



# POLICY PAPER

## TORRENTIAL FLOOD 2022

Prepared for  
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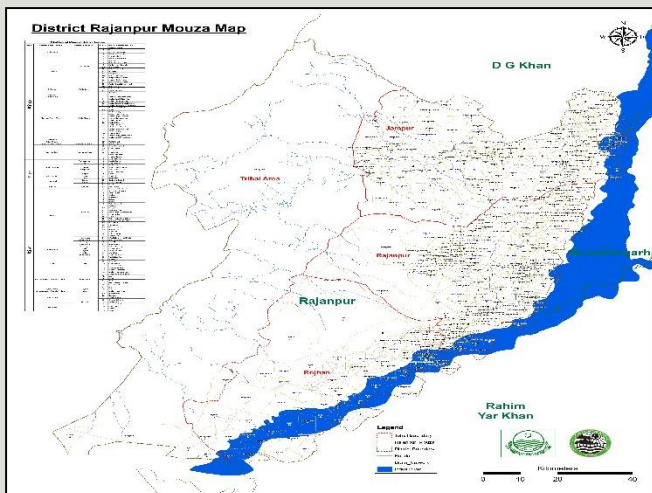
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DISTRICT RAJANPUR

## 1. INTRODUCTION

Rajanpur is the Southern-most district of Punjab Province. It has a total population of approx 1.9 million and is comprised of three Tehsils: Jampur, Rajanpur and Rojhan. In addition, a tribal area ("*de-excluded area*") lies in the Koh-e-Suleman range.

Being close to the river bed, the eastern part of the district (*Katcha zone*) is frequently hit by flooding from the Indus River due to heavy monsoon rains in July/August and snow melt in the Himalayas. This riverine flooding inundates a large part of the low lying areas along the river belt in all three Tehsils (*sub-divisions*), namely Jampur, Rajanpur and Rojhan. The western part of the district (locally called "Pachadh" Area/ Tribal Area) is frequently affected by "Flash / Torrential Floods" which develop in the Suleiman mountain ranges. Both these hazards bring heavy losses in the two areas (*Katcha & Pachadh*) that cover roughly about 80% of the area and about 60% of the population, damaging houses made of mud, land and crops, livestock and other property.



The lands in the Western (Pachadh) area are relatively steep and this tends to facilitate flash- flooding from torrential rains in the Suleiman range in July/August (or in some cases February/ March). Flash floods in the Pachadh zone are considered more serious than the riverine floods for the communities. If modest, the flash-floods can be harnessed for the benefit of crop cultivation, however, in case of the frequent severe flash floods, communities face heavy losses of standing crops, livestock, houses which are usually made of mud, and other physical infrastructure.

## 2. FLOOD SITUATION

### 2.1. Riverine Flood:

Due to heavy rains in the northern part of Pakistan and the water released by the India downstream to Pakistan cause water level rise in river Indus at Kot Mithan (Rajanpur), which started to develop flooding in the suburb areas of the river banks. In Rajanpur the rise in Indus River started from the 4<sup>th</sup> week of July 2022 and start damages of livelihood (Standing Crops especially Cotton and Sugarcane) of the riverine areas. Approx maximum discharge **7,20,000 cusec** (Discharge of Taunsa + Discharge of Panjnad + Discharge from Rodh Kohi Channels) is reported at **Benazir Bridge** at Kot Mithan which is continuously rising; As all the 05 rivers of the Pakistan are joining together at Kot Mithan in District Rajanpur due to which pressure of all the 05 Rivers become maximum in the areas of Rajanpur.

## 2.2. Flash Flood:

Flash Flood is another hazard developed from the mountain range of Koh-e-Suleman from the western side of Rajanpur. Heavy Rains started in the mountains areas from the 2<sup>nd</sup> week of July 2022 to onwards, which developed an exceptional high level flash flood of the history in the Pachadh Areas of Rajanpur which is continuous up till now. Maximum 108,941 cusec water in Kaha Hill Torrent and 75,900 Cusec reported in Chachar Hill Torrent. This rain water run throughout the district towards western part to eastern of the district and fall into the Indus River at different locations of Tehsil Rajanpur and Rojhan.



## 2.3. Rainfall and Maximum Discharge Reported:

Maximum rainfall reported in current year 2022.

Year	RAINFALL in mm				
	Rajanpur	Jampur	Rojhan	Tribal Area	District Average Rainfall
2017	94	77	105	181	114.25
2018	55	37	41	152	71.25
2019	173.5	132.5	137.5	251	173.625
2020	128	113	112.5	254	151.875
2021	51	21.5	49.5	172	73.5
01.01.22 to 29.08.22	232.3	238.5	244.5	457	293

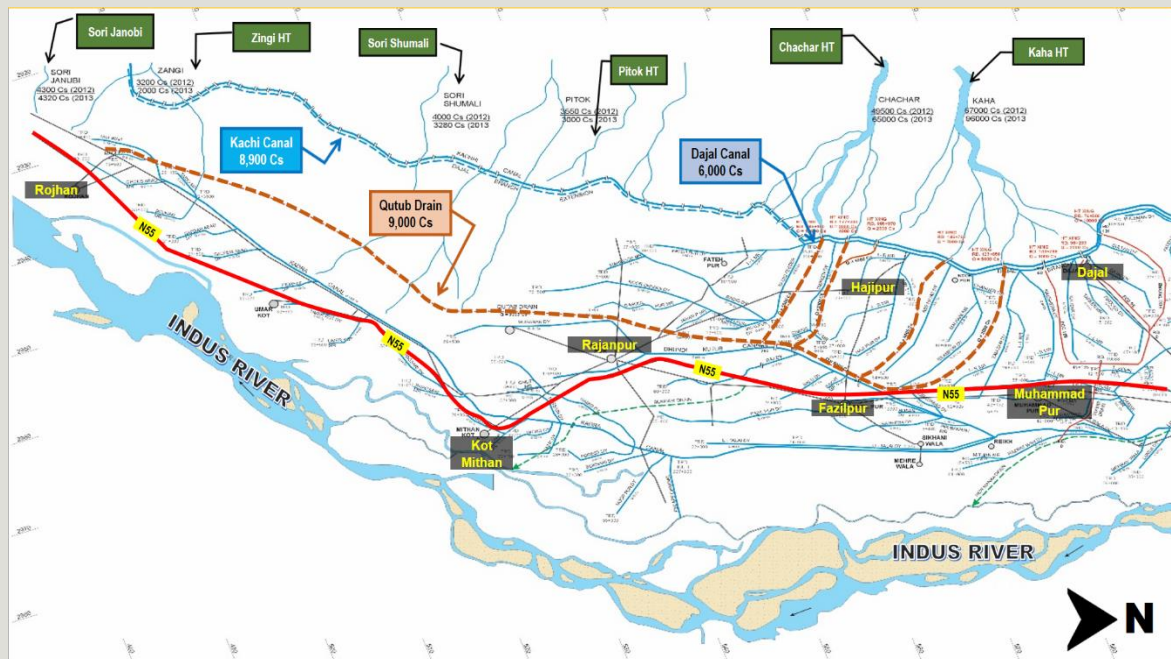
Currently Rajanpur district is vulnerable for both flash and riverine flood, the maximum flood reported/recorded in Rajanpur is as under:

Discharge of torrential

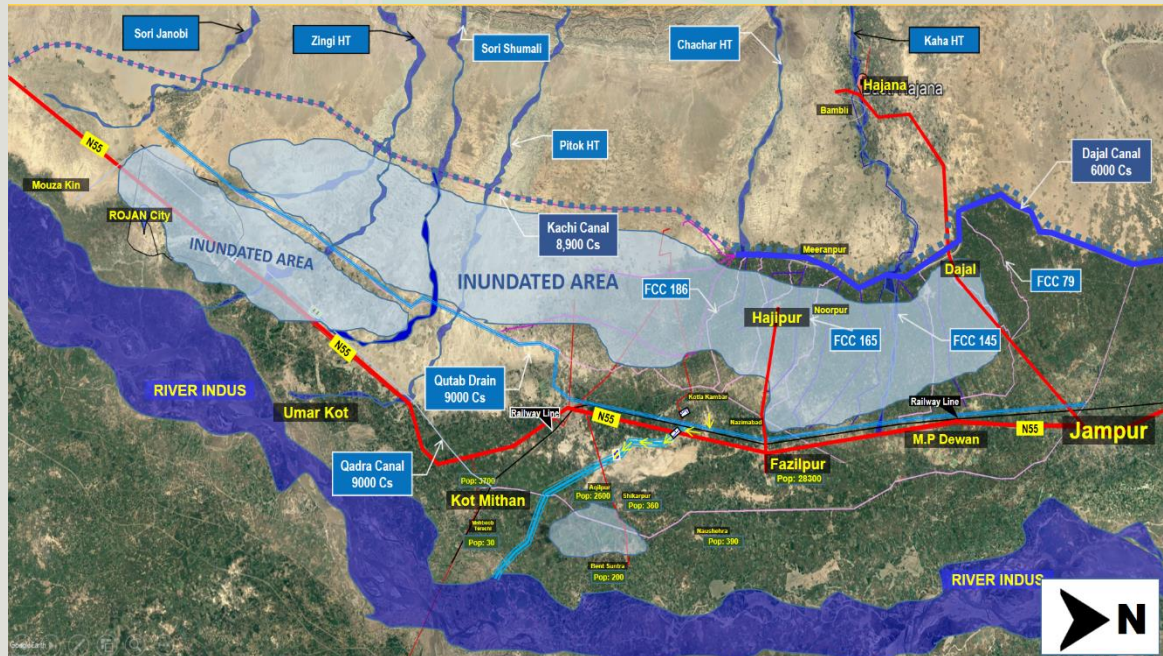
Sr.	Hill Torrents	Maximum Discharge (Cs)	
		1 <sup>st</sup> spell (15.07.22 – 04.08.22)	2 <sup>nd</sup> spell (14.08.22 – 29.09.22)
1.	Kala Bagga Khosra (Jampur)	10,500	18,500
2.	Kaha (Jampur)	40,905	108,941
3.	Chachar (Rajanpur)	22,750	75,900
4.	Pitok (Rajanpur)	2,500	5,000
5.	Sori Shumali (Rojhan)	2,000	7,000
6.	Sori Janubi (Rojhan)	7,000	17,000
7.	Zangi (Rojhan)	3,400	9,000



## IRRIGATION MAP



## INUNDATION MAP





## 2.4. Severity of Situation:

The DC / Chairman DDMA has declared emergency situation in the District Rajanpur vide his official order, The situation in Rajanpur was getting serious day by day, high flood was also expected in Indus River in Rajanpur in the last week of August 2022, 100% Pachadh area was under flood, standing Crops and other sources of livelihoods had got damaged. Due to continue Rains on Koh-e-Suleman which was producing Flash Flood every day; peoples from the flood affected areas had displaced to safer places along with their cattle, basic house equipments in the 1<sup>st</sup> week of August 2022. Pak Army was also called to support by the District Administration for assistance in relief activities along with the Recue 1122 Service of District Rajanpur.

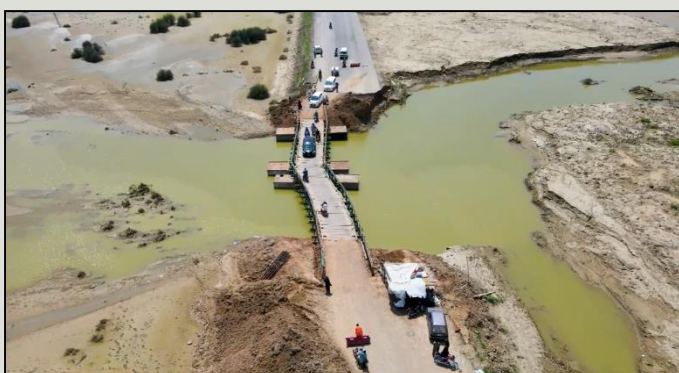


## 3. EMERGENCY FLOOD RESPONSE

### a. Steps taken by the District Administration

District Administration Rajanpur immediately taken the steps regarding safety of major populated towns. public and their and major populated towns.

- Relief cuts were made on different Flood Carrying Channels and drains;
  - To save the densely populated areas.
  - To give safe passage to water towards Indus River.
- Qutub Drain:
  - Pul Pathan (Western side)
  - Muhammad Pur Gum wala (Western side)
- Pond Area:
  - Hajipur down stream
  - Qutub drain down stream
  - Qutub Canal (eastern side)



- Flow to Bukhari drain (Eastern side) and cut on private flood protection bunds
- Cut on Indus Highways near PARCO Fazilpur (to save Northern side of city).
- Cuts on Hamid Minor and Qadra Canal (left side).
- The flood water shall ultimately touch and accumulate on Fakhar Flood Bund at Indus River. From there, Irrigation Department will manage safe discharge to River Indus subsequently.

**b. Response by the Government:**

The District Administration Rajanpur was high alert. The Deputy Commissioner Rajanpur had declared flood emergency in the district. All the line departments had established their flood affectee's facilitation camps at different locations, Rescue 1122 boats were mobilized at various points for the evacuation purpose, additional flood relief camps had been established in government schools, Revenue department was registering the IDPs, Medical and livestock camps had also been established almost in both the areas of flash flood as well as riverine areas.

District Emergency Operation Centre (DEOC) / District Control Room was established at DC Complex 24/7

Sr. #	Rescue & Relief Activities		Total
1	Persons Evacuated		54799
2	Animal Evacuated		10192
3	Relief Camps Established		27
4	Families in Relief Camps		945
5	Persons Treated		107,166
6	Animal Vaccinated	Large	75731
		Small	117596

**b.1 Services at Relief Camps:**

The District Administration Rajanpur ensured to provide the following facilities at the relief camps.

- ✓ Health and Veterinary Services
- ✓ Drinking Water
- ✓ Cooked Food
- ✓ Fodder for Livestock
- ✓ Tents / Toilets



### **b.2 Response by the NGOs:**

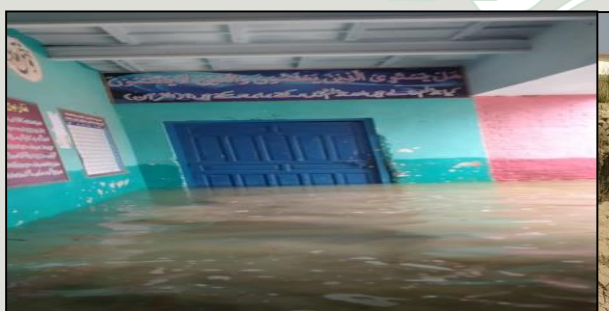
The NGOs were already present in the district started initial response & assessment in their respective areas in collaboration with the District Administration and Social Welfare Department Rajanpur. District Administration welcomed to all the NGOs working in Rajanpur for joining hands with the District Administration to cope the current critical situation of floods in Rajanpur.



## **4. FLOOD DAMAGES**

### **4.1 Major Losses**

Type of Losses / Damages	Rajanpur	Jampur	Rojhan	De-Excluded Area	Total
Union Council Affected	09	18	15	01	43
Villages Affected	113	120	20	03	256
Crop Damaged (acres)	77,059	89,054	22,948	-	189,061
Houses Damaged	10,609	8,600	9,289	107	28,605
Shops Damaged	26	24	19	-	69
Others /Boundary Wall Damaged	3,510	1,261	2,157	-	6,928
Livestock Losses	184	87	33	-	304
Deaths	12	13	09	03	37



### **4.2 Major Crops Affected**

Crops at large scale have been damaged in both the riverine as well as in flash flood areas; Agriculture is the major source of income in these areas not only for the farmers but for farm labour also. It will badly impact on the overall economy and business in the district in the coming days. Following is the detail of major crops

which have damaged.

- I. Sugarcane
- II. Cotton
- III. Mungbean
- IV. Fodders



## 5. IMMEDIATE NEEDS

Rajanpur is experiencing the worst flash flood at this time. According to the Flood Forecast Division Punjab Lahore 102,567 Cusec as the highest flood has passed for continuous 8 hours from the Hill Torrent “Darra Kaha” on 14<sup>th</sup> August 2022 which is the worst flood of the history of the hill torrents for Rajanpur.

District Administration is in efforts to deal with the flood situation and supporting the flood Affectees at its maximum level at priority. The level of emergency is beyond the expectations and required to response the situation jointly by all the stakeholders. The flood affected families of district Rajanpur are striving the following immediate needs.

- i. Safe Drinking Water
- ii. Cooked / dry food hampers
- iii. Fodder for livestock
- iv. WASH services in Relief Camps
- v. Health & Hygiene stuff
- vi. Plastic Sheets as the monsoon rains are continued
- vii. Family size tents
- viii. Other Non Food Items

Later on the rehabilitation of houses, community infrastructures, household kit, water facilities, toilets and livelihood recovery will be the needs of community to address after the recede of flood water.





## 6. IMPACT ASSESSMENT AND MITIGATION STRATEGY

### I. Flooded Area:

The areas flooded by recent torrential rainfall in district Rajanpur were as under:

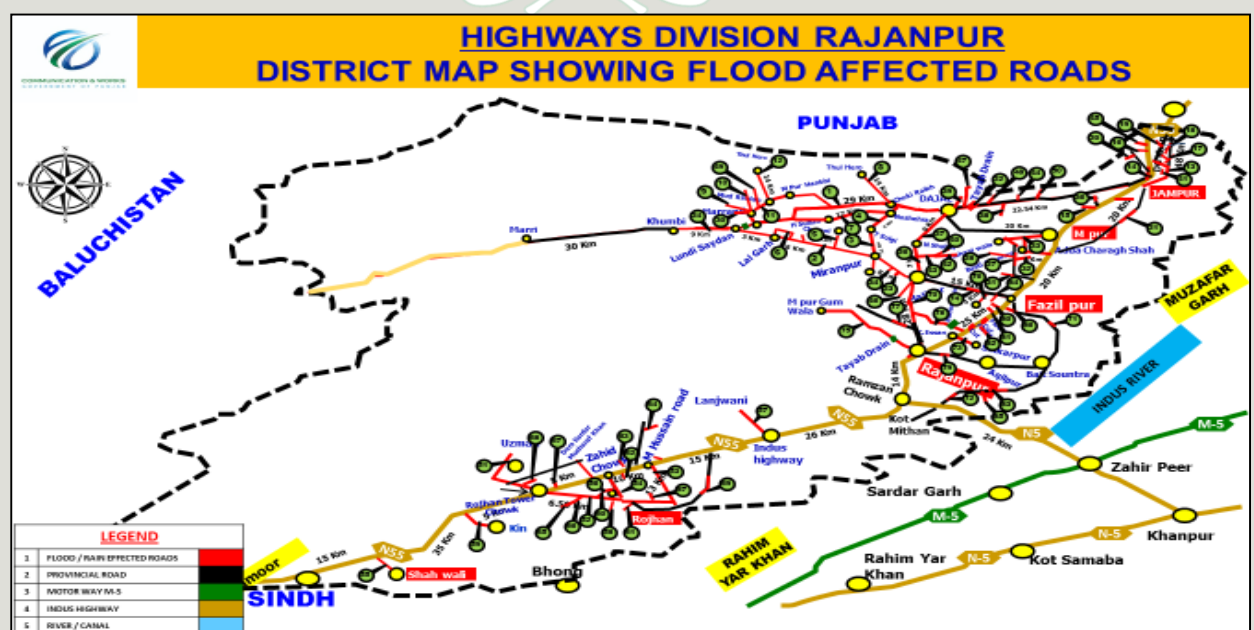
- Fazilpur
- Hajipur
- Muhammad Pur
- Dajal
- Rojhan

The figure below shows the areas affected by flood in District Rajanpur.



### II. Damaged Structure of Highway and Communication

Following are some details of structural damage done by recent flood to the Highway and Roads in District Rajanpur.



### District Map showing Flood-affected roads in Rajanpur. (Source: C & W Department)

The Communication structure of district Rajanpur has been badly affected by the recent flash flood all along the Indus Highway and adjacent arteries. The total number of roads damaged in the whole District are 87, comprising of 584.80. Kilometres in length, whereas 322.20 Km length is damaged. It rehabilitation and reconstruction cost is estimated at around Rs. 7794.310 Million.

Out of total 87 roads, 31 roads are partially damaged which need rehabilitation while remaining 56 roads are fully damaged and affected which need complete reconstruction and rehabilitation.

The following table explains the damaged done to the Highways in District Rajanpur besides Indus Highway (N-55) which comes under the jurisdiction of National Highway Authority (NHA). The following details of Provincial Highway in Rajanpur:

District	No. of Roads	Total Length of Roads (Km)	Affected Length (Km)	Cost Estimated (Rs. In Million)
Rajanpur	87	584.80	322.20	7994.310

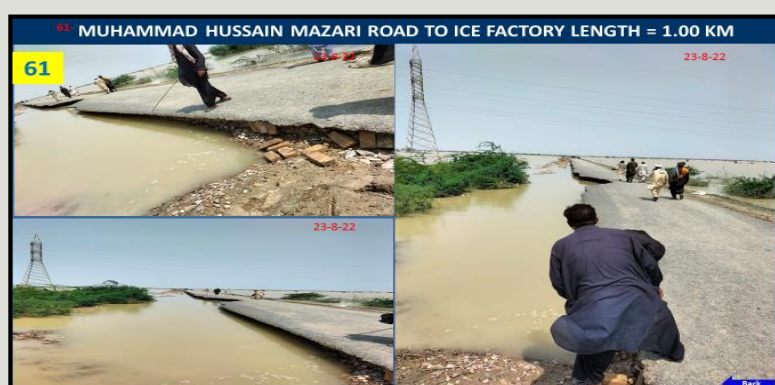
### Nature of Restoration

Nature of Restoration	No. of Roads	Total Length of Roads (Km)	Affected Length (Km)	Cost Estimated (Rs. In Million)
Rehabilitation	31	153.75	109.41	2332.689
Reconstruction	56	431.05	212.79	5461.621
<b>Total</b>	<b>87</b>	<b>584.80</b>	<b>322.20</b>	<b>7794.310</b>

Figure showing the Roads damaged in Tehsil Jampur  
(Source: C & W Department)



Figure Showing roads damaged in Tehsil Rojhan  
(Source: C & W Department)





As per C&W reports and observations, more damage in Highways has been done in Tehsil Rojhan and Tehsil Jampur of Rajanpur District.

### III. Damaged Structure of Irrigation

Following are some details of structural damage done by recent flood to the Irrigation channels, canals and structure in District Rajanpur.

Sr.	Canals	Total No. of breaches	Total length of breaches (Feet)
1.	Rajanpur Canal Division	232	77,027
2.	Jampur Construction Division	79	21,674
3.	Kachi Canal (Wapda)	138	49,212
<b>Total</b>		<b>449</b>	<b>14,7913</b>

(Source: Irrigation Department)

The above mentioned table stated the damage done by the floods to the Irrigation infrastructure. The total number of canal breaches is 449 with length of 14,7913 feet. This damaged irrigation infrastructure includes flood carrying channels such as Syphons, bridges along the roads, canal and drains etc.

This destruction not only devastated the already standing crops due to inundated water but also responsible of destroying aligned infrastructure too.

- a. Figure showing Canal water inundation after breaching in settled area.



- b. Figure showing Syphon damaged at Dajal branch Canal.





c. Figure showing breaching at Dajal branch Canal



#### **Need Assessment:**

The District Rajanpur has been geographically located in the torrential area between Koh-e-Suleman mountains and River Indus. Traditionally the district faced multiple flash floods both torrential and riverine floods in past many years. At present flash floods have badly damaged the overall infrastructure of the district which demands an overall policy formulation and need for construction of sustainable infrastructure and arrangements to deal with future catastrophes specially the floods.

In this regard, Irrigation Department has huge responsibility on its shoulders. The major damage has been done due to unprecedented rainfall in catchment area of Suleman Mountains which flows downstream in the Rajanpur district. The Irrigation structures mainly the FFCs (Flood Carrying Channels) were responsible for carrying and conveying that flood water from hill torrents to the River Indus. The failure and under capacity of flood carrying channels was the major cause of flash floods and destruction of infrastructure. The basic need proposed here for making a holistic policy which covers all aspects of Irrigation. The area has a potential for development of irrigation structures for provision of irrigated water to farmlands, flood control of whole area, groundwater recharge and safe passage to drain extra water into River Indus. The policy should be inclusive considering all topographical features and sloping patterns of the area.

The Flood Management in upper catchment areas of D.G. Khan and Rajanpur districts should be important as to assess the total predictable discharge in future so that capacity of flood carrying channels may be enhanced. One of the main reason of flash floods destroying major infrastructure was the low capacity of flood carrying channels. For example, the flood discharge was around 50,000-60,000 Cusecs while the capacity of existing flood carrying channels was merely 10,000 Cusecs which eventually damaged the whole irrigation infrastructure. The recent torrential floods of July-August 2022 had not only damaged infrastructure but also led to many human casualties and displacement of hundreds of families and livestock. Loss of precious human lives in district Rajanpur is a serious point of concern for administration whereas a lot of lives could be saved in presence of better flood water management and proper infrastructure.

The inundation in Pachad areas is major cause of crop and house damage in the district. It has been noted that cropping intensity in piedmont area of hill torrents fluctuates significantly according to the level and frequency of inundating. Conventionally the local farmers use low flow water from hill torrents by building small earthen embankments along the natural flow of water but these flash floods destroyed the earthen embankments and not allowing the farmers to use that precious water. A huge amount of useful water is being wasted on account of flash floods which can be utilized for irrigation and drinking purposes. Water, being the most important commodity specially in agricultural country like Pakistan, needs to be conserved and preserved for future generations. Pakistan is already declared as Water-stressed country and still being on the verge of water-scarcity in 2025.

The water conservation and storage in Hill Torrents will definitely help improving the agricultural output and per acre yield of crops in the district in particular and in the whole region in general. It will also help in mitigating future flash floods and even amidst unprecedented rainfall or any other natural catastrophes. The overall impact of the flood protection mechanism will be enhancement of per-capita income of local population and socio-economic uplifting of the district.

Therefore, water from hill torrents need to be channelized and streamlined by introducing and implementing proper water-shed management techniques and comprehensive policy for flood mitigation and control mechanism.

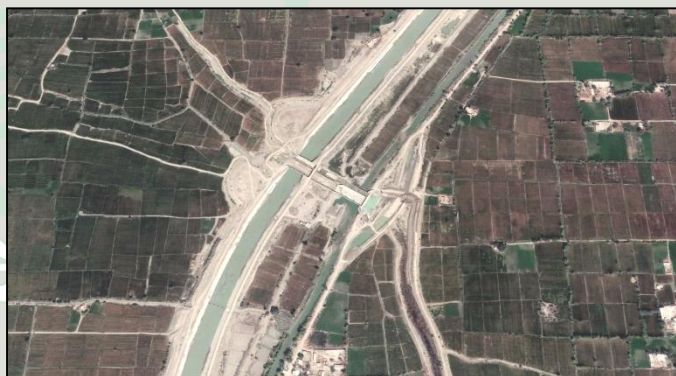
### **Policy Interventions:**

In view of the recent unprecedented torrential rainfall in the Koh-e-Suleman mountains, there is a dire need of devising a holistic and comprehensive flood fighting mechanism to avoid future disaster if any in Rajanpur District and nearby areas. Torrential flood water coming from D. G. Khan and adjoining areas finally flow down to River Indus by passing through Rajanpur District. This make this district quite vulnerable to flood risk every time. To address this problem, a proper flood protection mechanism is required to mitigate flood risks even in case of more unprecedented rainfall events.

The major policy interventions need to be done are as follows:

#### **1. Enhancing Capacity of Flood Carrying Channels:**

The most important policy intervention is enhancement of existing flood carrying channels. The design of existing flood carrying channels is faulty at most of the hill torrents which can be evident from the breaching of one of the major Syphon at Dajal Branch Canal as shown in figure above. The existing flood carrying channels were unable to carry discharges from hill torrents to the low lying areas. The new design of these channels should be made in accordance with the past record of floods. The capacity of flood carrying channels, if enhanced, can proved to be very useful in managing huge floods in future. The discharge capacity of these channels need to increased.



#### **2. Building of Small Dams in Hill Torrent Area:**

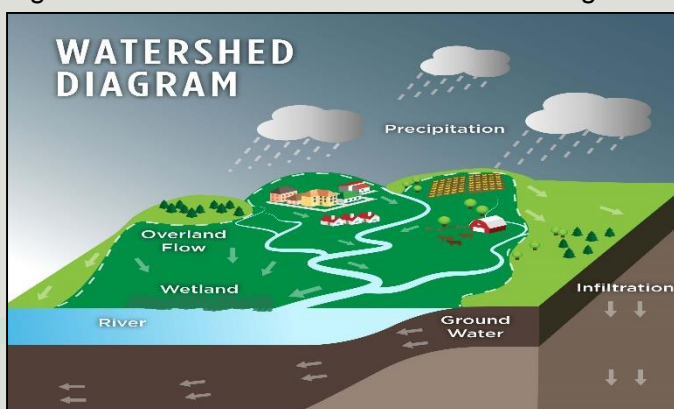
Small Dams can be of vital importance if built in these Hill Torrent areas. In district D.G. Khan, there is already proposed Sorra dam which is under construction. The same pattern of dam and water storage reservoir can be followed in Kaha and Chachar Hill Torrents in Rajanpur district. The small dams will not only protect the settlement from flash floods but it will also help in increasing the groundwater recharge in



the adjoining areas. This stored water can be utilized for irrigation and drinking purposes whole of the year. It will only improve the irrigation agriculture of the area but also ensure safety of the downstream areas from the hazards of sudden floods. About local role of small dams, economic experts believe that they are proven and effective tool for local poverty alleviation in their areas. They bring immediate economic prosperity at local level because they bring modern technology, huge investment and formal structures in the areas. If not built, the water can regularly spell disaster for the areas.

### **3. Watershed Management of Catchment Areas:**

The management of watershed areas and catchment areas is one of the key aspect which will provide huge benefit in controlling floods in future. The watershed management includes building of dispersion structures to kill and reduce the fast flowing velocity of flash floods along the hill torrents. Gauging of streams and hill torrents can be done with the help of Pakistan Meteorological Department (PMD). Building of protection bunds and embankments is also part of this technique. The rain-gauging and stream-gauging of water catchment areas will be helpful in future prediction of rainfall and floods. Further these gauging techniques can be used by flood-routing and Iso-hyetal maps to predict the future floods.



### **4. Provision of new bridges/Culverts all along the Indus Highway for the safe passage of water:**

Provision of new bridges and building of culverts all along the Indus Highway is mandatory for smooth passing of flood into River Indus. The Indus Highway lies perpendicular to the natural flow channel of water coming from hill torrents to the River Indus. The Indus Highway should be reconstructed and re-designed from the potential flood water passing points with adequate provision of Culverts and bridges all along the district. NHA should take on board the valuable input and technical assistance from the Provincial Irrigation and Highway departments. There is also dire need of construction of new bridges and culverts at downstream of Benazir Bridge at River Indus. The tehsil Rojhan suffered huge loss due to absence of such structures. The new Culverts should be design in order to carry at least discharge of 5000-10,000 Cusecs to provide sufficient way for passing of floodwater.

### **5. Development of Pond areas for Irrigation and drinking areas:**

#### **a. Potential locations:**

Ponding at various potential locations to store flood water is another aspect of water-shed management. Ponding increases the delay time of water travelling across the flood channels. It will also increase the groundwater table of adjacent areas. Potential locations can be find out by joint survey from all concerned stakeholders. The Irrigation Department again has principal responsibility in this task.

#### **b. Deep depressions / Water management:**



Building of deep depressions along the Pachad areas can help in improving overall water management of the district. These deep depressions will act as a storage reservoir for whole year and in return will be useful for agriculture and drinking purposes.

The Punjab government must initiate studies for optimum solution of these torrents. It must find a solution, which serves all three purposes: irrigation, flood management and sustainability. Apart from them, economic experts claim that the internal economic rate of return (IERR) of such small could be multiplied with more judicious use of water and improved cropping pattern in their areas of irrigation. Such dams make ideal case for high-efficiency irrigation systems for a number of reasons, which include topography and water supply.

