bannu (74), and Charsadda (56). The

damages to 477 irrigation structures totalled up to Rs.19.16 billion in losses.

The floods destroyed 90 schools and damaged 1,096 in the province, while damage to 91 health facilities including 52 basic health units and 37 dispensaries was also reported. Furthermore, over 1,455 kilometer long roads in the province and 73 bridges, mostly in Swat (29), were extensively damaged. The disaster also rendered more than 600,000 people homeless, while damaged houses totalled 76,700, with 65,165 in Dera Ismail Khan district and 2,400 in Tank district.

New Honeymoon Hotel (built on the riverbank) in Swat, Pakistan swept away by the riverine flash floods.

4.2
Balochistan

Balochistan is the largest of the four provinces of Pakistan, forming 43.6 percent of the total area of Pakistan (an area of 347,190 Sq, kms). The province which sees 50mm rain on an average every monsoon season, has so far recorded 284mm of rain this monsoon, a statistical rise of 469 percent!

Over 3,90,201 homes have been affected, out of which 133,994 homes were completely demolished while 94,742 homes were partially damaged. Over 120 people have lost their lives amid the floods. The devastating rains and the consequent flooding have caused losses of Rs 98 billion to the agriculture sector of the province, according to the Director General of Agriculture Balochistan- Abdul Wahab Kakar. The DG also said that the heavy rainfall and accompanying flash floods had damaged crops, orchards, and 15,800 tube wells, ponds, and solar systems on an area of 190 thousand acres.

He also added that over 60 percent people of the province were directly or indirectly involved in the agriculture sector as their means of livelihood hence emphasizing the damage to agriculture caused and what it means for the province. In Awaran district, the natural disaster has destroyed many of the impoverished province's mud homes. Initial estimates state that standing crops over 108,285 acres were damaged and over 107,377 animals were killed, whike 21,960 acres of orchards, and 14,882 acres of different vegetables were also destroyed.

A flooded residential area in Jaffarabad district after heavy monsoon rains in Balochistan province, Pakistan. on Aug. 29.

Relief camps are setup on the road side from the flood victim following flash floods. / Photo by Ahmed Ali / Anadolu Agency via Getty Images

4.3 Punjab

The land of 5-rivers with the largest population, and known as the granary of the east, Punjab is the lifeline of Pakistan. In order to conserve this lifeline, the National Disaster Management Authority (NDMA) had warned beforehand that from September 18, the flow of water in the Sutlej, Ravi, and Chenab rivers and their adjacent channels of Punjab was expected to increase. The advisory revealed that the water levels in the rivers and sewer lines would rise to dangerous levels, and all the concerned departments had also been instructed to exercise caution.

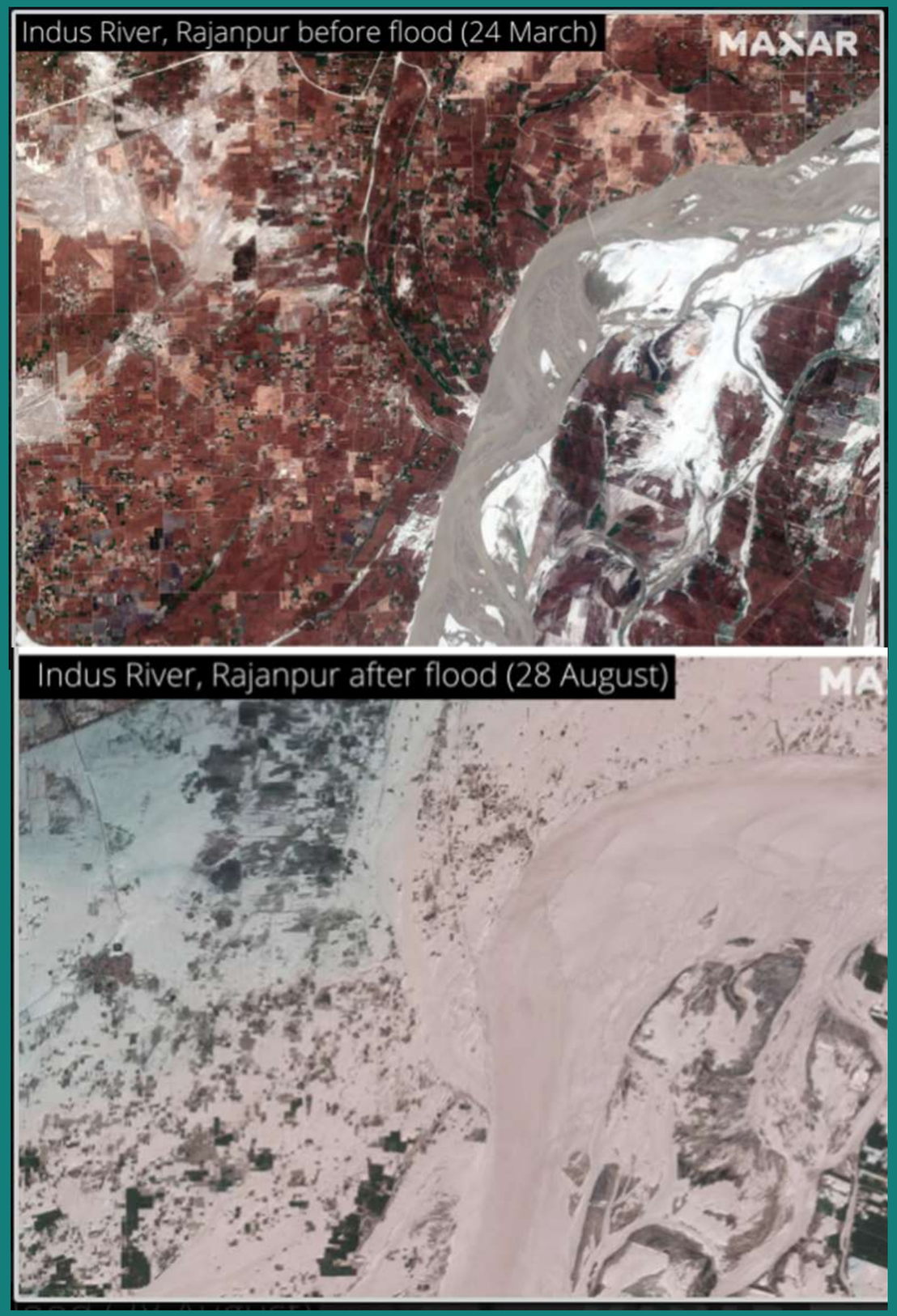
Despite the early warnings to the risk prone areas, the floods managed to have far reaching, devastating consequences for the most fertile of provinces. The government of Punjab estimates the destruction of the standing crops at around 900,000 acres in South Punjab. “Around 900,000 acres of land have been affected by the massive floods and rains in various districts of south Punjab, while 40 people have been killed during the calamity. Another 37 people have been killed due to collapsing of houses,” Punjab Government & Community Development Department Minister Mian Mehmoodur Rasheed told reporters at a press conference.

The most affected areas included Taunsa and Jampur tehsils in Rajanpur and DG Khan districts, besides parts of Layyah. About 0.20 Million acres of crops and fruit orchards in Punjab have been affected. Most of which are from Southwestern Punjab hill torrents as the floods from rivers were less intense than floods of 2010. Rivers in the province did not break embankments, but instead it was the hill torrents that caused flooding in parts of southern Punjab while the Upper and Central regions remained safe.

Over 130,140 acres of crops have been destroyed in Punjab where the province suffered a loss of Rs. 39.89 billions in terms of farm products. According to preliminary estimates, cotton, rice, maize, pulses, potatoes, tomatoes, sugarcane, wheat, chillies, tobacco, oil seeds, millets and garlic were amongst the vegetables damaged in the province owing to the floods. Overall, 31 percent of livestock holders have lost at least one animal/poultry due to floods, with the proportion in Punjab being 35 percent.

Infrastructural damage to roads and bridges has prevented people from migrating to safer areas and from receiving aid. Electricity failure has affected thousands of people due to damage of power lines. Internet issues had been reported too in many areas due to heavy floods and rains especially on August 19, 2022 which limited dissemination of aid information. These hill torrent floods ultimately end up in rivers which are inundated too much, and depict the inability of the existing infrastructure to absorb this flood water.

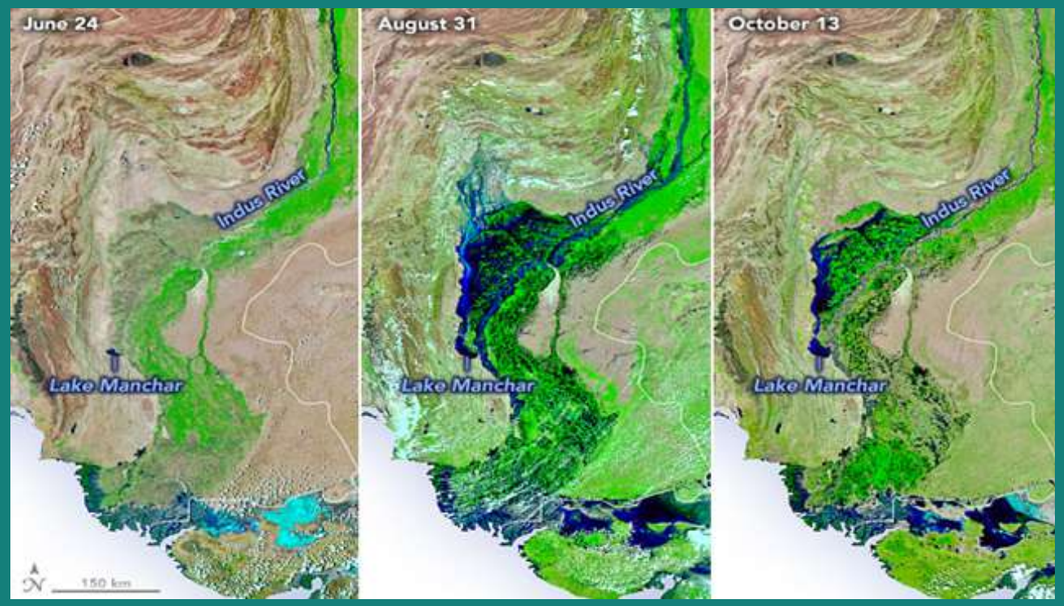
Rescue workers carry out an evacuation operation in the Rajanpur district of South Punjab province on August 25, 2022.



People struggle with a motorbike in a flooded street in Rawalpindi on July 5, 2022.

People pick up floating vegetables at a flooded marketplace after heavy rainfall in Lahore on July 21, 2022.

4.4
Sindh



Lake Manchar was breached on September 4, and covered the northern side of the lake with water. The Blue shows the extent of the flooding.

Sindh, one of Pakistan's 4 provinces, is essentially part of the Indus River delta and has derived its name from that river, which is known in Pakistan as the Sindhu. The province accounts for roughly one-quarter of the country's population in less than 18% of its land area.

The above image is of Sindh with a focus on Lake Manchar, depicting how much the lake had swelled over the past two months into an area covering hundreds of square kilometers following record levels of rain. What were once islands and peninsulas in the lake have disappeared and surrounding land has been swallowed up. People in the surrounding villages of Sindh had to choose between getting inundated or leaving their homes.

Sindh has been hit the hardest by the heavy torrential rainfall and flash floods in the months of July and August 2022. The floods have claimed more than 522 lives so far in the province, including 219 children. With no pathway for the water to drain, hundreds of thousands of people were forced to leave their homes and set up temporary make-shift tents on roads.

Pakistan's Sindh Province accounts for 42% of the rice production, 23% of the cotton production, and 31% of the sugarcane production nationwide. The 2022 Pakistan floods caused irreparable damage to agriculture crops, livestock, and infrastructure, including storage facilities with millions of tons of grain, posing the risk of a looming food security crisis in the country. Flood water submerged almost half or more of the total district area, severely impacting Jacobabad, Larkana, Qambar Shahdad Kot, and Shikarpur districts. Similarly, floods inundated around one-fourth of the district area in Badin, Kashmore, Khairpur, and Sujawal districts.

Sindh is the province most affected by floods in terms of damage and losses to agriculture. Estimates state that the major kharif crops – rice, cotton, and sugarcane – lost 80%, 88%, and 61% of their forecasted production, respectively (direct loss of USD 1.30 billion). Almost none of the cotton crops in Badin, Mirpur Khas, Khairpur, Sukkur, and Ghotki districts survived the disaster. Bananas, lemons, onions, chillies, tomatoes, and other kharif vegetables were either damaged in their entirety or suffered severe losses (a loss of USD 374 million in affected districts, with highest losses in Thatta, Badin, and Mirpur).

As per estimates, floods killed 42,174 livestock, including sheep, goats, camels, cows, buffaloes, and donkeys (a direct loss of around USD 13 million to livestock). Overall, the province faced the loss of USD 1.7 billion in rice, cotton, sugarcane, tomato, onion, chili, and livestock.

Rainfall well above average in most regions

Rainfall in 2022 compared to **average rainfall**, 1 Jul-30 Aug

Note: The average rainfall figures are for 1961-2010

Source: Pakistan Meteorological Department

BBC

4.5
Gilgit Baltistan

Gilgit-Baltistan is a very sparsely populated high-mountain area in the north of Pakistan. The region's natural environment is usually described with superlatives – the longest glaciers outside of the polar region, home of the world's second highest peak (K2).

However, the floods did not spare the administered territory either, where Gilgit-Baltistan Disaster Management Authority (GBDMA) said that 17 people had died and six others had been injured in the floods so far, while Rs7,406 million losses had occurred across GB.

A temporary bailey bridge installed over the Uchar nullah stream near the Karakoram Highway in Upper Kohistan's Dasu area was swept away by flash floods, disconnecting Gilgit-Baltistan from the rest of the country. The bridge was located near the residential camps of the 4,500 megawatt Dasu Hydropower Project.

The region of GB has the highest number of glaciers outside the polar regions which is one of the primary reasons for the region's vulnerability to climate change, other than the continuous political turmoil. This ecologically fragile part of the world faces the grave threat of glacial lake outburst floods (GLOF).

A report issued by the GB government on Aug 28 should have served as an eye-opener for authorities where between June 30th and Aug 26th this year, 110 flash floods were reported in GB. A total of 17 people lost their lives due to flood-related accidents, while six were injured. The infrastructure losses in the region—already underdeveloped and dependent upon the center for its budget — are also enormous.

According to the report, 418 houses were completely damaged and 257 houses partially so; 22 powerhouses were destroyed; and 78 drinking water supply schemes and 500 irrigation water channels were damaged. Moreover, 56 bridges and 49 roads were washed away, severely affecting people's mobility and transportation of food supplies that are brought in from Rawalpindi. While most of the damaged facilities have been temporarily restored, including 19 of the powerhouses, the rains and floods have exposed the region's feeble infrastructure.

Meanwhile, in an advisory, the National Highway Authority (NHA) said that the Karakoram Highway was temporarily two-way blocked for all types of traffic due to massive flash flood at the Uchar nullah. Shahzad Shigri, a GB Environmental Protection Agency Director, said the rapid melting of snow and glaciers started after a heatwave across the GB region. Mr Shigri said the snow received in winter did not melt until late summer. "After the sudden temperature increases, the snow in the mountains is not in a stable condition and glaciers are melting fast," he warned.

4.6
Urban Impact

Pakistan is a country of sprawling settlements and home to the bustling metropolitan city of Karachi. The 10 major cities of Pakistan make up around 54% of the total urban national population as found by The State of Pakistani Cities Report 2018. The monsoon of 2022 was intense in the urban regions too, leading to urban flooding and destruction that inundated the business districts as well.

The cities of Qambar and Larkana sit around 25 km apart and are just west of the Indus River. Both have been heavily impacted by flood water.

Karachi, the capital of the southern Sindh province and Pakistan's financial and economic hub, suffers from urban flooding each year with people dying from drowning and electrocution, as the city's clogged drains fail to empty water from the streets - and this year was no different. The main roads of Karachi were under water with many parts of the metropolis hit by power outages, as heavy monsoon rains continued in the region

As per the Provincial Disaster Management Authority Sindh on August 1, 45 people had lost their lives to this year's monsoon in Karachi alone. The streets of posh areas such as the Defence Housing Authority (DHA) and Clifton were flooded, with water flooding the houses. Karachi's main streets, which house financial institutions and bank headquarters including Pakistan's central bank were not spared either. Subsequently, traders were left counting their losses, with heavy flooding in the commercial sector destroying the electronics and garments market causing losses worth billions of rupees.

Analysts believe Karachi's rain crises are caused due to misgovernance, arguing that maintenance and monitoring of infrastructure and additions to it are necessary to equip the city appropriately, to face heavier downpours without drowning like it always does. "Karachi doesn't drown as much because of rain as it does because of criminal neglect towards the governance of this city and a lack of understanding towards governance," Fahim Zaman Khan, former administrator of Karachi told The Diplomat.

Cities in Sindh, other than Karachi were completely submerged, leaving people grappling with the loss of lives and belongings. The cities of Qambar and Larkana sit around 25 km apart and are just west of the Indus River and both have been heavily impacted by flood water. Urban centers like Larkana and Sukkur, while not completely unscathed, faced comparatively lesser damage from the flooding. The airport remained operational and received flights carrying relief supplies that had been arriving from China, Turkey, and the United Arab Emirates carrying tents, food and medicine.

Rawalpindi, one of the famous twin cities had to station the army on standby due to the dangers the flooding brought.

People wade through a flooded road after heavy monsoon rains in Karachi. Sights such as above are extremely familiar to the city's residents as urban flooding is an annual occurrence.

Heavy rains played havoc in the garrison city with rainwater inundating low-lying areas and entering houses and shops, damaging goods worth millions of rupees. The Leh Nullah (stormwater drain flowing along the city) rose to 15 feet at Gawalmandi and Kattarian bridges, forcing the local administration to alert the flood warning system, asking people along Leh Nullah to move to safer places. Further downtown, rainwater destroyed motorcycles and cars parked on main roads in Mochi Bazaar, Bohar Bazaar, Sadiqabad and Jamia Masjid Road.

Major avenues such as; Dhoke Juma, Banni Chowk, Sadiqabad, Satellite Town, Commercial Market, College Road, Bohar Bazaar, Naya Mohallah, Iqbal Road, Raja Bazaar, Kohati Bazaar, Mochi Bazaar, Mohanpura, Nanakpura, Arjan Nagar, Amarpura, Service Road along Murree Road, Khayaban-i-Sir Syed and Rawal Road were submerged in three to four feet of rainwater. The situation in Islamabad, especially in I-9, I-10, Karachi Company, Peshawar Mor, G-8, G-7 and even Margalla Road was no different.

The officers' ward at Benazir Bhutto Hospital (BBH) and the basement of Holy Family Hospital (HFH) were no match for the gushing floodwaters, while Rescue 1122 officials said rainwater entered metro bus stations on Murree Road and accumulated on the elevated track. Electricity and gas supply were suspended in low-lying areas to avoid any harm. Rawalpindi Traders Association President Shahid Ghafoor Paracha told Dawn that rainwater entered Raja Bazaar and adjoining markets, including Moti and Mochi bazaars, and destroyed goods in shops and stores.

Other cities in South Punjab such as Dera Ghazi Khan and Rajanpur districts fell victim to swollen hill torrents from the Sulaiman Mountain Range, wreaking havoc on scores of localities forcing locals to flee. Many indigenous embankments — put together to store water — gave away under the pressure exerted by the gushing waters.
The provincial capital of Balochistan - Quetta - and its surrounding areas were plunged into complete darkness after 33 of 72 feeders of the Quetta

Electric Supply Company (Qesco) went out of order due to the torrential rains. Dozens of mud houses collapsed leaving many trees and electricity poles uprooted, further exacerbating the risk of human lives. The low-lying areas of the business hub were badly affected where flood water entered houses, resulting in the collapse of mud houses while makeshift residentials of nomads were swept away in the flash floods.

According to the Provincial Disaster Management Authority, four deaths were reported in the Sariab area of this provincial capital where a house collapsed. Furthermore, two young girls reportedly drowned in the flood water in the Eastern Bypass area. In the Sariab Mills area heavy food swept away four persons who were trying to rescue a car which was stuck up in floodwater. The Badini Link road, Eastern Bypass and slum areas were badly affected due to flooding caused by heavy rains.

Critique has also been extended to encroachment construction within rivers which is quite common across the country. Despite efforts by local officials, commercial encroachments have increased across the Indus and even in the lakes. These settlements dramatically transform the ecology of lakes leading to increased vulnerability. Some ad-hoc anti-encroachment operations have taken place at the local level, particularly in KPK, where the problem of commercial riverbed construction is most acute, but with little to no success. In the town of Bahrain, for example, hotels and shops constructed within the riverbed were washed away during the current floods. However, some also blame the Pakistan government for its failure to plan for climate crises and for allowing construction to alter the rivers' natural pathways and human settlements on floodplains. Mohammed Hanif, District Community Officer in Kaghan, said that most of the damage done in his province of Khyber Pakhtunkhwa was in areas where the course of the rivers Sindh, Kabul, Swat, and Kunhar have been encroached on by commercial activities.

4.7
Azad Kashmir

Azad Kashmir, also called Azad Jammu and Kashmir (AJK), area of the Pakistani-administered sector of the Kashmir region, is in the northwestern part of the Indian subcontinent. Established in 1947 after the partition from India, AJK is Azad ("Free") Kashmir. It is neither a province nor an agency of Pakistan but has a government of its own that is regarded by Pakistan as "independent," even though it is protected by and economically and administratively linked to Pakistan. The region, too, has been affected by the "monsoon on steroids"- with the National Weather Forecasting Centre sending one alert after the other to residents and local authorities against flash flooding and landslides in the region, specifically in the districts of Neelum and Poonch. The cloudburst induced flash floods in Neelum Valley swept away five young tourists, adding up the loss of lives in the region at 37.

The cloudburst had unloaded huge amounts of water in Ratti Gali Nullah, some 6 km downstream of the famous glacial lake, partially damaging and destroying some 30 houses, vehicles, and foot bridges as well as sweeping away cattle along its course. Prime Ministerof Azad Jammu and Kashmir, Sardar Tanveer Ilyas Khan said that monsoon rains have also caused a lot of damage in Azad Kashmir. Infrastructure worth billions of rupees was destroyed. "Due to icloudbursts, there has been a lot of damage to infrastructure in Neelum valley and other places", he said adding that Azad Kashmir government has neither enough resources nor machinery to tackle the situation.

People walk through flowing floodwaters in Dagai Mukram Khan, Peshawar, on August 26, 2022.

Pictures shared on social media show the debris of the destroyed houses swept away by the cloud burst induced flash floods.

5.0 Impact

Overview: At the start of 2022, with the Russia-Ukraine War taking centre stage and with an increase in global energy prices and talks of a recession, many reckoned a crisis was inevitable. Then, the floods struck. Coupled with political instability that began a few months earlier with the ouster of former Prime Minister Imran Khan at the hands of the Pakistan Democratic Movement (PDM), Pakistan came into a very precarious position economically, culturally, socially and politically.

5.1 Economic

Pakistan's economy relies heavily on imported food and energy. As commodity prices continue to soar due to the decrease in food supply, the current account-balance has widened while hard currency drains away. Markets believe Pakistan's economy might be amongst the list of those following the unfortunate path into debt default and economic crisis like Sri Lanka's. Over the past year, the nation's current exchange reserves have shrunk by more than half to just over $9bn, which adds up to about six weeks' worth of imports.

The historic floods of 2022 have inundated 7 million hectares out of 22 million hectares of total cultivated land available in the country, which come to around 33%. As per the data shared by provinces to the Ministry of Food Security and Research, damages of Rs298 billion were incurred in the agriculture and livestock sector. The agriculture sector contributes 23% of the GDP and 19% to the gross output. Estimates state that the agriculture sector production loss can be around 25-30% including livestock losses and crop damages.

For the sake of comparison, the floods of 2010 negatively affected the agriculture sector, as major crop production declined by 15%. Agriculture growth dropped to 0.23%, sinking the overall GDP growth to 2.58% in that year. The destruction caused by the recent floods is of a higher magnitude, as it has negatively impacted vast areas of cultivated as well as cultivable land. Cotton contributes to 1% of the GDP, while the damage caused to the cotton crop has been irreparable. Vegetables, date palms, sugar cane, and rice crops also got badly damaged translating into a 50% production loss. Around 700,000 to 800,000 livestock has been lost, a sector which contributes 11% to the national GDP.

Pakistan estimates the total losses from its recent floods could be as high as $40 billion – which is $10 billion more than the government's initial estimate. The economic impact caused by this disaster can be summarized as a reduction of GDP growth by 3.84%. The following year's GDP growth shall remain within 1-2% combined with higher inflation and increased unemployment.

5.2 Cultural

The devastating floods in the country have caused significant damage to Mohenjo Daro, a famous 4,500-year-old archaeological site in Sindh province which UNESCO has declared a World Heritage site.

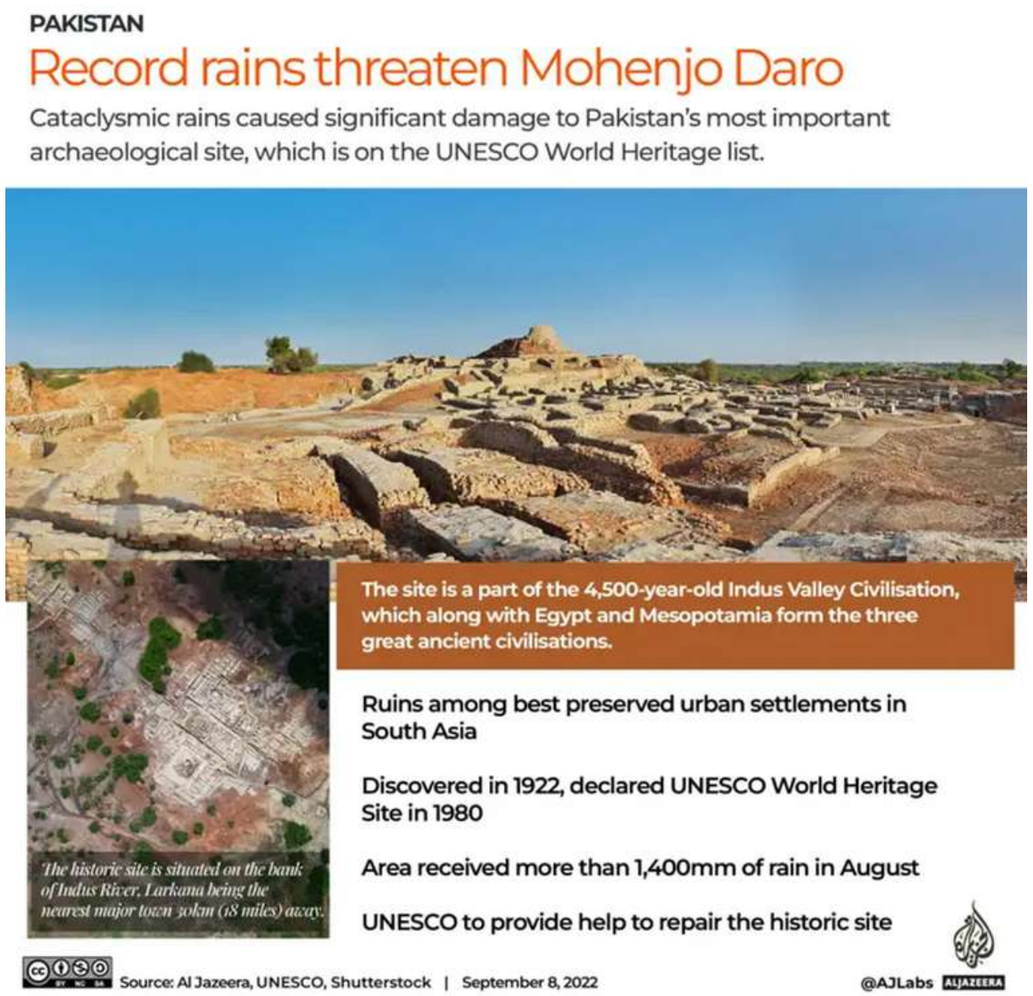
Abdul Fatah Shaikh, the director of archeology and museum for the provincial government told Al Jazeera that the incessant rains damaged the protective outer covering on the historic structures. He also said that this season's rain was the most recorded since the ruins were discovered 100 years ago in 1922. He added that the original structure is safe, including the stupa at site and it is the protective layer that took the brunt of the damage. He further emphasized the need for immediate conservation to prevent any further irreparable damage.

Larkana, which saw some of the heaviest downpours in the region, houses the Shah Baharo and Tajjar buildings which are

now submerged in rainwater overflowing from drainage and sewage lines in the city. But it is the Mian Noor Mohammad Kalhoro graveyard (in Moro) that has suffered the most. At the historically significant graveyard, several graves, including six tombs, have completely vanished and the condition of many others has deteriorated severely.

The walls of those that do stand have caved in.

To add on to the damage caused, the Buddhist stupa at Thul Mir Rukun fell victim to the inclement weather as its drum is now broken. Talking about the seriousness of the issue, Hamid Akhund, who is secretary of the Endowment Fund Trust (EFT) for the Preservation of Heritage of



Sindh, told Dawn that the damage is “on a massive scale”. “Whatever we have restored has been damaged. There is not a single place left in Sindh where heritage remains intact; be it Kot Diji, Ranikot, Shahi Mahal, White Palace, Faiz Mahal, the historic imam bargahs, bungalows or public dispensaries.”

According to Mr Akhund, Kot Diji — often considered the strongest of the ancient fortifications in the region — has all but collapsed, as have the walls of Ranikot. “We do not know what is happening in Thar. There is four to five feet of stagnant water in Kot Diji. The entire heritage area of the province is turning into Mohenjo Daro, and the government is not moving,” he said. The floods have not spared the famous Makli monuments in Thatta and Banbhore either — both internationally renowned archeological sites.

The impact of widespread displacement caused due to the floods, shows up in the marked rise in street crime statistics, especially in Karachi. A meeting of the Senate Standing Committee on Interior chaired by Senator Mohsin Aziz was called in response, where police officers gave a briefing over the increasing street crime cases in Quaid’s city. The officers reported that half of the criminals caught by them belonged to other parts of the country, highlighting the fact of flood affectees moving to Karachi for refuge and committing crimes like theft, robbery, kidnapping, murder and target killings. 4553 bikes, 169 cars, and 2446 phones have been reported to have been stolen in Karachi in September alone.

During the “super-floods" of 2010, extremist attacks against religious minorities—particularly Ahmadis and Shias—increased, sparking violent protests against the police for failing to protect them. Minority groups had been denied services by aid workers, an offense likely to reoccur in the absence of protective measures and safeguards for vulnerable groups. Reports of SGBV against women and girls from minority religious communities, including Hindus, have already surfaced. [CSIS]

The floods have taken the lives of children, their homes and

their food security for the next year or so, but the impact of the catastrophe goes beyond the next five years because of the damage brought to educational institutes across the flooded districts. An estimated 3.5 million children have had their schooling disrupted. Gohar Abbas, an education activist, says that many schools have been transferred to emergency shelters where families have temporary accommodation. This devastation compounds Pakistan's learning crisis. Prior to COVID and the floods, three in four Pakistani children were in "Learning Poverty", which means that they do not know how to read or understand simple text by age 10 (due to being out of school or their inability to read at a minimum proficiency level by a certain age). In some parts of the country, the scale of flood-induced damage to school infrastructure is so severe that Learning Poverty may rise by 5 percentage points from schooling deprivation alone.
To put things in perspective, the 2005 earthquake substantially reduced children's learning outcomes four years later
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despite significant financial compensation for families. This shows the extent at which the future of these children is at risk because education is an afterthought when food and shelter is scarce.

5.3 Social

Sociology defines social impact as a positive or negative change in response to a pressing social challenge. This includes any economic, public health, and other social crises that might occur or be resolved. In the context of Pakistan's recent flood apocalypse, while the flooding has compounded pre existing economic and public health disparity, the minorities face the brunt of the injustices doled out.

Expectedly, the floods have severely worsened the situation for women, girls, and other vulnerable groups. According to CARE Pakistan country director Adil Sheraz, "It's women, girls, and other marginalized groups who face the biggest challenges including access to humanitarian

assistance." The UN Population Fund estimates more than 8 million women and girls of reproductive age are affected, with 1.6 million needing humanitarian assistance. Despite the development of a separate database for vulnerable groups amid disaster, Pakistan's crumbling healthcare infrastructure has rendered at least 650,000 pregnant women without the facilities and support they need to deliver their children safely.

Of the 100,000 pregnant women in Sindh province, only 891 have been able to relocate to emergency relief camps. Up to 73,000 women have delivery dates in the next month and require skilled birth attendants, newborn care, and support. Shabnam Baloch, IRC Pakistan Director, said, "There is an acute sense of despair in all corners of the country. In the immediate term, families are likely to go hungry as employment dries up and they cannot afford food. Meanwhile, we know that during times of crisis, women and girls are at an increased risk of violence, exploitation and abuse, as pressures mount for households to access an income and source food and essential household supplies. IRC and its

partner's teams on the ground in Sindh, Balochistan and Khyber Pakhtunkhwa provinces are disturbed by an increase in reports of sexual harassment and assault."

5.4 Political

Since the spring no-confidence motion against former prime minister Imran Khan and the formation of the new government under Shehbaz Sharif, headlines and political energy in Pakistan have been completely dominated by political infighting, machinations within the governing coalition, and tussles with the military and judiciary. The overall flood response has been a distracted attempt to do so due to the latest charges against Imran Khan and his party's control of the provincial governments in Punjab and Khyber-Pakhtunkhwa.

A testament to his popularity and ability to get the Pakistani diaspora mobilized was Khan's live telethon in which he was able to raise a substantial sum for flood relief efforts where he

raised Rs. 5 billion in two hours. Overall, the Pakistani government and the military have been trying to deliver aid across the country despite the political crisis. A power struggle between the Pakistan Democratic Movement coalition government and ousted leader Imran Khan's party- Pakistan Tehreek-e-Insaf- dominated media coverage in earlier months of the crisis. While hogging the media attention, opposition Party leaders held several political rallies to muster public support for early elections amid the galloping disaster, but without showing any concern for the victims of the savage floods. At one such rally, a prominent PTI leader even appealed to expatriate Pakistanis not to send any kind of support for the flood victims in an attempt to undermine the current government's relief efforts.

The heat wave that began in April and the floods that hit Balochistan in July received little attention from politicians or news organizations. While the immediate political crisis has ceased, underlying tensions may affect the long-term response; hence proving that the larger problem stems from long-term political instability and recurring crises that do not allow for the policy implementation, continuity and reform that might have better prepared Pakistan to address such a climate disaster.

In addition to climate change, several other factors account for the extreme impact of the flooding. Experts claim the Pakistani government is "paying the price for years of delays in addressing the problem." Corruption, mismanagement of the country's water resources, a lack of necessary infrastructure, and weak governance have fueled the crisis, hitting the poorest and middle class the hardest. Many structures were built illegally or so poorly that they could not withstand the rains and subsequent floods, and some were constructed in places previously affected by the 2010 floods. Local government authorities often lack the capacity to combat illegal construction. Pakistan's army chief, General Qamar Javed Bajwa, has called for legal action

against those responsible for erecting structures on vulnerable sites.

Illegal logging persists across Pakistan, despite claims that the government controlled the situation through the deployment of paramilitary forces. Pakistan, already in a forest deficit with only 5 percent of areas forested, compared with a global average of 31 percent, has experienced higher deforestation rates than average due to rampant forest fires and uncontrolled logging. Trees restrict sediment deposition and stabilize soil during extreme rain events. With increased deforestation, Pakistan will become more susceptible to severe flooding.

Successive Pakistani governments have responded to floods by reacting once the floods take place, with little in the way of proactive policies. This is despite numerous reports from previous floods detailing policy prescriptions. The destructive effects of the flooding are exacerbated by years of poor ecological governance. Their catastrophic consequences could have been mitigated if Pakistan's rulers had taken action.

Research, data, opinions and the ever-rising global temperatures suggest the 2022 floods will not be as anomalous as they are if we continue down the same road of petty and callous politics as we have. It should go beyond saying that the health and safety of millions of Pakistanis should take precedence over partisan politics for a leader that actually cares for the people it leads. But no party yet appears interested in a ceasefire of the politicking and instead focusing on disasters that are probable of causing national emergencies and unprecedented losses year on year. It is time for Pakistani politicians to rethink and reanalyse their priorities, lest the very country they are trying to rule over is a pile of ruins.

6.0
Post Floods

6.1 Relief and Rehabilitation Efforts

With more than one-third of Pakistan affected by flooding, over 30 million people are in need of food, shelter and medical care. Researchers, along with the government, international aid agencies and local organizations are extending help in the limited ways possible. The World Bank for instance, is working with the federal and provincial governments to provide immediate relief to those who are most affected.

Light has been shed towards the unjust climate vulnerability Pakistan faces, while the World Bank is repurposing funds from existing projects to support the pressing needs in health, food, rehabilitation, shelter, and cash transfers. With the help of the world bank, the federal government is working on instructing the respective provincial governments to prepare emergency operations to quickly start the reconstruction and rehabilitation to rebuild or repair infrastructure, housing and restore livelihoods, and to help strengthen Pakistan's resilience to climate-related risks.

Furthermore, The "2022 Pakistan Floods Response Plan (FRP)" [UN] was jointly launched on August 31 by the Government of Pakistan and the United Nations, simultaneously in Islamabad and Geneva. The response plan focuses on the needs of 5.2 million people, with regard to the life saving activities amounting to US$ 160.3 million covering food security, assistance for

agriculture and livestock, shelter and non-food items, nutrition programmes, primary health services, protection, water and sanitation, women's health, and education support, as well as shelter for displaced people.

The FRP while acknowledging Pakistan's efforts, towards meeting the humanitarian needs of the affectees in collaboration with the UN and other partners, also aims to set out a well-coordinated and inclusive plan of action to respond to the needs of the affected people. The plan is holistic, with a multi-sectoral approach covering the thematic clusters of food security and agriculture, health, nutrition, education, protection, shelter and non-food items, water, sanitation and hygiene. Moreover, Pakistan continues to host more than 3 million Afghans refugees and like previous occasions, the 421,000 refugees living in flood-affected areas are included in the FRP.

IIn addition, the Pakistan Federal Government sped up rescue and relief operations on August 28 in flood affected areas all over the country. Relief camps were also set up to which elief camps were also set up to which the rescued persons were shifted across all calamity-hit areas of the country, whereas food, medical aid and other relief items were being provided to affected people in the camps. Water-borne diseases in this sort of scenario became rampant.

Meanwhile, the Provincial Disaster Management Authority (PDMA) continued distributing tents among the affected people. However, many areas were not reached and even in mid-October, many areas in Upper Sindh and Balochistan are still waiting for their villages to be dewatered. In the case of Sindh, particularly Insufficient linkages and coordination between PDMAs, elected officials, and other government departments hampered evacuation and relief efforts, despite contingency planning and early warnings.
Similarly, Pakistan Army troops with officials of National Disaster Management Authority (NDMA) and the relevant provincial departments, expedited rescue and rehabilitation operations in the flood-hit areas, including Khyber Pakhtunkhwa and the worst-affected Balochistan.
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The Pakistan Army conducted an aerial relief operation in Rajanpur District and provided aid by distributing ration bags, tents were provided to the affectees as well. However, the bulk of the disaster response being managed by the military indicated a clear lack of confidence in civil administration. Moreover, there also remained a gap in information dissemination between the military and humanitarian community which led to inefficient distribution of relief goods (same items were being given out repetitively)

The Benazir ncome Support Programme (BISP) has disbursed over Rs. 6 billion among 255,946 families under the Flood Relief Cash Assistance initiative. A grant of Rs. 10 billion was announced by Prime Minister Muhammad Shehbaz Sharif for Balochistan. Minister for Information and Broadcasting Marriyum Aurangzeb added that two aircraft from Turkiye carrying relief goods arrived in Karachi on Monday 29 August. Other countries continue to help and send aid to mitigate the crisis. Tent cities have been set up to cater to refugees.

A girl poles a makeshift raft through a flooded alleyway in Latifabad, Hyderabad, Pakistan, on August 20, 2022.

People gather along a flood-damaged road in Quetta on August 26, 2022.

People wade through a flooded road after heavy monsoon rains in Karachi. Sights such as above are extremely familiar to the city's residents, for urban flooding is an annual occurrence.

6.2 Diseases

The onset of one third of Pakistan being submerged underwater was in June, when the monsoon began as did the devastation. It is October now, the season of fall and usually when the chill of the following winters starts setting in. Despite the passage of time, the devastation remains as is, water is still stagnant and reluctant to recede while the decrease in temperatures is now causing a rise in respiratory infections too on top of all the other water-borne illnesses festering. WHO chief Tedros Adhanom Ghebreyesus warned of a looming health disaster in Pakistan [ARY], saying that a wave of disease and death will follow this catastrophe leaving millions vulnerable, and that is exactly what has been happening.

As authorities wait for the flood waters to recede, which may take two to six months, the regions have become infested with diseases including malaria, dengue fever, diarrhea and skin problems. Water-borne diseases have become an acute concern in flood ravaged Pakistan. Officials in Sindh said that more than 137,000 cases of diarrhea, over 10,000 cases of dysentery and at least 4,000 confirmed cases of malaria were reported in the province [AJ]. The officials described the health crisis as challenging due to a lack of protective nets or medical kits to detect malaria.

As stated previously, the challenges faced by women amongst the flood devastations are acute and incomprehensible. Pregnant women were at risk in the affected areas owing to more unsafe births, more untreated diabetes or heart disease, and more children missing vaccination. The United Nations Population Fund in August cautioned that more than 650,000 pregnant women in flood-affected areas require urgent maternal health services. There has been great neglect in catering to sexual and Ireproductive health for women, where many local and small scale relief organizations are collecting donations to provide affected women with menstrual hygiene products.

Three other flood affected provinces also reported tens of thousands of patients visiting make-shift health facilities in flood ravaged areas, noting acute respiratory problems, skin diseases such as scabies, eye infections and typhoid. The spread has forced the government to deploy additional medical teams and dispatch medicine besides providing clean drinking water to survivors, many of whom are living in tents and makeshift homes.

An army doctor checks a woman at a makeshift hospital in the flood-affected Rajanpur district, in Pakistan's Punjab province, on August 2, 2022.

7.0 Future

7.1 Future Planning for Floods: Dams, Infrastructure, Rebuilding

U.N. Secretary-General António Guterres said after visiting the country, while noting the floods' human toll and scale of destruction, "The flooded area is three times the size of my entire country, Portugal."

Early assessments suggest that the infrastructure loss caused by the devastating floods adds up to more than $12 billion. The sum is as substantial as it is because more than 13,0835 kilometers of roads have been destroyed all over the country. Most roads still remain inundated in Sindh, Balochistan, and southern Punjab, making it extremely difficult for relief supplies to reach the hardest hit areas, further straining supply chains in an already disaster struck environment. Complete destruction of the road network particularly in Balochistan- the fruit basket of the country - would make it difficult for any fruits to be sent across the country as supply chains break down, resulting in heavy economic losses for the people in the region.

2022 has witnessed the worst ever floods in Pakistan's history which have destroyed 13,0835 kilometers of roads, 375 bridges and 194,3978 houses. Of these, 778,560 houses have been fully damaged due to the floods, says Pakistan's National Disaster Management Authority (NDMA) [RW]. Similarly, it is estimated

The image above is of a British-built railway bridge in Quetta, Balochistan. The bridge had been functioning since its creation in the 1880s, but heavy rainfall in the month of August caused it to collapse, suspending train service between Balochistan and other parts of the country. The destruction of this historical bridge proves just how devastatingly fierce the 2022 floods were.

that roughly US$ 2.5 billion will be required to reconstruct roads, of which more than 5,000 kilometers have been completely destroyed. This reconstruction activity needs to be initiated on an emergency basis, as roads would remain critical in ensuring connectivity, supply of rehabilitation goods, and reconstruction.

More importantly for areas in the mountains, and for communities in remote areas, reconstruction of bridges would be critical to enable access and kickstart reconstruction activities. It is estimated that more than US$ 1 billion would be required to construct more than 250 bridges that have been destroyed by the floods. Early assessments suggest that reconstruction activity would require at least US$ 6 billion over the next twelve months for reconstruction activity.

Experts within Pakistan's construction business estimate Rs 2.735 trillion ($12.32 billion) would have to be spent to rehabilitate and rebuild houses, roads and bridges. Saeed Ahmed Mughal, secretary information of Karachi Contractors Association (representative body of companies mainly working on government projects) estimated that the cost of repairing a house is Rs 900,000 while the reconstruction cost of a fully damaged house is estimated at Rs 1.5 million. He further added that per kilometer of road cost is Rs 32 million and the construction of a bridge would cost Rs 300 million, based on the current market rate (calculations are based on the tender prices of similar ongoing projects in the country).

Aisha Khan, executive director for Civil Society Coalition for Climate Change highlighted how authorities in Pakistan have traditionally focused more on flood management and less on disaster risk reduction [CCN]. The most urgent adaptation needed for disaster risk reduction are resilient infrastructure, which will require millions of dollars of investment. Houses, that were washed away and now require millions of rupees for reconstruction, should be rebuilt with concrete foundations and steel girders,

not with mud bricks which can be washed away in the next instance of flood.

In addition to Pakistan coordinating closely with international aid providers, its own relief organizations and civil society to rescue victims of the flooding, the disaster stricken country also has to begin thinking for prevention of such large scale destructions in the future. Pakistan needs a grand infrastructure plan, construction which is climate resilient, and which can withstand extreme weather events. All of this needs to be done on a priority and accelerated basis.

It is important to realize that Pakistan's governance failures exacerbated the impacts of climate change. Since its creation, the country has struggled to maintain a stable democracy, with long periods of military rule. This lack of political continuity has caused policy instability, which prevents Pakistan from undertaking the ong-term infrastructure and prevention investments needed to mitigate climate disasters. One can argue that there is only a limited extent to which a country can prepare for a climate disaster of this magnitude.

In the aftermath of the 2010 floods, the government in Islamabad established the National Disaster Management Authority and its relevant provincial counterparts. However, the agency has focused on a broad framework which makes use of general meteorological data, which has limited application in proper planning. The authority lacks the technical expertise and experience to mitigate acute climate disasters. For example, in Sindh, the Provincial Disaster Management Authority (PDMA), in its planning for the 2022 monsoon season, stockpiled just over 70,000 tents [USIP]; however the flooding has displaced almost 4 million people in the province alone, emphasizing just how focused the agency is on disaster management than the actual risk reduction.

Taking the example of the use of early warning systems in May 2022, the system allowed entire communities in Gilgit-Baltistan to escape before flooding from a lake overran its banks. This instance affirms the need for the provincial-level disaster management authorities to involve the scientific community in a more detailed capacity so that they can better utilize more up-to-date weather models to supporr disaster planning and preparedness.

Along the Indus River's flow path, dams, barrages and a canal system are used to manage the water flow. Likewise, several dams and barrages have been constructed along the various tributaries with some of these joined by major canals. This irrigation infrastructure is not adequate to manage flash floods or long periods of droughts. Currently, there aren't many dams and they do not have enough depth to store water in case of excess floods. Flowing water carries suspended particles along from the mountains and deposits it in the plains. This reduces the storage capacity of the reservoirs and clogs the waterways, resulting in overflows. The recent calamity has reignited the conversation surrounding the construction of smaller dams to better store and supply surplus water (not enough water is available during droughts while there is a lot of it during floods).

The construction of dams, dikes, storm surge barriers etc, are included under the term of structural measures necessary for future flood disaster prevention. Existence of sufficient storage capacity is crucial to mitigate the impact of super floods whereby these storages can be built both on-channel and off-channel to attenuate flood peaks. During the historic 2010 floods at the Tarbela reservoir, the peak discharge ranged from 835,000 cusecs at inflow to 604,000 cusecs at the outflow. Similarly, Mangla reservoir on the Jhelum River reduced peak flow of 344,000 cusecs at inflow to 225,000 cusecs at the outflow. These two reservoirs played a critical role in lowering the flood peaks at Jinnah and Panjnad Barrages downstream which otherwise could have played havoc with

Pakistan's strategic irrigation infrastructure hence stressing the need for storage capacity along Pakistan's fruitful water bodies.

Critique has also been extended to encroachment construction within rivers which is quite common across the country. In the town of Bahrain, for example, hotels and shops constructed within the riverbed were washed away during the current floods. However, some also blame the Pakistan government for its failure to plan for climate crises and for allowing construction to alter the rivers' natural pathways and human settlements on floodplains. Mohammed Hanif, District Community Officer in Kaghan, said that most of the damage done in his province of Khyber Pakhtunkhwa was in areas where the course of the rivers Sindh, Kabul, Swat, and Kunhar have been encroached on by commercial activities [HP]

It is important to realize that Pakistan's governance failures exacerbated the impacts of climate change. Since its creation, the country has struggled to maintain a stable democracy, with long periods of military rule. This lack of political continuity has caused policy instability, preventing Pakistan from undertaking the long-term infrastructure and prevention investments as well as the development of damage and loss databases needed for climate focused research, which are capable of mitigating climate disasters. One can argue that there is only to a limited extent that a country can prepare for a climate disaster of this magnitude. .

In the aftermath of the 2010 floods, the government in Islamabad established the National Disaster Management Authority and its relevant provincial counterparts. However, the agency has focused on a broad framework which makes use of general meteorological data, which has limited application in proper planning. The authority lacks the technical expertise and experience to mitigate acute climate disasters. For example, in Sindh, the Provincial Disaster Management Authority (PDMA), in its planning for the 2022 monsoon season, stockpiled just over 70,000 tents [USIP]; however the flooding has displaced almost 4 million people in the province alone, emphasizing just how focused the agency is on disaster management than the actual risk reduction.

7.2 Refugees

The disastrous floods have uprooted previous refugees and citizens alike. People with homes, livelihood and settled lives are now sleeping in tents under the open sky, waiting for the floodwaters to recede so they could wade through the devastation caused. Major cities like Karachi have also seen an influx of refugees as well as a subsequent rise in street crimes which has left police forces filing FIRs. Officers reported that half of the criminals caught by them belonged to other parts of the country, highlighting that flood victims who have been moving to Karachi for refuge are committing crimes such as theft, robbery, kidnapping, murder and target killings.

Pakistan has been host to 1.4 million Afghan refugees out of which 420,000 live in the worst flood affected districts of the country. These statistics call for a more integrated and inclusive distribution of aid to the communities affected. The international community and Pakistani government are to realize that climate-disasters impact people regardless of their immigration status; the case at hand being the longstanding struggle of the Afghan community against the prevailing xenophobia and the indifference directed at their fates in the wake of the floods.

The reason for this indifference is the spiralling economic crisis that has made the government and people even less interested in helping refugees. Pakistan continues to host more than three million Afghans where at least 421,000 refugees are living in flood-affected areas included in the FRP. The floods, as devastating as they are, give Pakistan a chance to rescript the refugee response in order to bring international attention to the needs of Afghans for improved housing and healthcare facilities. It is also an opportunity to highlight that refugees, like other socio-economically disadvantaged communities, are at high risk of climate-caused humanitarian disasters.

The NDMA issued a 24-hour situation report released on a routine basis that accounted overall life, property, and infrastructure losses incurred by the heavy rains lashing out various parts of the country. According to the report, 480,030 displaced persons have been shifted to refugee camps. These numbers should be significant in realising just how integral it is for Pakistan to learn from its past experiences and to discern that there is so much cash programming and aid can do to help tackle crises like these. Most of the structural concerns of the recent response, including access to WASH (water, sanitation and hygiene) infrastructures and healthcare systems need reforms and planning consisting of critical understanding of the risks of disasters (i.e. 2022 floods).

Tents are set up at a makeshift camp for displaced people after they fled from their flood-hit homes in the Charsadda district of Khyber Pakhtunkhwa on August 29, 2022.

7.3 Flood Relief Programs

Al Khidmat Foundation: The foundation's relief efforts are ongoing in the affected regions of Sindh, Balochistan and South Punjab on an extensive scale. Alkhidmat has set up tents, medical facilities and has ensured the provision of at least two meals a day to the affectees, while the delivering of ration too villages is also being done.

Maryam Zia's Fundraiser: Maryam Zia is an exchange student in Washington DC and beyond. She has collected funds for the relief of her people in Balochistan. So far $21,000 have been collected on her gofundme page out of the $100,000 targeted.

Rizq Trust: Rizq is an organization that believes in food security being the right of every human for the sole reason of them being alive and deserving of Rizq. The trust is managing a Flood Relief campaign to support people in affected areas of Punjab and Balochistan. The campaign aims to provide relief rations to the flood-stricken population to keep them afloat during these trying times.

Indus Resource Center: IRC is a nongovernmental organization (NGO) established in the year 2000 with the aim of providing sustainable and replicable models for integrated social and economic development in Sindh, Pakistan. IRC is asking for food and non-food items such as dry ration, cooked food, clean drinking water, tents, mosquito nets, plastic sheets, and medical supplies etc. for the affected families.

Following is a list of legitimate organizations and fundraisers working for the relief and rehabilitation of flood affectees. The list includes many women led organizations too.

<u>Flood 2022 Pakistan Fundraisers</u>

https://docs.google.com/spreadsheets/d/1u4EcNZIhKUltDc7ZPiMT3CLrVooFLFd_4AyKM1raEZs/edit#gid=463574238

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Most of the structural concerns of the recent response, including access to clean water, WASH (water, sanitation and hygiene) infrastructure and healthcare systems needs reforms and planning consisting of critical understanding of what exactly do disasters such as that of 2022 floods put at risk.

Army soldiers distribute food-relief bags to flood-affected people in Shikarpur of Sindh province on August 28, 2022.

8.0 Conclusion

As much as news reports, articles, and coverage material describe the floods of 2022 as “unprecedented”, the fact of the matter is that the floods and subsequent destruction were not as unexpected as we would like to believe. The La Nina phenomenon has caused the temperatures to pendulate in the region to absolute extremes, making the likelihood of a “monsoon on steroids” highly predictable.

A sense of injustice has prevailed since the developing country has been facing the effects of Climate Change due to its geographical vulnerability head on, while the Global North discusses the “supposed” challenges climate change might bring about in the future. This is where climate reparations come in, i.e. the call for money to be paid by the developed countries to the developing countries as a means of addressing the historical contributions that the more carbon-emitting countries have made (and continue to make) toward climate change. The debate lasts for the Global North to pay for the damage its unsustainable practices have brought to Pakistan: the “monsoon on steroids” being the repercussion. Urgent appeals for debt relief from rich nations are being raised. This is a reminder that Pakistan is paying the price for Western greed.

Climate Financing is one way in which the impact can be mitigated. According to United Nations Climate Change: climate financing refers to local, national or transnational financing—drawn from public, private and alternative sources of financing—that aims to support [UNFCCC]. For Pakistan, this is crucial at the precipice of irreversible climate change the country stands upon.

While light is being shed on all the reasons the entire world and global emissions are responsible for the disaster local to Pakistan right now, concerns have also been raised on the governmental mismanagement. There are questions being raised about why the level of preparedness has not increased since 2010, which was the last time Pakistan had a massive flood crisis. As discussed previously, Pakistan needs structural changes stemming from climate financing which aim to support mitigation and adaptation actions that will address climate change. Such examples include the widespread installation of flood detection systems to alert authorities and to therefore combat the yearly occurrence of untamed floods leading to losses at all fronts.

While the flooding was intensified by the rising temperatures, the minimal investments in the agriculture sector are worthy of being discussed too. The silting in dams and barrages, reduced water storage space, and the ill planned water supply have all played their part in augmenting the looming disaster. Dams and other water control works, particularly water spreading works in the upper riverine area are critically needed for better management and redirection of water from the melting glaciers, all working together cohesively to prevent future calamities like the 2022 floods.

Prompt responses in the form of health camps ensuring comprehensive health assessments especially for reproductive health of vulnerable groups, development of locally produced nutrition products to treat malnourished affectees, provision of agricultural and livestock support in the form of relief packages for the upcoming sowing season as well as the conduction of thorough damage surveys, are all measures that would enable Pakistan immensely in its disaster management as well as mitigation.

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