GOVERNMENT OF PAKISTAN

MINISTRY OF WATER & POWER

ANNUAL FLOOD REPORT 2016

OFFICE OF THE CHIEF ENGINEERING ADVISOR &
CHAIRMAN FEDERAL FLOOD COMMISSION
ISLAMABAD

ANNUAL FLOOD REPORT-2016

District Sialkot (Punjab)

District Karachi (Sindh)

District Chitral (KP)

District Quetta (Balochistan)

District Gilgit (Gilgit-Baltistan)

District Bagh (Azad Jammu & Kashmir)

OFFICE OF THE CHIEF ENGINEERING ADVISOR/CHAIRMAN
FEDERAL FLOOD COMMISSION ISLAMABAD

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EXECUTIVE SUMMARY

Flood constitutes one of the world's most serious environmental hazards. Thousand years of recorded history tells man's repeated failure to evade the destruction of floods. In spite of many years of experience and highly developed techniques, flood even now continues to play havoc in most parts of the planet.

The frequency of occurrence of floods in the region in general and Pakistan in particular has considerably increased since past several years, because of global warming and rapid climate change. That is why Pakistan has faced series of flood events during the past 6-7 years i.e. since 2010, which indicates that flood has now become a regular feature in the country. This is exacerbated by the inadequate surface water storage capacity for absorbing flood peaks, chronic and increasing threat of encroachments in flood plains, inadequate discharge capacity of some of Barrages/Bridges, inadequate budget allocation under PSDP and Provincial ADP for execution of flood projects, weakness in flood defenses due to improper maintenance of existing flood protection structures and importantly a distorted natural drainage network.

Capacity deficits exist both at provincial and district levels. There is a lack of effective coordination among institutions involved in flood management, caused in part by limitations of technical capacities such as dissemination of early warning, disaster preparedness measures, emergency response and structural measures for flood mitigation. The local communities do not have enough disaster preparedness information and there is lack of general awareness raising, sensitization and education of the masses regularly affected by floods, focusing especially on populations residing within the active flood plains along major, secondary and tertiary rivers.

The riverine floods are generally caused due to heavy concentrated rainfall in catchment areas of major & other rivers, which are sometimes augmented by snowmelt due to high temperature and generate exceptionally high flood flows in main rivers & their tributaries flowing across the country. The torrential rains are caused due to monsoon currents originating from Bay of Bengal and resultant depressions (strong weather system) often cause heavy downpour in the catchment areas of major and other rivers including hill torrents, which is sometime augmented by the Westerly Wave from Mediterranean Sea.

Pakistan has suffered a cumulative financial loss of more than US$ 38.171 billion during the past 69 years. Around 12,330 people lost their lives, some 197,275 villages damaged/ destroyed and an area more than 616,598 Sq.km was affected due to 24 major flood events. The 2010 floods were worst flooding in the past about 80 years in the region **(Table-2)**.

Prior to 1976, the Provincial Governments were responsible for the planning and execution of flood protection works. Disastrous floods of 1973 & 1976 caused heavy loss of life and property and it was felt that the existing flood protection facilities and planning were inadequate to provide effective protective measures for the country. Heavy losses to

the economy due to floods were discussed in the Inter-Provincial Conference held in January 1977 wherein it was decided to establish Federal Flood Commission (FFC) for integrated flood management on country wide-basis.

Since its establishment, FFC has so far prepared three National Flood Protection Plans, i.e. National Flood Protection Plan-I (1978-88), National Flood Protection Plan-II (1988-1998) & National Flood Protection Plan-III (1998-2008) which were executed through Provincial Irrigation Departments and Federal Line Agencies. A total investment of more than Rs 30.00 billion has been made on construction of around 2,742 flood protection structures during the past 39 years through PSDP/Foreign Aided Programme, besides, upgradation of country's existing Flood Forecasting & Warning System **(Table-1&4)**.

Work on preparation of National Flood Protection Plan-IV was started in year 2006-07, but it could not be approved for implementation at that time due to low priority given to Flood Sector as result of drought like conditions over the country. Due to large scale damages as a result of 2010 floods, followed by subsequent flood events during 2011 & 2012, the need for investment in flood sector gained importance. Hence, Federal Flood Commission re-started working on formulation of National Flood Protection Plan-IV. For that purpose, consultants were engaged in May 2013 through World Bank Funded Water Sector Capacity Building & Advisory Services Project (WCAP) for preparation of NFPP-IV for next ten years. The draft National Flood Protection Plan-IV (Ten-year Plan) had been prepared in close consultation with all stakeholders at Federal and Provincial Governments level keeping in view the lessons learnt from past flood events.

The draft final NFPP-IV (Ten-year Plan) was submitted by the consultants in May 2015, which was forwarded by the Ministry of Water & Power to Ministry of Inter Provincial Coordination for approval of Council of Common Interests (CCI). The draft NFPP-IV (Ten-year Plan) has been thrice considered by the CCI in its meetings held on 29.02.2016, 25.03.2016 & 16.12.2016. The draft final NFPP-IV, modified in the light of CCI decisions, is under process with Ministry of Inter Provincial Coordination for consideration in the forthcoming meeting of CCI.

Actual implementation has been planned during the next ten years after approval of Plan by the Government of Pakistan and provision of adequate funds for construction of various interventions proposed in the NFPP-IV (Ten Year Plan). Meanwhile, urgent nature flood protection works are being carried out by Provincial Irrigation Departments (PIDs) through Provincial ADP and GOP funded Normal/Emergent Flood Programme.

2016 Floods

Flood flows triggered by torrential rains affected various parts of country, especially Chitral valley in Khyber Pakhtunkhwa, Punjab, Balochistan and some parts of Sindh & Federally Administered Areas (Gilgit-Baltistan, FATA & AJK) due to flash floods. Moderate to heavy downpour in upper catchments of major rivers and their tributaries generated flood flows, which caused losses to human lives and damages to private and public infrastructure. 2016-rains/ floods affected 45 villages, claiming 153 lives and damaged 1452 houses.

Way Forward

Irrigation Department of the four provinces (PIDs) and concerned Federal Line Agencies, (WAPDA, PMD, PCIW, GB-PWD, Irrigation Directorate FATA, Irrigation & Small Dams Organization, Government of AJ&K) may take immediate action on the following recommendations for early completion, so as to face monsoon season 2017 in a much better way.

i. PIDS & Federal Line Agencies to complete all ongoing flood protection works being executed through Public Sector Development Programme (PSDP), Provincial Annual Development Programme or any other Programme, well before the start of Monsoon Season 2017.

ii. The Irrigation, Drainage & Flood Protection Infrastructure damaged during previous floods, especially 2015 & 2016 floods may be restored/ rehabilitated on fast track basis, so as to complete the task well before the start of Monsoon Season 2017.

iii. Pre-flood inspection of all Flood Protection Infrastructures (flood bunds, spurs, Barrages/Head Works and their allied components etc.) may be carried out jointly with concerned Corps of Engineers, well in time, and critical reaches as identified by the inspection teams may be got repaired/ strengthened well before the start of Monsoon Season 2017.

iv. Adequate O&M funds for Flood Protection Infrastructures may be arranged through Provincial Budget and all urgent nature O&M works related to Irrigation, Drainage & Flood Protection Infrastructures may be completed well before the start of Monsoon Season 2017.

v. PID Punjab, NHA and Pak. Railways to make necessary arrangements of explosive and others flood fighting material at sites of pre-determined breaching sections in close coordination with concerned Corps of Engineers. Stone reserve stock/ flood fighting material may also be arranged at all critical reaches of flood embankments well before start of monsoon season 2017.

vi. PID, Punjab to expedite action on preparation of Proposal/ PC-I for long term measures (based upon fresh model study recommendations) on war footing basis. Meanwhile, all necessary precautionary measures may be undertaken for safe passage of upcoming Monsoon season 2017.

vii. Flood Fighting Plans may be prepared by the PIDs & Federal Line Agencies including NHA and Pak. Railways keeping in mind lessons learnt during the past consecutive flood events and circulated among concerned organizations including FFC.

viii. The encroachments may be removed from flood plains/waterways of main & other rivers including hill torrents and drainage network particularly along Bara Kas Nullah and Jhelum river downstream Mangla, besides, removal of settlement on flood protection structures well before the start of Monsoon Season 2017.

ix. PIDs & WAPDA to carry out all essential O&M Civil & E/M works of all Barrages/Headworks well before start of monsoon season 2017.

x. WAPDA & Pakistan Metrological Department/FFD, Lahore may carry out all essential O&M works of Flood Forecasting and Warning System equipment well in time and ensure that System is fully functional before start of Monsoon Season 2017. The Hydrology & Water Management wing of WAPDA to complete the repair/ rehabilitation work of 24 damaged Flood Telemetry Stations well before start of monsoon season 2017.

xi. The links for coordination among flood management related organizations at Federal & Provincial Government level needs to be further improved keeping in mind the experiences of past flood events. The concerned organizations may link up themselves with Mangla Dam Authorities (through video link system) for better coordination during upcoming Monsoon Season 2017.

xii. PCIW may continue its efforts on making necessary arrangements with Indian Counterpart for obtaining discharges of Eastern Rivers and Chenab River flood flow data at Salal HEP, 56 KM upstream of Akhnoor bridge across Chenab River, besides inflows & levels of reservoirs across Eastern rivers i.e. Bhakra, Pong & Thein Dam Projects and its transmission to end users (FFC, PMD/FFD, Lahore, WAPDA, NDMA & PDMAs) during Monsoon Season 2017.

xiii. WASA Rawalpindi may carry out desilting work of critical sections of Lai Nullah well before the start of Monsoon Season 2017. TMA & City District Government may expedite action on demarcation of water way of Lai Nullah and also take necessary steps for removal of encroachments on banks/waterway of Lai Nullah, besides, stoppage of dumping solid wastes/garbage & building material in bed of Lai Nullah.

xiv. PIDs & FLAs including NDMA, PDMAs, GBDMA, FDMA & SDMA etc. may ensure effective use of Flood Plain Inundation maps already circulated by FFC among all concerned organizations for better flood management during Monsoon Season 2017.

xv. The NFPP-IV may be processed on priority basis for early approval of competent authority and thereafter arrangement of funds may be made through GOP resources/international donor agencies e.g. World Bank, ADB, JICA, etc. for timely implementation of various interventions proposed under the Plan.

xvi. Under the increasing flood threat in the context of climate change, allocation of funds for Normal/Emergent Flood Programme under PSDP may be significantly enhanced as per actual needs of the provinces (Demand for next financial year is Rs 11.50 Billion).

xvii. Provinces may allocate adequate funds through their provincial resources for proper maintenance of their flood protection structures, besides, flood fighting activities during Monsoon Season 2017.

ACKNOWLEDGEMENT

The preparation of Annual Flood Report of Federal Flood Commission commenced from 1998 with a view to compile essential information on yearly basis for documentation of the yearly flood events, flood flow data, lessons learnt from previous flood events and exploring the needs for future protective measures.

The 2016 Annual Flood Report contains inter-alia, information about historical floods in Pakistan, flood management works, functions of FFC & other concerned Provincial and Federal Government organizations, flood warning dissemination system and flood preparedness activities carried out during the flood season 2016. The report focuses on flash floods experienced during monsoon season 2016, which reportedly caused considerable damages to private and public infrastructure in various parts of country, especially Chitral valley in Khyber Pakhtunkhwa, Punjab, Balochistan and some parts of Sindh & Federally Administered Areas (Gilgit-Baltistan, FATA & AJK).

Services of following officers are greatly acknowledged who contributed in a dedicated manner for the preparation of 2016-Annual Flood Report of Federal Flood Commission:

Sr. No.	Name	Designation	Role
1.	Mr. Asjad Imtiaz Ali	Chief Engineering Advisor/Chairman Federal Flood Commission	Supervisory
2.	Mr. Alamgir Khan	Chief Engineer (Floods)	Contributory
3.	Mr. Ashok Kumar	Superintending Engineering (Floods)	Contributory
4.	Mr. Zafar Iqbal	Senior Engineer (Floods)	Contributory
5.	Mr. Yawar Rasheed	Assistant Engineer (Floods)	Contributory
6.	Mr. Sibte Hassan	Assistant Engineer (Floods)	Contributory

FLOODS IN GENERAL PERSPECTIVE

1. FLOODS IN GENERAL PERSPECTIVE

1.1 Flood Problem in Perspective

The riverine floods take hours or even days to develop, giving ample reaction time to locals to prepare/evacuate. However, flash floods generate quickly in mountainous regions with little warning/reaction time for locals. Flash floods can be extremely dangerous, instantly turning a babbling brook into a thundering wall of water and sweeping everything on its way downstream. Floods occur in all types of rivers and their tributaries. Localized flooding may be caused or exacerbated by drainage obstructions such as landslides, ice, debris, or dam failure. The increase in flow may be the result of sustained rainfall, rapid snow melting, Monsoon/Depression (Weather System) or tropical cyclones. Rapid flood events including flash floods, more often occur on smaller rivers, rivers with steep valleys or rivers that flow for much of their length over impermeable terrain. The cause may be localized convective precipitation (intense thunderstorms) or sudden release from an upstream impoundment created behind a dam, landslide or glacier.

Disaster experts classify floods according to their likelihood of occurring in a given time period. A hundred-year flood, for example, is an extremely large, destructive event that would theoretically be expected to happen only once every century. But this is a theoretical number. In reality, this classification means there is a one-percent chance that such a flood could happen in any given year. Over recent decades, possibly due to global climate change, hundred-year floods have been occurring worldwide with frightening regularity.

Climate change is considered to be a critical global challenge and recurring flood events have demonstrated the growing vulnerability to climate change. The impacts of climate change range from affecting agriculture to further endangering food security, to rising sea levels and the accelerated erosion of coastal zones, increasing intensity of natural disasters like floods & droughts, species extinction and the spread of vector-borne diseases.

It is generally recognized that complete prevention from floods is humanly impossible, but protection from flood is feasible and is a vital necessity. By proper planning, means can be devised to harness the fury of floods to safeguard human life and property. Devoid their destructive power, floods can be used in the service and the welfare of a community.

1.2 Floods in Pakistan

Pakistan is a country with diverse type of land and fluctuating pattern of climate. Climate is usually considered hot and dry in Pakistan but it has shown significant obvious variations in last few years. Many districts and urban centers located along the rivers banks are ever on a great risk to confront with various types of floods i.e. riverine flood, flash flood and urban floods particularly in Punjab & Sindh provinces. The floods cause damages to hundred thousand acres of fertile agricultural lands, standing crops and affect adjoining abadies with monetary loss in billions of rupees. Major direct flood damages in the country are caused to agricultural lands, standing crops, urban and rural abadies, besides, other private & public property.

The riverine floods are generally caused due to heavy concentrated rainfall in the rivers catchments, during monsoon season, which is sometimes augmented by snow melt flows. Monsoon currents originating from Bay of Bengal and resultant depressions (weather system) often result in heavy downpour in the Himalayan foothills, which occasionally generate destructive floods in main rivers and their tributaries. Sometimes exceptionally

high flood flows in major rivers are generated due to formation of temporary natural dams by landslide or glacier movement and their subsequent collapse.

Flooding of the Indus River and its tributaries represents the greatest hazard in Pakistan. Floods occur usually in summer season (July - October). Therefore, damages to agriculture sector are mainly to the standing Kharif crops. However, in some cases the inundated lands do not dry up in time and ultimately affecting sowing Rabi crops.

The major rivers (Indus, Jhelum, Chenab, Ravi, Sutlej) and secondary rivers (Kabul, Swat etc.) cause flood losses by inundating low lying areas around the rivers bed by damaging irrigation and communication network, besides, land erosion along the rivers banks. In the upper part of the Indus Basin (Punjab & Khyber Pakhtunkhwa), floodwater spilling over the high banks of the rivers generally turns back to the main rivers channel.

In the lower parts of the country i.e. Lower Indus Basin (Sindh province), River Indus is flowing at ridge i.e. higher elevation than adjoining lands. That is why flood embankments have been provided along both sides of the river. The flood water, if breaches the embankments do not return to the main river channel. This largely extends the area and period of inundation resulting in more damages to abadies, standing crops and other private as well as public infrastructure.

Sometimes breaches are occurred in the flood embankments, when the rivers attain the Exceptionally High Flood Level *{LMB Taunsa Barrage in Punjab & Tori Bund Complex in Sindh Province incidents during 2010-Floods}.* At times, the flood embankments are breached at pre-determined locations to save the main structures across main rivers *(RMB Jinnah Barrage was operated during Flood Season 2010).* The remodeling/ rehabilitation works of barrages, on the basis of 100 years return period, were taken up by the Punjab & Sindh province. The capacity enhancement/ rehabilitation work at Jinnah, Balloki and Khanki Barrages have substantially been completed whereas rehabilitation works of Sulemanki, Punjnad and Trimmu Barrages were in progress. Similarly, rehabilitation work of Guddu Barrage was in progress in Sindh province, whereas PC-I/project proposal for modernization and rehabilitation of Sukkur Barrage was under preparation.

1.3 Flood Control Objective & Need

Flood management planning in Pakistan is being carried out to essentially cover the following three specific objectives:

i. To reduce or eliminate damages to existing properties;
ii. To prevent future increase in damages; and
iii. To mitigate the residual hazards.

In Pakistan, flood control planning is a complex problem and calls for great ingenuity and experience on the part of the planners. The nature of flood problems varies in each of the four provinces and federally administered areas due to varying physiographic, climatic, demographic, and socio-economic conditions. Even the characteristics of catchment areas of various rivers differ from each other. Flood problems relating to various provinces are given as under:

PUNJAB

In Punjab, the flood protection marginal bunds have been generally constructed either to protect Headworks and other irrigation structures, or to safeguard certain towns, villages

& adjoining agricultural lands. Due to general topography of the area, pre-determined breaching sections have been provided in the Right Marginal Bunds (RMBs) for operation for safety of Headworks/ barrages in case of exceptional high flood flows i.e. likely to exceed the designed level. In order to protect areas from erosion, spurs have been constructed in critical reaches. These spurs have protected vast areas and in some cases even large tracks of eroded lands have been reclaimed.

SINDH

The Indus River flows on a ridge in Sindh Province and generally, surrounding areas (outside the flood embankments) are lower than the river bed; hence, water once leaving the Indus River does not return to the main channel. The escaped water thus causes greater damage to widespread areas, and it persists for a longer period even after flood peaks are over *(Refer Tori Bund, M.S Bund breaches during 2010-Flood Season)*.

Sindh province is situated at tail end, hence, drain out all rivers and if flood protection measures adopted in the upper Sindh are not properly planned, severe damages are likely to occur in the Province. In most of the reaches, a double line of flood embankments has been constructed on both sides of the river from Guddu to few kilometers short of Arabian Sea. These flood embankments have been further compartmentalized to contain widespread inundation.

KHYBER PAKHTUNKHWA

In Khyber Pakhtunkhwa, the floods are mainly due to flash flood flows in secondary rivers (Kabul, Swat, Panjkora, Kurram etc.) and major hill torrents/flood flow generating nullahs having steep bed slopes, which greatly increase flood velocity and severely erode the banks. In Khyber Pakhtunkhwa, mostly flood protection walls/embankments and short spurs have been constructed to save the areas from spill action and erosion.

Around 40 spurs having considerable shank length and Marginal Bund have been constructed along the right bank of Indus River "Chashma Barrage – Ramak Reach" for protection of D.I. Khan City and adjoining area from devastating flood flows of Indus River. A large number of spurs and flood embankments/flood protection walls in critical locations have also been constructed along Kabul, Swat, Panjkora, Kurram rivers and their tributaries including flood flows generating nullahs/hill torrents.

BALOCHISTAN

Due to peculiar physiographic and climatic characterizes in Balochistan, the bed slopes of rivers and nullahs in Balochistan are very steep; hence, generate flash flood flows with high velocity causing banks erosion and inundations of low lying area along the banks of rivers and their tributaries. Mostly flood protection walls/embankments & short spurs have been constructed for protection of orchards, agricultural lands and abadies. Flood flows regulators/ flood diversion structures have also been constructed to dissipate the thrust of flood water and use the same for agriculture in the area.

GILGIT-BALTISTAN, FATA & AJK

The bed slopes of rivers and nullahs in Gilgit-Baltistan, FATA and AJ&K are very steep. The flash flood flows generated in main rivers and their tributaries cause severe banks erosion. Flood Protection walls and short spurs in PCC & gabion crates are constructed in order to check the spill and erosive action of flood flows in rivers/hill torrents. The main

purpose of such interventions is to provide protection to abadies, agricultural lands and other private and infrastructure.

1.4 WATER RESOURCES IN PAKISTAN

Five main rivers, namely, the Indus, Jhelum, Chenab, Ravi and Sutlej and their tributaries flow through the country's plains. The Indus, Jhelum and Chenab are known as the **Western Rivers** and Ravi, Beas, and Sutlej known as the **Eastern Rivers**. These rivers supply water to the entire Indus Basin Irrigation System. The rivers have their origin in the higher altitudes and derive their flows mainly from snowmelt and monsoon rains.

The catchment area of Indus is most unique in the sense that it contains seven (7) of the world's highest-ranking peaks, after Mount Everest. These include **K-2 (28,253 feet), Nanga Parbat (26,660 feet), Rakaposhi (25,552 feet)** etc. Likewise, barring the polar areas, seven (7) glaciers situated in the Indus catchment, **namely Siachin, Hispar, Biafo, Batura, Baltoro, Barpu and Hopper** are amongst the largest in the world.

1.5 IRRIGATION NETWORK OF PAKISTAN

The Irrigation System of Pakistan is the largest integrated irrigation network in the world, serving around 45 million acres of contiguous cultivated land. The system is fed by the waters of the Indus River and its tributaries. The irrigation network of Pakistan mainly comprises of 3 major reservoirs (Tarbela, Mangla & Chashma), 19 Barrages, 12 inter-river link canals, 45 independent irrigation canal commands and 143 medium dams (having height 15 meters and above).

The major storage reservoirs include Tarbela (*existing Live Storage Capacity = 6.434 MAF against original storage capacity of 9.70 MAF),* Chashma *(existing Live Storage Capacity = 0.276 MAF against original storage capacity of 0.70 MAF)* on River Indus and Mangla with existing Live Storage Capacity = 7.406 MAF *(this includes the additional storage capacity of 2.88 MAF after Mangla Dam Raising allowing Maximum Conservation Level of 1242 feet)* against original storage capacity of 5.34 MAF on River Jhelum. The schematic diagram of Indus Basin Irrigation System is given at **Figure-1.** Diversion of river waters into off-taking canals is made through Barrages, which are gated diversion weirs. The main canals in turn deliver water to branch canals, distributaries and minors. The watercourses get their share of water through outlets in the irrigation channels. Distribution of water from a watercourse is made through a time-schedule called "Warabandi".

According to IRSA record, the average annual surface water availability from Western and Eastern Rivers is 145.03 MAF (Western Rivers: 138.50 MAF & Eastern Rivers: 6.53 MAF), whereas the maximum inflows recorded was 183.45 MAF (in year 1978-79) and minimum inflows were 99.05 MAF (in year 2001-2002) during the post Tarbela period (1976-77 to 2015-16). The Provincial utilization was 97.08 MAF, System losses were 18.46 MAF and Escapages downstream Kotri Barrage were 29.48 MAF.

1.6 FLOOD PROTECTION FACILITIES IN PAKISTAN

The existing flood management strategy includes flood flows regulation by three major reservoirs (Tarbela, Chashma on Indus & Mangla on Jhelum), protection of important private & public infrastructure, urban/rural abadies and adjoining agricultural lands located along the rivers banks by flood embankments and spurs & other interventions, besides, Flood Forecasting & Early Warning System, Rescue & Relief measures in case of

flooding situation. As per inventory developed by M/s NESPAK under Task-B of NFPP-IV studies completed in May 2015, zonal/ regional distribution of existing flood protection works in the four provinces and federal line agencies is given in **Table-1**.

TABLE-1

EXISTING FLOOD PROTECTION INFRASTRUCTURE

Sr. No.	Zone/Region/ Agency/District	No. of Protection Works
Punjab*		
1.	Lahore Irrigation Zone	251
2.	Faisalabad Irrigation Zone	71
3.	Sargodha Irrigation Zone	325
4.	Multan Irrigation Zone	231
5.	Bahawalpur Irrigation Zone	89
6.	D.G. Khan Irrigation Zone	218
	Sub-Total	**1,185**
Sindh		
1.	Guddu Barrage	63
2.	Ghotki Feeder Canal Area Water Board (SIDA)	23
3.	Sukkur Barrage Right Bank	48
4.	Sukkur Barrage Left Bank	78
5.	Kotri Barrage	42
6.	Left Bank Canal Area Water Board (SIDA)	07
	Sub-Total	**261**
Khyber Pakhtunkhwa^		
1.	North Irrigation Zone	439
2.	South Irrigation Zone	345
	Sub-Total	**784**
Balochistan		
1.	North Irrigation Zone	159
2.	South Irrigation Zone	96
3.	Canal System Dera Murad Jamali	05
	Sub-Total	**260**
Gilgit-Baltistan		
1.	Gilgit	02

2.	Hunza/Nagar	08
3.	Skardu	04
4.	Ghizar	04
5.	Astore	02
6.	Ghanche	09
7.	Diamer	01
	Sub-Total	**30**
FATA		
1.	Bajaur	12
2.	Khyber	21
3.	Kurram	41
4.	Mohmand	8
5.	Orakzai	9
6.	North Waziristan	9
7.	South Waziristan	42
8.	FR Bannu	5
9.	FR D.I. Khan	26
10.	FR Kohat	15
11.	FR Lakki	7
12.	FR Tank	14
	Sub-Total	**209**
AJ&K		
1.	Bagh	03
2.	Bhimber	06
3.	Kotli	01
4.	Mirpur	01
5.	Muzaffarabad	02
	Sub-Total	**13**
	Grand Total	**2,742**

* Bund/Embankment 375, Flood Protection Wall 19, Spur / Stud 771 & Flood Dispersion Structure 20 = Total 1185
^ Embankment / Bund 105, Flood Protection Wall 455, Spur / Stud 223, & Flood Dispersion Structure 01 = Total 784

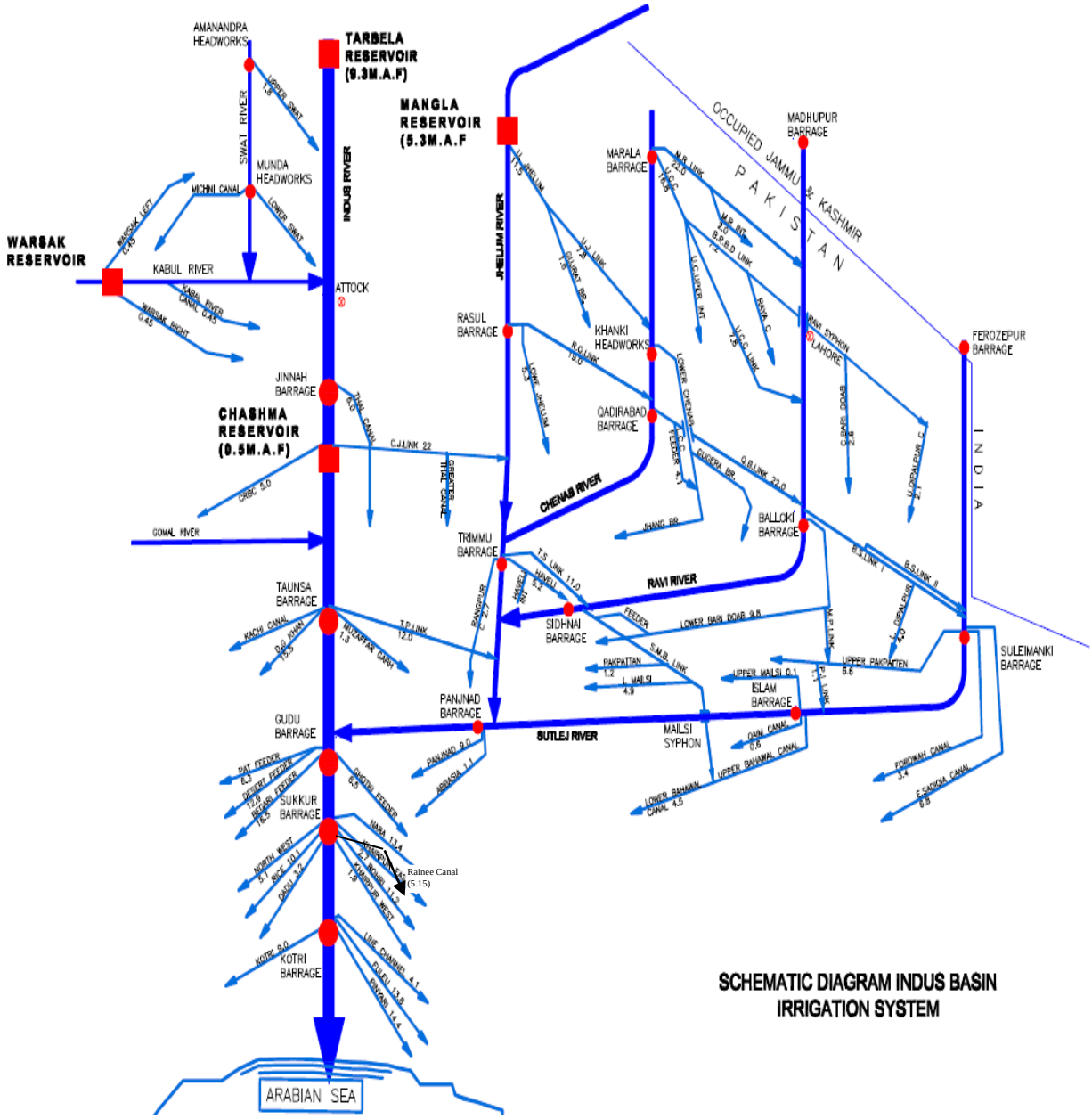


Figure 1: Schematic Diagram of Indus Basin Irrigation System

1.7 IMPACT OF GLOBAL WARMING & CLIMATE CHANGE ON FLOOD MANAGEMENT

Global warming causes climate change, which is a serious issue for the entire world. It is a serious threat to the third world as its impacts will not be felt equally across our planet. Developing countries including Pakistan are much more vulnerable to the impacts of climate change. The melting rate of glaciers in South Asia has increased, which may cause floods in Pakistan and surrounding countries in the coming years. Pakistan economy has faced significant losses due to environmental damages and degradations.

Pakistan is amongst the top ten countries on the globe experiencing frequent and intense climate change events such as floods, droughts, cyclones, heavy rains, extremely high temperatures, etc. The average global temperature has increased due to increasing concentrations of carbon dioxide and other greenhouse gases in the atmosphere for last many years. During the last century, it increased by 0.6 degree Centigrade and is likely to increase further by 1.0 ^{o}C to 4.0 ^{o}C till the end of the current century.

The most recent extreme climate events witnessed by Pakistan are floods hitting various parts of the country during the monsoon season. Pakistan has experienced flooding almost every year since 2010 which caused huge damages to life and property. The water security of the country is also threatened by the climate change. The increasing temperatures in the northern mountains of the country were likely to result in glacier melting, thereby affecting the flows of Indus River System.

1.8 HISTORICAL FLOOD EVENTS IN PAKISTAN

Since its creation, Pakistan has faced 24 severe flood event i.e. 1950, 1955, 1956, 1957, 1959, 1973, 1975, 1976, 1977, 1978, 19981, 1983, 1984, 1988, 1992, 1994, 1995, 2010, 2011, 2012, 2013, 2014, 2015 & 2016, the 2010 floods were worst ever in the country. The floods of various magnitudes since 1950 to 2016 affected vast areas in the four provinces including Gilgit-Baltistan, FATA & Azad Jammu & Kashmir. Owing to adverse impacts of climate change, in the recent years, vulnerabilities of communities to coastal & urban flooding have also increased. Flood damages are caused mainly due to riverine flooding in main rivers and flash floods in Secondary & Tertiary Rivers/Hill Torrents, Coastal flooding due to Cyclone & urban flooding due to torrential rains and inadequate storm drainage facilities, besides, GLOFs in northern parts of the country.

The unprecedented floods of 2010 were the worst floods in history of the country in which about 1985 people lost their lives, 1,608,184 houses were damaged/ destroyed, 17,553 villages were affected and total area of 160,000 Km^2 was affected. The Sindh province, particularly southeastern parts of the province was severely affected due to unprecedented rains and inadequate drainage facilities during Monsoon Season-2011.

The torrential rains during 2012 rains/floods affected Southern Punjab, Sindh & Balochistan provinces. About 571 people lost their lives, 636,438 houses were damaged/ destroyed, 14,159 villages were affected and a total area of 4,746 Sq.km was affected. About 333 people lost their lives during 2013 rains/floods, around 8,297 villages with land area of around 4,483 Sq.km was affected. The floods of 2014, affected cropped area of about 2.415 million acres (9,779 square kilometers) affecting 4,065 villages, claiming about 367 lives, fully damaging 107,102 houses and population of about 2.600 million was affected. The floods 2015, affected more than 1.933 million populations, 4,634 villages (damaging 10,716 houses) and claiming about 238 lives all over the country.

Flood flows triggered by torrential rains affected various parts of country, especially Chitral valley in Khyber Pakhtunkhwa, Punjab, Balochistan and some parts of Sindh & Federally Administered Areas (Gilgit-Baltistan, FATA & AJK). Moderate to heavy downpour in upper catchments of major rivers and their tributaries generated flood flows, which caused losses to human lives and damages to private and public infrastructure. 2016-rains/ floods affected 45 villages, claiming 153 lives, 113 injured and damaging 1452 houses. The historical flood events experienced in the past and their damages are given in the **Table-2**.

TABLE-2

HISTORICAL FLOOD EVENTS EXPERIENCED IN PAKISTAN

Sr. No.	Year	Direct losses (US$ million) @ 1US$= PKR 86	Lost lives (No)	Affected villages (No)	Flooded area (Sq-km)
1	1950	488	2,190	10,000	17,920
2	1955	378	679	6,945	20,480
3	1956	318	160	11,609	74,406
4	1957	301	83	4,498	16,003
5	1959	234	88	3,902	10,424
6	1973	5134	474	9,719	41,472
7	1975	684	126	8,628	34,931
8	1976	3485	425	18,390	81,920
9	1977	338	848	2,185	4,657
10	1978	2227	393	9,199	30,597
11	1981	299	82	2,071	4,191
12	1983	135	39	643	1,882
13	1984	75	42	251	1,093
14	1988	858	508	100	6,144
15	1992	3010	1,008	13,208	38,758
16	1994	843	431	1,622	5,568
17	1995	376	591	6,852	16,686
18	2010	10,000 @ 1US$= 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$= PKR 98	333	8,297	4,483
22	2014	440^^ @ 1US$= PKR 100.89	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**	**45**	-
Total		**38,171**	**12,330**	**197,275**	**616,598**

* *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)*
# *Based on PIDs & FLA's interim reports related to irrigation, drainage & flood protection infrastructure only*

1.9 INTEGRATED APPROACH IN FLOOD MANAGEMENT

Flood management plays important role in protecting people and their socio-economic activities in flood plains from flooding. The development in the river basins has been closely linked with successful implementation of flood control projects. In the past, exposure to flood risks has been handled largely through structural measures. However, strategies that rely largely on structural solutions unfortunately alter the natural environment of the river, which may result in loss of habitats, biological diversity and ecosystem productivity.

Further, structural approaches are bound to fail the moment an extraordinary or unforeseen event occurs. These traditional approaches, where the risks are merely transferred spatially, are likely to generate conflicts and inequities. Environmental degradation has the potential to threaten human security, including life and livelihoods, and food and health security. This realization has recently led to calls for a paradigm shift from traditional flood management to Integrated Flood Management.

Integrated Flood Management (IFM) is a concept that addresses issues of human security against flood risks and sustainable development within the framework of Integrated Water Resources Management (IWRM). Such an integrated approach to flood management can play an important role in sustainable development and poverty reduction. Integrated Flood Management aims at minimizing loss of life from flooding while maximizing the net benefits derived from flood plains.

1.10 FLOODS AND THE DEVELOPMENT PROCESS

Historically, flood plains have been the preferred places for socio-economic activity as is evident from the very high densities of human settlement found there. Floods are a natural phenomenon, with both negative and positive impacts, and, generally, should not be considered a hindrance to economic development. Floods play a major role in replenishing wetlands, recharging groundwater and support agriculture and fisheries system, making flood plains preferred areas for human settlements and economic activities. Extreme demands on natural resources due to population growth have forced people and their property to move closer to rivers in many parts of the world. Further, flood control and protection measures have encouraged people to utilize newly protected areas extensively, thereby increasing flood risks and consequent losses.

Recurrent and extreme flooding, however, pose grave risks to development and have negative impacts on lives, livelihoods and economic activity and can cause occasional disasters. Flood disasters result from the interaction between extreme hydrological events and environmental, social and economic processes. These disasters have the potential to put development back by five to ten years, particularly in developing countries. The spiraling economic losses in developed countries also have given rise to grave concerns.

The balancing of development needs and risks is essential. The evidence worldwide is that people will not, and in certain circumstances, cannot abandon flood-prone areas. There is a need, therefore, to find ways of making life sustainable in the floodplains. The best approach is to manage floods in an integrated manner.

1.11 TRADITONAL FLOOD MANAGEMENT OPTIONS

The traditional management response to severe floods was typically an adhoc reaction – quick implementation of a project that considered both the problem and its solution to be

self-evident, and that gave no thought to the consequences of flood risks for upstream and downstream areas. Thus, flood management practices have largely focused on mitigating floods intensity and reducing their localized damages to private and public property. Traditional flood management has employed both structural and non-structural interventions, besides, physical and institutional interventions. These interventions were employed prior, during and after flooding and have often overlapped. The traditional flood management interventions are listed below;

i. **Source control to reduce runoff:**

   a. Permeable pavements, a forestation artificial recharge;

ii. **Storage of runoff:**

   a. Detention Basins, reservoirs etc.;

iii. **Capacity enhancement of Headwork/Barrages across rivers:**

   a. Remodeling of Barrages/Headworks, provision of Bypass/Escape channels etc.;

iv. **Separation of rivers and populations:**

   a. Land-use control, flood plan mapping & zoning, removal of illegal encroachments, construction of flood protection infrastructure.

v. **Emergency management during floods:**

   a. Flood forecasting & warnings, flood fighting works i.e. raising/strengthening flood embankments, evacuation of flood affectees from dangers zone and their temporary settlement at safe places; and

vi. **Flood recovery:**

   a. Compensation of flood affectees and restoration of damaged public infrastructure.

Surface water storages (large, medium & small dams), flood embankments and flood flows retention basins, is a traditional approach to attenuating flood peaks. Water storage attenuate floods by slowing the rate of rising waters, by enhancing the time it takes for the waters to attain high level and evade the synchronization of flood peaks, hence, lowering the peak level in the downstream areas. Such storages reservoirs serve multiple purposes i.e. storage of water mainly for irrigation water supplies, hydropower generation including flood management. Storage Reservoirs have to be used in an appropriate combination with other structural and non-structural measures.

Seemingly self-evident, but regularly overlooked in practice, is the need to make flood management a part not only of the planning and design, but also of the operation of reservoirs. Releases of surplus water from reservoirs at the time, when rivers in the downstream areas experiencing high flood flows can create risks, therefore, careful operation of reservoirs can minimize the loss of human life and damages to property due to properly managed releases. In this context transboundary cooperation is indispensable.

Flood embankments are most likely to be appropriate for floodplains that are already intensely used, in the process of urbanization, or where the residual risks of intense

floodplain use may be easier to handle than the risks in other areas i.e. (Landslides or other disturbances).

Land-use control is generally adopted where intensive development on a particular floodplain is undesirable. Providing incentives for development to be undertaken elsewhere may be more effective than simply trying to stop development on the floodplain. Where land is under development pressure, however, especially from informal development, land-use control is less likely to be effective. Flood protection or construction of houses at high elevation is most appropriate where development intensities are low and properties are scattered, or where the warnings times are short. In areas prone to frequent flooding, protection of the infrastructure and the communication links from floods can reduce the debilitating impacts of flood on the economy.

Flood Forecasting & issuance of timely warnings are complementary to all forms of intervention. A combination of timely, clear & accurate warning messages with a high level of community awareness gives the best level of preparedness for self-reliant action during floods. Public education programme/awareness campaign is crucial to the success of warnings intended to preclude a hazard from turning into a disaster.

Evacuation is an essential constituent of emergency planning, and evacuation routes may be upward into a flood refuge at a higher elevation or outward, depending upon the local circumstances. Outward evacuations are generally necessary where the depths of water are significant, where flood velocities are high and where the buildings are vulnerable. Successful evacuations require planning and awareness among the population of what to do in a flood emergency.

Active community participation in the planning stage and regular exercises to assess the viability of the system help ensure that evacuations are effective. The provision of basic amenities such as water supply, sanitation and security in areas where affectees gather is particularly important in establishing a viable evacuation system.

1.12 THE CHALLENGES OF FLOOD MANAGEMENT

Besides many other challenges, climate change is emerging as perhaps the greatest environmental challenge for Pakistan causing floods, droughts and increasing hunger, poverty, displacement, soil degradation, desertification and deforestation. Rising number of extreme climate events, shift of monsoon rainfall zone from North-east to North-west. Intense, concentrated monsoon rains in short time of interval, inconsistent behaviour of monsoon and erratic flash flood events are the major future challenges. There is strong need to educate people about these natural disasters and their frequent occurrence in the region including Pakistan.

There is a growing recognition that current approaches regarding flood management are not as sustainable as they might be. Hence, it is imperative to cope with increasing risks of flooding and the uncertainties of climate change more effectively. Increased population pressure and enhanced economic activities in floodplains, such as the construction of buildings and infrastructure, further increase the risk of flooding. In developing countries with primarily agricultural economies, food security is synonymous with livelihood security. Floodplains contribute substantially to the food production that provides nutrition for the people of these countries.

Asia-Pacific region is under the very frequent and severe impacts of floods because of its geographical composition. Majority of the region’s major cities are riverine or coastal,

which have concentration of population, assets, economic & industrial development and infrastructures.

Flooding can be caused by torrential rains in urban areas, flash floods in semi mountainous regions, riverine flooding in main rivers in plain areas, or storm surge. In this respect, rapid urban growth brings us not only the prosperities but also a series challenge, in which the water-related issues, including the escalation of urban floods, have become essential problems in connection with sustainable development. The increasing urban flood risk has pushed all nations and international organizations to take measures to confront the threats caused by floods and to build flood resilient cities.

Pakistan is a resource constraint country with a fast growing population, low natural resource development based and unfavorable local socio-cultural conditions, and climate change is an additional stress for the country. Educating masses about natural disasters and building up their preparedness at educational institutions can be of great help to minimize the damages of disasters. Media can play its due role in this regard as without its support, awareness cannot be boosted. Areas vulnerable to climate change-induced natural disasters must have adequate flood protection facilities, besides, reliable medium and long range Weather & Flood Forecasting & Warning System in place.

1.13 IMPACT OF RAPID URBANIZATION ON FLOOD MANAGEMENT

According to World Urbanization Prospects (2014 revision), world is experiencing a historically unprecedented transition from predominantly rural to urban living. In 1950, one-third of the world's population lived in cities; today the number has already reached more than one-half, and in 2050 city dwellers are expected to account for more than two-thirds of the world's population. This rapid rise will mainly take place in developing countries. Africa and Asia will be the fastest urbanizing regions with the urban population projected to reach 56% in Africa and 64% in Asia by 2050 (currently at 40% and 48%, respectively).

People move from rural environments into cities to seek economic opportunities and better access to basic services. Climate change is likely to accelerate the migration patterns into urban areas by altering the livelihood basis from both fishing and farming, and by increasing the occurrence and intensifying the effects of natural hazards. Land use and other human activities influence the peak discharge of floods by modifying how rainfall and snowmelt are stored on and run off the land surface into streams.

Construction of roads and buildings often involves removing vegetation, soil, and depressions from the land surface. The permeable soil is replaced by impermeable surfaces such as roads, roofs, parking lots, and sidewalks that absorb little water, reduce infiltration of water into the ground, and accelerate runoff to ditches and streams. With less storage capacity for water in urban basins and more rapid runoff, urban streams rise more quickly during storms and have higher peak discharge rates than do rural streams. In addition, the total volume of water discharged during a flood tends to be larger for urban streams than for rural streams.

1.14 CLIMATE VARIABILITY AND CHANGE

Apart from the antecedent basin conditions, flood magnitudes depend on precipitation intensity, depth, timing, and spatial distribution. A variety of climate and non-climate parameters influence flood processes. Temperature and wind affect snowmelt, which in turn affects flood magnitudes. The projected effects of global warming include changes in

atmospheric and oceanic circulation, and many subsystems of the global water cycle are likely to intensify, leading to altered patterns of precipitation and runoff. Various climate model simulations show complex patterns of precipitation change, with some regions receiving less and others receiving more precipitation than they do now.

Pakistan Meteorological Department (PMD), in a recent monsoon rainfall distribution analysis, assessed that climate change has rendered a 100 km spatial shift towards west in the overall monsoon pattern in the country. Rainfall distribution patterns have not only shifted spatially but also seasonally. The analysis showed that summer monsoon rainfalls have shifted towards late season; similarly, winter rain and snowfall have also shifted towards late February and March. Changing patterns result as emergence of new vulnerable areas to floods which include Khyber Pakhtunkhwa (KP), South Eastern Punjab and Central Sindh.

According to an analysis of fifty-year data, variation in the co-efficient of variability was highest in post-monsoon and pre-monsoon seasons as compared to the winter and monsoon seasons. It further revealed that most of the northern areas (upper KP and Gilgit Baltistan) remain in the same old pattern except in the post-monsoon period while the central and southern half suffers throughout the year in terms of high rainfall variability, he informed. It is also observed that more snowfall is received in the month of February as compared to January over recent years.

FEDERAL FLOOD COMMISSION

2. FEDERAL FLOOD COMMISSION

2.1 Historic Background

Prior to 1976, the Provincial Governments were responsible for the planning and execution of flood protection works. Disastrous floods of 1973& 1976 caused heavy loss of life and property and it was felt that the existing flood protection facilities and planning were inadequate to provide effective protective measures for the country. Heavy losses to the economy due to floods were discussed in the Inter-Provincial Conference held in January 1977 wherein it was decided to establish Federal Flood Commission (FFC) for integrated flood management on country wide-basis.

2.2 Functions of Federal Flood Commission

The existing charter of duties of FFC is given as under;

i. Preparation of Flood Protection Plan for the country including management of the Plan;
ii. Scrutiny of flood control/protection schemes funded by the federal government and prepared by Provincial Governments and Federal Agencies;
iii. Review of damage of flood protection works and review of plans for restoration and reconstruction works;
iv. Measures for improvement of Flood Forecasting & Warning System;
v. Preparation of a Research Programme for flood control and protection;
vi. Standardization of designs and specifications for flood protection works;
vii. Recommendations regarding principles of regulation of reservoirs for flood control;
viii. Evaluation and monitoring of progress of implementation of the National Flood Protection Plan;
ix. Federal Flood Commission may notify sub-committees as it deems appropriate.

Provincial governments and Federal Line Agencies undertake flood protection schemes proposed under the National Flood Protection Plans (NFPPs). The Federal Government, however, provides the resources for meeting the capital costs of projects under NFPPs.

2.3 Achievements of FFC

Since its establishment in 1977, FFC has so far executed three 10-Years National Flood Protection Plans covering periods from 1978-1988 (NFPP-I), 1988-1998 (NFPP-II) and 1998-2008 (NFPP-III). Brief details of projects are given as under:

National Flood Protection Plan-I (1978-88):

Details of flood protection schemes executed under **National Flood Protection Plan-I (NFPP-I)** through various programme/projects are given as under;

Normal/ Emergent Flood Programme:

- Expenditure incurred: Rs 1,729.75 million
- No. of flood protection schemes completed in the four Provinces, AJ&K, FATA & NA (now G-B): 311
- Source of Funding: 100% by GOP

Under NFPP-I, emphasis was mainly given on the implementation of structural measures (construction of flood protection structures). Pakistan Meteorological Department (PMD) and WAPDA carried out only maintenance works related to Flood Forecasting & Warning System equipment.

National Flood Protection Plan-II (NFPP-II) (1988-98):

Details of flood protection schemes/activities carried out through various Programme/ projects are given as under;

Normal/ Emergent Flood Programme:

- Expenditure incurred — Rs 805.33 million
- No. of Schemes executed — 170
- Source of funding — 100% by GOP

Flood Protection Sector Project-I (FPSP-I):

- Expenditure incurred — Rs 4,735.29 million
- No. of flood protection schemes executed — 256
- Co-financed by GOP & ADB — ADB= 80%
GOP = 20%

Under NFPP-II, the following activities were undertaken for improvement of Country's existing Flood Forecasting & Warning System through Flood Sector Protection Project (FPSP-I), which was jointly funded by ADB and GOP.

- Procurement & installation of Meteor-burst Telecommunication System (Phase-I) including one Master Station and 24 remote sensing stations.
- Installation of 10-CM Quantitative Precipitation Measurement (QPM) Weather Radar at Flood Forecasting Division (FFD) Lahore.
- Pre-feasibilities studies for four Barrages i.e. Sulemanki, Baloki, Trimmu & Panjnad for increasing their design discharge capacity to carry increased flood flows in view of 1992 floods.
- Preparation of Flood Plain Maps of Indus River (5-Reaches i.e. Chashma-Taunsa, Taunsa-Guddu, Guddu-Sukkur, Sukkur-Kotri & Kotri-Seas Reach).

Prime Minister's River Management Programme 1994-1996

- Expenditure incurred — Rs. 613.386 million
- No. of schemes executed — 10
- Source of Funding — 100% by GOP

1988-Flood Damage Restoration Project

- Expenditure incurred — Rs. 1,874 million
- No. of structures restored — 2,028
- Source of Funding — 90% by IDA & ADB,
10% by GOP

1992-Flood Damage Restoration Project

- Expenditure incurred — Rs. 6,888.36 million
- No. of structures restored — 1,980
- Source of Funding — 80% by IDA, ADB & KfW
20% by GOP

National Flood Protection Plan-III (NFPP-III) (1998-2008):

Details of flood protection schemes carried out through various Programme/projects are given as under;

Normal/Emergent Flood Programme:

- Expenditure incurred — Rs 4,192.35 million
- No. of flood protection schemes executed in four Provinces, AJ&K, FATA, ICT and Northern Areas (Now Gilgit-Baltistan) — 362
- Source of Funding — 100% by GOP

Special Grant through President/Chief Executive Directive (2000-2002)

- Expenditure incurred — Rs. 92.035 million
- No. of schemes executed — 21
- Source of Funding — 100% by GOP

Flood Protection Sector Project-II (FPSP-II):

- Expenditure incurred — Rs 4,165 million
- No. of Flood Protection Schemes executed — 101
- Source of Funding — 80% by ADB,
20% by GOP
- Flood Forecasting & Warning System — Rs 432.123 million

The major activities undertaken for improvement and upgradation of country's existing Flood Forecasting & Warning System include;

- Procurement & installation of 24 No. HF-Radio Sets.
- Procurement & installation of 20 additional remote sensing stations under existing Meteor-burst Telecommunication System (Phase-II);
- Upgradation of 10 CM Quantitative Precipitation Measurement Weather Radar procured under FPSP-I in the premises of FFD, Lahore;
- Upgradation of 5.36 CM Sialkot Weather Radar into 10 CM Quantitative Precipitation Measurement Weather Radar;

- Procurement & installation of a 10 CM Quantitative Precipitation Measurement Weather Radar at Mangla;

- Development of initial/1st version of Computer Based Flood Early Warning System (FEWS) through NESPAK, PMD & Delft Hydraulics;

- Expansion of Flood Plain Mapping activity covering major tributaries of River Indus i.e. Rivers Jhelum, Chenab, Ravi & Sutlej.

- Bathymetric Survey & flow measurements of Indus River and its major tributaries *(Sutlej, Ravi, Chenab & Jhelum)* for improvements in discharge rating curves & to collect data for FEWS Model & Flood Plain Mapping activities.

Establishment of Flood Forecasting & Warning System for Lai Nullah Basin (Islamabad &Rawalpindi):

- Expenditure incurred: Rs 348 million
- Source of Funding;
  - *Japanese Grand –in-Aid* Rs 337 million
  - *GOP share* Rs 11.00 million
- Facilities provided include:

o Two No. Telemetry rainfall gauging stations at Golra, Islamabad and Bokra, Islamabad;

o Two No. water level gauging stations at Kattarian Bridge, Rawalpindi and Gawalmandi Bridge, Rawalpindi;

o Master control station in PMD, Islamabad;

o Two monitoring stations at FFC and TMA/Rescue-1122-Rawalpindi respectively;

o Executive Warning Control room in Rawalpindi Fire Brigade, and

o Nine (9) No. warning posts at various locations.

2.4 National Flood Protection Plan -IV

After experiencing 2010 floods in country, the need for investment in flood sector has gained importance. Federal Flood Commission initiated working on formulation of National Flood Protection Plan-IV on fast track basis and consultants were engaged in May 2013 through World Bank Funded Water Sector Capacity Building Project (WCAP) for preparation of NFPP-IV. The draft National Flood Protection Plan-IV has been prepared by the consultants in consultation with concerned organizations. The National Flood Protection Plan-IV (Ten Year Plan) is under approval process by the Government of Pakistan through Council of Common Interests. Actual implementation has been planned during the next ten years, subject to timely approval of plan by the Government of Pakistan and provision of adequate funds for construction of various interventions proposed in the NFPP-IV in coming years.

Presently, the urgent nature flood protection works being proposed by the Provincial Irrigation Departments and Federal Line Agencies are executed through GOP funded

Normal/Emergent Flood Programme. However, due to inadequate budget allocation under PSDP each year *(minimal as compared to the Provinces & Federal Line Agencies demands)* for Normal/Emergent Flood Programme, some urgent nature flood protection schemes remain un-attended. Total 205 number flood projects costing Rs. 4.06 billion have been carried out during the period {(2009-10) to (2015-16)}. The budget demand by the Provinces and Federal Line Agencies, budget allocated and actually released during the past 6-7 years {(2009-10) to (2015-16)} to PIDs & Federal Line Agencies is given in **Table-3**.

TABLE-3

BUDGET DEMAND BY THE PROVINCES & FEDERAL LINE AGENCIES, BUDGET ALLOCATED & RELEASED DURING PAST 6-7 YEARS

(Rs. Million)

Sr. No.	Financial Year	Funds demanded	Budget Allocation under PSDP		Funds Released
			Original	Revised	
1	2009-10	3,500.000	1,000.000	575.110	78.358
2	2010-11	3,500.000	740.798	735.798	276.714
3	2011-12	4,000.000	894.000	844.194	567.095
4	2012-13	4,000.000	900.000	900.000	419.325
5	2013-14	4,500.000	1,000.000	1,000.000	855.533
6	2014-15	5,000.000	1,000.000	1,000.000	898.477
7	2015-16	5,000.000	1,000.000	964.430	964.430
	Total	**29,500.000**	**6,534.798**	**6019.532**	**4059.932**

2.5 Normal/Emergent Flood Programme (2014-15) & (2015-16)

Federal Flood Commission is presently coordinating implementation of Normal/ Emergent Flood Programme, which was started in (1978-79). It is a yearly program in which Provincial Irrigation Departments and Federal Line Agencies submit their schemes (based on their shares) each year, which are processed by FFC for technical clearance of Scrutinizing Committee of FFC and approval of DDWP/CDWP. The award of contract, execution and disbursement is the exclusive responsibility of Provincial Irrigation Departments and Federal Line Agencies. The flood protection schemes are processed for approval and implementation before 30th June each year subject to in-time approval and release of funds by Planning Commission/Finance Division to the Line Agencies.

An amount of Rs. 1,000.00 million was allocated under PSDP (2015-16) for Normal/ Emergent Flood Programme, against that Rs 964.430 million were released to PIDs & FLAs. Total 112 No. flood protection schemes (64 ongoing works & 48 new schemes) costing Rs 4,471.034 million were taken up for implementation. Similarly, an amount of Rs. 500.00 million has been allocated under PSDP (2016-17) for Normal/ Emergent Flood programme. Total 45 No. flood protection schemes (17 ongoing works & 28 new schemes) costing Rs 2,279.805 million were taken up for implementation. Detailed list of

schemes executed/being executed under Normal/ Emergent Flood Programme during Financial Years (2015-16) & (2016-17) is attached as **Appendix-I.**

2.6 Summary of investment on Flood Projects through GOP grants/ Foreign Aid:

The summary of investment on flood projects through GOP grants & foreign aids coordinated by FFC since 1978-79 to June 2016 is given in **Table-4**.

TABLE 4

SUMMARY OF FEDERAL INVESTMENT ON FLOOD PROTECTION WORKS

Sr. No.	Flood Plans/ Programs	Location	No. of schemes	Expenditure (Rs Million)
1.	**NFPP-I (1978-88)**			
	Normal Annual Development Programme GOP funded	Countrywide	311	1,729.751
2.	**NFPP-II (1988-98)**			
i.	Normal/Emergent Flood Programme	Countrywide	170	805.331
ii.	First Flood Protection Sector Project (FPSP-I) Co-financed by GOP & ADB	Four Provinces	256	4,735.29
iii.	Prime Minister's River Management Programme (1994-96)	Punjab, Khyber Pakhtunkhwa & Balochistan	10	613.386
3.	**NFPP-III (1998-2008)**			
i.	Normal/Emergent Flood Programme	Countrywide	362	4,192.348
ii.	Second Flood Protection Sector Project FPSP-II (1998-2007) Co-financed by GOP & ADB	Four Provinces	101	4,165.00
iii.	Special package executed through directives of President/Chief Executive (2000-02)	Gilgit-Baltistan	21	92.035
iv.	Lai Nullah Flood Forecasting & Warning System through JICA grant-in-aid	District Rawalpindi & ICT	1	348.00
v.	Normal/Emergent Flood Programme (2008-09 to 2015-16)	All over the country	243	4,990.677
	Sub Total-I (NFPP-I,II &III**)**		**1,475**	**21,671.818**
4.	**Flood Damage Restoration Projects**			
i.	1988-Flood Damage Restoration Project	Four Provinces	2,028	1,874.00
ii.	1992-Flood Damage Restoration Project	Countrywide	1,980	6,888.36
	Sub Total-II		**4,008**	**8,762.36**
	Grand Total		**5,483**	**30,434.178**

FLOOD MANAGEMENT MECHANISM

3. FLOOD MANAGEMENT MECHANISM

3.1 Organizations involved and responsibilities

Flood management is a multifunctional process involving a number of organizations. The Government Organizations, which play major role in the flood management, are the Provincial Irrigation Departments (PIDs), GB-PWD, Irrigation Directorate FATA, Irrigation & Small Dams Organization, Government of AJ&K, PMD/Flood Forecasting Division, Lahore WAPDA, PCIW, Federal Flood Commission, NDMA, Provincial Relief Organizations, Pak Army, NHA, Pakistan Railways, Provincial Disaster Management Authorities, GB-DMA, FDMA, SDMA & DDMAs/District Administration. Functions of these organizations are briefly described hereinafter;

3.1.1 Provincial Irrigation Departments:

The Provincial Irrigation Departments (PIDs) play a front line role in flood management, fighting and mitigation. Major flood related functions include:

i. Operation and maintenance of Barrages, Irrigation & Drainage Networks, including flood protection structures, besides, measurement of discharges at control points (Barrages/Headworks) across main rivers;

ii. Planning, design, construction of new Irrigation, Drainage & Flood Protection/ River Training projects;

iii. Collection and transmission of Rivers flows data to FFD, Lahore, FFC and other concerned organizations for taking further action at their end;

iv. Establishment & Operation of Flood Warning Centre during the monsoon season each year for sharing flood flows data and other information, besides, timely dissemination of the flood forecasts/warnings to concerned quarters;

v. Preparation & implementation of the Flood Fighting Plans during monsoon season every year.

3.1.2 WAPDA

WAPDA is actively involved in the flood forecasting process as it provides water levels of major reservoirs (Tarbela, Chashma & Mangla), river flows and rainfall data collected through Flood Telemetric System/Gauged sites in the catchment areas of major rivers. The system is supplemented by Meteor-burst communication system. WAPDA supports another hydrometric data measurement and transmission system through its Surface Water Hydrology Project.

WAPDA's Flood Telemetric Network is directly linked with FFD, Lahore. WAPDA provides hydrometric flood data and water levels, inflows/ outflows of Tarbela, Chashma and Mangla reservoirs to FFD, Lahore, FFC and other concerned organizations. Coordination between FFD Lahore and WAPDA has considerably improved after the 1992-flood disaster. Regular meetings in the office of General Manager (Planning & Design) are held during flood season and necessary instructions are issued to Tarbela and Mangla Dam Flood Management Committees.

3.1.3 Provincial Disaster Management Authorities:

Ultimate aim of flood warnings is to reduce the loss of life and damages to property of the community living in the flood prone/high risk areas. Provincial Disaster Management Authorities are responsible for disaster preparedness, preparation of emergency response plan, rescue and relief measures and rehabilitation plan and its approval from Provincial Government before implementation; examine the vulnerability of various parts of the province to different disasters and specify prevention or mitigation measures; lay down guidelines for preparation of disaster management plans by the Provincial Department and District Authorities; evaluate preparedness at governmental levels to respond to disaster and enhance preparedness; coordinate response in the event of disaster; give directions to DDMAs regarding actions to be taken in response to disaster; and promote general education, awareness and community training etc. pertaining to all disasters including floods.

Rescue and relief functions at the District, Tehsil and Union Council level are now performed through the District Disaster Management Authorities, which are responsible to coordinate with the concerned departments to carry out the disaster management functions at the District level.

3.1.4 Pak Army:

Pak Army's Corps of Engineers under the command and control of Engineer-in-Chief *(E-N-C)* provide necessary help to the civil authorities to carry out rescue and relief operations during floods. Provincial Governments facilitate Pak Army in providing necessary logistic support/equipment (boats, life jackets, vehicles, tents etc.) for such operations.

Pakistan Army's flood related functions encompass all the three phases of flood operations from the pre-flood to post flood phases including the important flood phase. Pre-flood phase is the flood preparatory phase during which the adequacy and serviceability of the flood fighting equipment is ensured. Pre-flood meetings are also held at the Corps Head Quarters and Engineer Directorate, GHQ in order to review the arrangements of PIDs, PDMAs & Federal Line Agencies for handling flood situation.

Pre-flood inspections of the flood protection structures are carried out by the respective Commander Corps of Engineers alongwith concerned field formations of Provincial Irrigation Departments for their respective areas to ensure that the flood protection structures (Bunds, Barrages, Spurs etc.) are in satisfactory state of maintenance. Deficiencies, if any, are brought into the notice of PIDs. Availability of flood fighting material and sufficient stock of explosives is ensured at pre-determined breaching sections to activate the pre-determined breaching sections, whenever required.

An officer of the 4 Corps Engineers is placed on duty in the Flood Warning Centre, Lahore, to keep a close watch on the flood situation. All flood forecasts and warnings are communicated to the CC Engineers 4 Corps in time, which are transmitted to the D.G. Engineers and all other CC of the Engineers. In the event of floods, units of the Pak Army move out to their respective areas of responsibility and carry out the rescue and relief operations in coordination with the respective civil administration.

Besides above, a post flood coordination meeting is held under the Chairmanship of Engineer-in-Chief/D.G. Engineers to discuss the performance of all flood management related agencies with the view to bring about the necessary improvements in future.

3.1.5 Pakistan Commissioner for Indus Waters (PCIW)

Pakistan has a unique flood-forecasting problem in the sense that major part of the flood generating in upper catchments of Rivers Sutlej, Ravi, Jhelum and Chenab lie across the border in India/ held Kashmir. A number of water storage reservoirs have been constructed over Eastern Rivers (Ravi & Sutlej) across the border. As a result, the free flood flow conditions are disrupted making the operation of the rainfall/runoff model extremely difficult. The situation underlines the need for the acquisition of rivers flow data from across the border in respect of important sites over the rivers in India/held Kashmir.

Consequently, an agreement had been signed between the two countries in 1989 through their respective Commissioners for Indus Waters, which includes provision/ sharing rivers flows data with India such rivers flow and rain data as is considered important for flood forecasting in Pakistan. A number of river flow stations are specified for this purpose.

The Pakistan Commissioner for Indus Waters receives the Chenab River and Eastern Rivers (Ravi & Sutlej) data normally once in a day. The data is then passed on to the FFD, Lahore for preparation and issuance of flood forecast to concerned organizations. Frequency of data reception is increased to six hourly and even to hourly in case of severe flood situation.

Pakistan Commissioner for Indus Waters is thus responsible to provide to FFD, Lahore, the much-needed data obtained from India for use in the flood forecasting models to ensure accurate forecasts for Rivers Sutlej, Ravi, Jhelum & Chenab. Pakistan Commissioner for Indus Waters is the only forum through which any clarification or further information can be obtained from India with regard to flood flows data of Chenab & Eastern River (Ravi & Sutlej).

3.1.6 Role of Federal Flood Commission in Flood Management/Mitigation

Pre-Monsoon Season action taken by FFC:

- FFC chalks out pre-emptive measures for better flood management during monsoon season, which are circulated amongst all stakeholders for taking further action at their end.

- For that purpose, preparatory meeting of Federal Flood Commission was held on **17.02.2016** under the Chairmanship of Chief Engineering Advisor/ Chairman Federal Flood Commission in the Committee Room of office of CEA/CFFC in order to review the progress on post 2015 floods activities and preparatory works for monsoon season 2016. Necessary pre-emptive measures were issued to concerned organizations.

- The pre-flood meeting of FFC was held on **13.04.2016** under the Chairmanship of Additional Secretary (II), Ministry of Water & Power to review progress on the pre-emptive measures and ensure that necessary instructions are issued to flood management related organizations at Federal and Provincial Government level.

- The 3rd quarterly meeting of Federal Flood Commission was organized on **17.05.2016** under the Chairmanship of Honourable Federal Minister for Water & Power to review the status of preparedness of the Provinces and Federal Line Agencies for monsoon season 2016 and status of compliance of directions given by the Honourable Supreme Court of Pakistan on the recommendations of Flood

Inquiry Commission.

- The 51st Annual meeting of FFC under the Chairmanship of Federal Minister for Water & Power was organized on **13.07.2016**, which was attended by all stakeholders for presenting their status of preparedness. Necessary directions were issued to concerned organizations for assuring the safe passage of flood flows during monsoon season 2016.

- Follow up meeting for review the arrangements of flood management related organizations and evaluate progress on decisions taken in 51st Annual Meeting of FFC, was arranged on **16.08.2016** in Ministry of Water & Power, Islamabad.

- As per previous practice, the desilting work in critical reaches of Lai Nullah was carried out through WASA Rawalpindi before **30.06.2016.**

- Federal Flood Commission participated in Pre-Flood Conference of Pak. Army held on **12.05.2016** in Engineer Directorate, GHQ Rawalpindi;

- Federal Flood Commission attended the Pre-Flood Conference of NDMA held on **09.06.2016.**

During Monsoon Season Role of FFC:

- FFC issued Daily Flood Situation Report to higher ups and Flood Management related agencies, based on Weather Forecasts/ Advisories and Rainfall & Rivers flow data as received from FFD, Lahore/PMD, WAPDA & PIDs. For that purpose, Flood Communication Cell established in FFC worked on round-the-clock basis during entire Monsoon Season (15th June to 15th October, 2016). Responsibility for response/ reaction to warnings issued by PMD/FFD, Lahore & FFC rests upon concerned Provincial organizations/District Administrations.

Post Monsoon Season Role of FFC

- FFC reviewed the list of flood protection schemes in consultation with Provincial Irrigation Departments and Federal Line agencies and re-prioritized in light of allocated budget under PSDP (2016-17) for execution of urgent nature flood protection schemes through Normal/Emergent Flood Programme (2016-17);

- FFC technically scrutinizes the PC-Is of flood projects through S.C of FFC and submit to Ministry of Water & Power for approval of DDWP/CDWP. Total five meetings of Scrutinizing Committee of FFC were organized up to February 2017, wherein 25 number flood protection schemes were technically examined and recommended to Ministry of Water & Power for approval of DDWP/CDWP.

- Three meetings were organized for review of progress on implementation of flood projects under GoP funded Normal/Emergent Flood Programme.

- The sites inspections of flood protection schemes being executed under Normal/Emergent Flood Programme were carried out by the FFC's Monitoring Teams.

- A follow up meeting for review the watershed management issues of flood management related organizations and chalk out possible remedial measures, was arranged on **10.11.2016** in office of Chief Engineering Advisor/ Chairman Federal Flood Commission, Islamabad.

- Post Flood meeting of Federal Flood Commission was held on **24.11.2016** in the committee room of office of Chief Engineering Advisor/Chairman Federal Flood Commission, Islamabad under the Chairmanship of Chief Engineering Advisor/ Chairman FFC, Islamabad in order to review the damages caused to irrigation, drainage and flood protection infrastructure during monsoon season 2016.

- 2nd meeting to review the draft TOR for proposed study titled *"Formulation of National Watershed Management Plan"* was held on **28.12.2016** in office of the Chief Engineering Advisor/ Chairman Federal Flood Commission, Islamabad.

- Federal Flood Commission participated in Post-Flood Conference of Pak. Army held on **06.12.2016** in Engineer Directorate, GHQ Rawalpindi;

- Federal Flood Commission attended the Post-Flood Conference of NDMA held on **09.01.2017.**

3.1.7 Flood Forecasting Division (FFD), Lahore

FFD, Lahore, the specialized unit of Pakistan Meteorological Department, plays a pivotal role in the Flood Forecasting & issuance of Warnings to concerned quarters. It obtains hydro-meteorological data from the various National and International sources, which is then analyzed to produce weather /flood forecasts & warnings and disseminated to various Federal/Provincial organizations and electronic/print media through various means and also uploaded on PMD Website.

3.1.8 National Disaster Management Authority (NDMA)

Government of Pakistan had embarked upon establishing appropriate policy to minimize risks and vulnerabilities and passed NDMA ordinance 2006. National Disaster Management Authority (NDMA) serves as focal point and coordinating body to facilitate implementation of disaster risk management strategies. This necessitates NDMA to directly interact/communicate with all stakeholders, including Ministries, Divisions, and Departments in relaxation to normal communication channel.

NDMA is an expedient to provide an effective national disaster management system and for matters connected therewith and incidental thereto. As per National Disaster Management Authority Act-2010, the main functions of NDMA are as under:

i. Act as implementing, coordinating and monitoring body for disaster management;
ii. Prepare the National Plan to be approved by the National Disaster Management Commission;
iii. Implement, coordinate and monitor the implementation of the national policy;
iv. Lay down guidelines for preparing Disaster Management Plans by different ministries or departments and the provincial authorities;
v. Provide necessary technical assistance to provincial government and provincial authorities for preparing their Disaster Management Plans in accordance with the guidelines laid down by the National Disaster Management Commission;
vi. Coordinate response in the event of any threatening disaster situation or disaster;

vii. Lay down guidelines for the concerned ministries or provincial governments and provincial authorities regarding measures to be taken by them to response to any threatening disaster situation or disaster;

viii. For any specific purpose or for general assistance requisition the services of any person and such person shall be co-opted as member and exercise such power as conferred upon him by the authority in writing;

ix. Promote general education and awareness in relation to disaster management;

x. Perform such other functions as the National Disaster Management Commission may require performing.

3.2 Flood Warning Dissemination System:

Monsoon Season normally starts in 1st week of July (s*ometimes, it starts little early)* and ends in last week of September *(sometimes prolongs up to mid-October).* However, the Flood Warning Centers of all flood management related agencies start functioning from 15th June every year for collecting weather & flood flows data and keep continue upto 15th October. During this period, effective interaction and communication between various floods related provincial as well as federal agencies is maintained on round-the-clock basis in order to counter any eventuality due to monsoon rains/floods.

PREPAREDNESS/ CONTINGENCY PLANNING FOR MONSOON SEASON 2016

4. PREPAREDNESS & CONTINGENCY PLANNING BY FEDERAL FLOOD COMMISSION FOR MONSOON SEASON 2016

FFC mainly plays coordination role among Provincial and Federal Government Organizations dealing with flood management in the country for avoiding loss of life and minimizing damages to agricultural lands and other public and private property. However, managing the flood water is the sole responsibility of provincial Irrigation Department, and Federal Line Agencies.

As per practice, FFC holds meetings prior to start of Monsoon Season (1st July to 15th October) every year, to review the status of preparedness/ flood fighting arrangements made by Federal/Provincial Organizations for upcoming Monsoon season.

4.1 Preparatory Meeting of Federal Flood Commission

FFC chalks out pre-emptive measures for better flood management during monsoon season each year, which are circulated amongst all stakeholders for taking further action at their end. For that purpose, first preparatory meeting of Federal Flood Commission was held on February 17, 2016 under the Chairmanship of Chief Engineering Advisor/ Chairman Federal Flood Commission in the Committee Room of office of CEA/CFFC in order to review the progress on post 2015 floods activities and preparatory works for monsoon season 2016. The following directions were issued to PIDs/Federal Line Agencies, WAPDA, PMD & other concerned agencies etc.;

i. **Provincial Irrigation Department & Federal Line Agencies** will ensure completion of 2015-flood damages restoration works related to Irrigation, Drainage & Flood Protection Infrastructure by/before **15th June 2016**. The compliance report would be submitted to FFC soon after completion of the task.

ii. **Provinces & Federal Line Agencies** will ensure strengthening of all critical points/weak sections of flood protection infrastructure *(flood bunds, spurs, Barrages/Head Works and allied works etc)* well before the start of Monsoon Season 2016 (by/before **15th June 2016**). The compliance report regarding completion of all necessary O&M works would be submitted to FFC soon after completion of the task.

iii. **Provinces & Federal Line Agencies** will vigorously follow their cases regarding approval of new flood protection schemes & release of funds under Normal/ Emergent Flood Program of PSDP (2015-16) so as to accelerate the pace of implementation in order to complete all new/ongoing flood protection schemes before the start of upcoming monsoon season 2016.

iv. **PID, Punjab** will share complete list and status of implementation of their 2015 flood damages restoration works planned/ being carried out under ADB assisted DCRIP & FERRP with all stakeholders including FFC and NDMA.

v. **Chief Engineering Advisor/Chairman, Federal Flood Commission** will write DO letter to Chief Secretaries of the provincial governments & Federally administered areas for immediate allocation & release of adequate O&M funds to the project authorities for repair & rehabilitation of Irrigation, Drainage & Flood Protection Infrastructure well before start of monsoon season 2016.

vi. **Chief Engineering Advisor/Chairman, Federal Flood Commission** would write a D.O Letter to Chief Secretary/ACS (Dev.), Govt. of the Punjab and KP asking for ensuring senior level representation from PIDs in such type of highly important meetings in order to make them meaningful.

vii. **Irrigation & Hydel Power Directorate FATA and Irrigation & Small Dams Organization of AJK** will ensure their appropriate/senior level participation in such type of highly important meetings in future.

viii. **Provinces & Federal Line Agencies** will ensure to carry out pre-flood monitoring of flood protection infrastructure *(flood bunds, spurs, Barrages/Head Works and allied works etc)* alongwith concerned Corps of Engineers of Pak Army and ensure strengthening all weak sections of bunds/spurs etc. well before the start of Monsoon Season 2016 (**by/before 15th June 2016**).

ix. **Provincial Irrigation Departments & Federal Line Agencies** will finalize District/ Division-wise Flood Fighting Plan, keeping in mind lessons learnt during the past consecutive flood events and ensure their circulation among concerned organizations by/before **15th June 2016**.

x. **Provincial Irrigation Departments & concerned Federal Line Agencies** will ensure removal of encroachments from flood Protection infrastructure and flood plains before start of Monsoon Season 2016 (by/before **15th June 2016**). The compliance report would be submitted to FFC.

xi. **WAPDA** will organize a joint meeting of all concerned agencies (Pak Army, FFC, NDMA, PID, Punjab, PDMA/DDMA etc.) in order to formulate a comprehensive plan for removal of encroachments from waterway/flood plain of Jhelum river downstream Mangla Reservoir, besides rehabilitation & removal of encroachments from Barakas Nullah.

xii. **PIDs & FLAs including NHA, Pak Railway** will ensure arrangements of explosive and others material at sites of pre-determined breaching sections and stone reserve stock/ flood fighting material to be arranged at all critical reaches of flood embankments as identified during pre-flood inspections before start of Monsoon Season 2016 (**before 15th June 2016**).

xiii. **NHA** will submit updated status of restoration/ rehabilitation of 2010-flood damaged vulnerable locations (identified on the directions of Honourable Supreme Court of Pakistan under a separate study carried out by M/S NESPAK) to FFC ***within a week's time.***

xiv. **PMD, FFD, Lahore & WAPDA** will carry out all essential repair/ maintenance works of Flood Forecasting and Warning System equipment and ensure that the System /Radars Network is fully functional by/before **15th June 2016**.

xv. **Chief Engineering Advisor/Chairman, FFC** will take up the matter with concerned organizations (PID, Punjab, PID, Sindh, FFD, Lahore and IRSA etc.) regarding proposed installation of flood telemetric gauge at Mithan Kot for better flood forecast and early warning for Sindh Province.

xvi. **CEA/Chairman, FFC** would write a D.O letter to Chief Secretary, Govt. of the Punjab asking for early solution of flood problems associated with limited flood flows carrying capacity of Shahdara Railway Bridge.

xvii. **NDMA in consultation with Pak Army, PDMAs and DDMAs** will ensure completion of all necessary arrangements regarding rescue and relief activities to be carried out during the flood emergency in the coming monsoon season 2016.

xviii. **PCIW** will ensure smooth flow of information from Indian side during monsoon season 2016 for better flood management in Eastern Rivers. PMD will carefully watch and determine the validity/reliability of data provided by India for use in flood management operation in the country.

xix. **PID, Balochistan** will ensure submission of all necessary flood information/rivers flow data to all concerned agencies including FFD, Lahore, regularly on daily basis, during the entire monsoon season 2016.

xx. **Chief Engineering Advisor/Chairman, FFC** will take up the matter with Ministry of Water & Power/Finance Division for early allocation/ release of additional funds requirement for repair of damaged Flood Telemetry equipment of WAPDA. WAPDA to follow up the case with Ministry of Water & Power/Finance Division for early arrangement of funds.

xxi. **District Coordination Officer (DCO) Rawalpindi** will ensure removal of encroachments from the bed & banks of Lai Nullah before start of Monsoon Season 2016 (**15th June 2016**)

xxii. **WASA Rawalpindi** will ensure that de-silting work, in the light of recommendations of panel of IRI experts, was completed well before the start of Monsoon Season 2016 so as to ensure smooth passage of flood flows during Monsoon Season 2016.

xxiii. The links for coordination among flood management related organizations at Federal & Provincial Government level needs to be further improved keeping in mind the experiences of past flood events. **All concerned organizations** may link up with Mangla Dam Authorities (through video link system) for better coordination during upcoming Monsoon Season 2016.

xxiv. **SUPARCO** will organize joint consultative meeting of all concerned organizations including Irrigation Department of the four provinces, representatives from FFC, WAPDA, PMD, NDMA/PDMAs, GSP, PCIW, M/s NESPAK (consultants of NFPP-IV) etc., in order to remove anomalies in flood plain inundation maps of various agencies and choose most appropriate and authentic information for planning purpose and especially for integrated flood management during emergency situation. Meeting may be convened before 30th March 2016.

xxv. The recommended/finalized version of **flood plain inundation maps** and district wise submergence plans would be circulated by FFC among all concerned agencies for their effective use so as to forewarn the communities in areas under threat of likely inundation during floods of various magnitudes. Efforts would be made to finalize the refinement process of maps already prepared by M/s NESPAK under NFPP-IV studies by 30th April 2016 so that same could be distributed among all concerned organizations before start of monsoon season 2016.

4.2 First pre-flood meeting of Federal Flood Commission

The first pre-flood meeting of FFC was held on **April 13, 2016** under the Chairmanship of Additional Secretary (II), Ministry of Water & Power to review progress on post flood 2015 activities and pre-flood arrangements by flood management related organizations for monsoon season 2016. The following decisions were taken in the said meeting;

i. Irrigation Department, Government of the Punjab and Pakistan Railways in consultation with other concerned organizations would address the long outstanding issue of "Increasing discharge capacity of Shahdara Railway bridge across River Ravi" on top priority basis. Effective contingency plan will be kept in place for safe passage of flood during monsoon season 2016. A comprehensive proposal for long term measures (based upon model study recommendations) may also be prepared and processed for approval and implementation

ii. Provinces & Federal Line Agencies will speed up progress on implementation of flood protection schemes taken up under Normal/ Emergent Flood Programme (2015-16) so as to complete all newly approved/ongoing flood protection schemes **before 30th June 2016.**

iii. PIDs & FLAs including WAPDA, PMD, NHA, Pak Railway etc. will ensure completion of all essential rehabilitation/restoration works before **15th June 2016.**

iv. Irrigation Department Government of Sindh would arrange joint visit of concerned officers of PID Sindh & Balochistan of Tori Bund Complex in order to know the site condition and thereafter review the design parameters of flood embankments in the light of recommendations of inspection team. The outcome of the exercise would be shared with FFC before **15th May 2016.**

v. Chief Engineering Advisor/Chairman, Federal Flood Commission would write DO letter to Pakistan Telecommunication Authority for immediate restoration of frequency allotted to Lai Nullah Flood Forecasting & Warning equipment on permanent basis in order to ensure efficient functioning of Lai Nullah Flood Forecasting & Warning System during monsoon season 2016.

vi. PIDs & FLAs will ensure strengthening of all critical points/weak sections of flood protection infrastructure (flood bunds, spurs, Barrages/Head Works and allied works etc.) by/before **15th June 2016**. The compliance report regarding completion of all necessary O&M works would be submitted to FFC soon after completion of the task.

vii. General Manager Mangla will expedite the matter regarding organizing a joint meeting of all concerned agencies (Pak Army, FFC, NDMA, PID Punjab, PDMA/DDMA etc.) in order to formulate a comprehensive plan for removal of encroachments from waterway/flood plain of Jhelum river downstream Mangla Reservoir, besides rehabilitation & removal of encroachments from Barakas Nullah. The task would be completed before **30th June 2016.**

viii. PIDs & FLAs will finalize Division-wise Flood Fighting Plan, keeping in mind lessons learnt during the past flood events and ensure their circulation among concerned organizations by/before **15th June 2016.**

ix. The H&W Wing of WAPDA will take up the matter with PMPIU of Ministry Water & Power for meeting its additional funds requirement for repair of non-operational flood telemetry stations through WCAP. It would be ensured that the entire network is fully operational before start of monsoon season 2016.

x. PIDs & FLAs will ensure removal of encroachments from flood Protection infrastructure and flood plains by/before **15th June 2016**. The compliance report would be submitted to FFC.

xi. Provincial Irrigation Departments & Federal Line Agencies will ensure completion of 2015-flood damages restoration works related to Irrigation, Drainage & Flood Protection Infrastructure by/before **15th June 2016.** The compliance report would be submitted to FFC soon after completion of the task.

xii. PIDs & FLAs including NHA, Pak Railway will ensure arrangements of explosive and others material at sites of pre-determined breaching sections and stone reserve stock/ flood fighting material to be arranged at all critical reaches of flood embankments as identified during pre-flood inspections before start of Monsoon Season 2016/before **15th June 2016.**

xiii. NHA will ensure installation of flood flow measurement gauge at Benazir Shaheed Bridge near Mithan Kot soon after its completion, which will help PMD and lower riparian in flood estimation.

xiv. NHA will submit updated status of restoration/rehabilitation of 2010-flood damaged vulnerable locations (identified on the directions of Honourable Supreme Court of Pakistan under a separate study carried out by M/S NESPAK) to FFC **within a week's time**.

xv. PMD, FFD, Lahore & WAPDA will carry out all essential repair/ maintenance works of Flood Forecasting and Warning System equipment and ensure that the System /Radars Network is fully functional by/before **15th June 2016**.

xvi. NDMA in consultation with Pak Army, PDMAs/FDMA/GBDMA/ SDMA and DDMAs will ensure completion of all necessary arrangements regarding rescue and relief activities to be carried out in flood emergency during monsoon season 2016.

4.3 Quarterly meeting of FFC held on 17.05.2016 to review status of preparedness of Provinces and Federally Administered Areas for monsoon season 2016 & compliance of directions given by the Honourable Supreme Court of Pakistan

The 3rd quarterly meeting of Federal Flood Commission was organized on 17th May 2016 to review the status of preparedness of the Provinces and Federally Administered Areas for monsoon season 2016 and status of compliance of directions given by the Honourable Supreme Court of Pakistan related to Constitution Petition No. 62 of 2010, filed by Ms Marvi Memon versus Federation of Pakistan, through Secretary Cabinet & others. Following decisions were taken related to flood preparedness of the four Provincial Irrigation Departments and Federal Line Agencies, WAPDA & PMD etc.:

i. **Chief Engineering Advisor/Chairman, FFC** would write D.O Letter to Chief Secretaries of Govt. of the Punjab and Gilgit Baltistan, besides, Secretary, Ministry of communications & Secretary Ministry of Railways, asking for ensuring senior level representation from Irrigation Department, Government of the Punjab, NHA, Pak Railway and GB-PWD in such future meeting of FFC.

ii. **PIDs & Federal Line Agencies including WASA** will submit their reports/documents/replies on legal size papers of green colour having original signatures of concerned officers alongwith CMA forms to FFC/ Ministry of Water & Power for taking further action in the matter.

iii. a) **PIDs & FLAs** will provide complete list of encroachments in flood plains, waterways and settled over irrigation, drainage & flood protection infrastructures. All encroachments, especially those which were constricting waterways and creating hurdle in flood flows would be removed well before the start of monsoon season 2016. The compliance report may be submitted to FFC before **30th June 2016**.

b) Meanwhile, **PIDs & FLAs** would submit complete information to SUPARCO for verification and status report would be submitted to FFC for consideration in next quarterly review meeting of FFC.

c) **Chief Engineering Advisor/Chairman, Federal Flood Commission through PMPIU** would ensure that flood plains inundation maps of major rivers and District-wise submergence (prepared by M/S NESPAK) have been circulated among stakeholders particularly with SUPARCO on their requisite GIS format.

iv. a) **PIDs & FLAs** to carry out exercise on war footing basis. The list of encroachments alongwith requisite information would be submitted to SUPARCO without further delay under intimation to FFC.

b) **SUPARCO** would carry out exercise on priority basis. The status report would be presented in next quarterly review meeting of FFC.

v. **H&WM Wing of WAPDA** will pursue the case with M/o Water & Power for exploring funds availability through PMPIU or other source for repair of damaged stations.

vi. The proposed plan regarding radars network and other flood forecasting & warning system related equipment as recommended in the **PMD** meeting held on 15-12-2015 would be included in the Investment Plan of NFPP-IV.

vii. **PIDs and FLAs** (Irrigation Directorate FATA, GB-PWD & Irrigation Department AJK) will coordinate with their respective Forest Departments for promoting forestation activities, besides, control over deforestation activities in the catchment areas of rivers/hill torrents in order to check land sliding and excessive bed erosion, which would minimize flood damages. The status report would be submitted to FFC before next quarterly review meeting.

viii. a) **PID, Punjab** would make utmost efforts for early installation of planned 120 MW Power Plant at Barrage. The progress on project would be submitted to FFC before next quarterly review meeting.

b) PID, Punjab would take utmost care and strict vigilance in operation of Taunsa Barrages for safe passage of flood flows in future, keeping in mind the non-availability of designated breaching facility at these Barrages.

ix. **WASA Rawalpindi** will organize site visit of Lai Nullah by Experts of IRI, Lahore. The de-silting work (as recommended by experts of IRI) would be carried out before **30th June 2016.**

x. **DCO Rawalpindi** would initiate work on removal of buildings waste, solid garbage and encroachments in waterway of Lai Nullah through RDA, TMA & WASA. The status report would be submitted to FFC before next quarterly review meeting.

4.4 Flood Communication Cell of FFC

The Flood Communication Cell of Federal Flood Commission had started functioning on round-the-clock basis from 15th June 2016 till end monsoon season (15th October 2016) for collection, compilation rainfall, rivers flow data and reservoir water levels and its transmission to concerned agencies at Federal and Provincial Government level on daily basis in normal/low flood stage and 6-hourly basis in case of high flood levels in main rivers. Based on PMD's Weather Forecasts and Advisories, since July 01, 2016, FFC's daily flood/weather situation report through its Flood Communication Cell, was being issued to all concerned agencies on daily basis till end monsoon season (2016).

4.5 51st Annual Meeting of Federal Flood Commission held on 13.07.2016

The 51st Annual Meeting of Federal Flood Commission was held on 13th July 2016 under the Chairmanship of Honourable Federal Minister for Water & Power in the Committee Room of office of CEA/CFFC Islamabad, in order to review the status of preparedness of the Provinces & Federal Line Agencies for Monsoon Season 2016. The following directions were issued to PIDs/ Federal Line Agencies, WAPDA, WASA & PMD etc:

i. **PMD** to closely watch the weather situation during monsoon season 2016. The weather & flood forecast may be further improved. The short range weather & forecast, especially qualitative forecast may be prepared very carefully, so that ample time is available to organizations dealing with emergency situation.

ii. **Chief Engineering Advisor/Chairman, FFC** would write DO letter to Chief Secretaries government of the Punjab, Sindh & Khyber Pakhtunkhwa for removal of encroachments in flood plains/waterways and desilting of local nullahs passing through urban areas (Sialkot, Lahore, Faisalabad, Hyderabad, Karachi, Quetta, Peshawar, Kohat, Mardan Charsadda, Kohat etc.), besides, other emergency remedial measures for safe passage of monsoon season 2016.

iii. **PID, Punjab** to speed up progress on ongoing Minchin Flood Bund project, so as to complete the same before **31st July 2016**. The compliance report would be submitted to FFC for taking further action in the matter.

iv. **PID, Punjab & Sindh** to take emergency remedial measures on war footing basis for protection of Kashmore Garrison from flood flows in Shori nullah during monsoon season 2016. The proposals/PC-Is prepared by PID, Punjab & Sindh for protection of Kashmore Garrison and adjoining area (permanent remedial measures) would be processed on fast track basis for timely approval and implementation before next monsoon season (2017).

v. **PID Punjab & Sindh** to arrange joint meeting immediately in order to review the maintenance issue Mashko flood bund. The outcome of the meeting would be shared with FFC before the next meeting.

vi. **PID, Punjab** to expedite action regarding constitution of Committee to evaluate and check the feasibility of relocating/shifting of breaching section of Chiniot – Sargodha Railway Embankment (2 x sections) as breaching section cannot be operated in its current state as reported by Engineer Directorate, Pak. Army, GHQ Rawalpindi.

vii. **PID, Punjab & Pakistan Railways** in consultation with other concerned organizations would address the long outstanding issue of "Increasing discharge capacity of Shahdara Railway bridge across River Ravi" on top priority basis. Effective contingency plan will be kept in place for safe passage of flood during monsoon season 2016. Meanwhile, comprehensive proposal i.e. long term measures *(based upon model study recommendations)* may also be prepared and processed for approval and implementation.

viii. **PIDs & Federal Line Agencies** to speed up progress on implementation of flood protection schemes taken through Normal/ Emergent Flood Programme under PSDP (2015-16) so as to complete all ongoing flood protection schemes before **31st July 2016.**

ix. **PIDs & Federal Line Agencies** to remain vigilant and ensure patrolling on round the clock basis of flood protection infrastructure, especially vulnerable sections of flood protection infrastructure, Barrages/Headworks and allied structures during monsoon season 2016.

x. **Provincial Irrigation Departments** to ensure that Flood Fighting Plans at Divisional level are in place and necessary arrangements have been made to cope with emergency situation during monsoon season 2016.

xi. **WAPDA's (H&W Wing)** to ensure repair and operationalization of non-functional Flood Telemetry Stations through its own resources so as to get and transmit the requisite data to end users without interruption during current monsoon season. Meanwhile, case may be pursued with Ministry of Water & Power for getting the requisite funds through World Bank funded project (WCAP) for rehabilitation and upgradation of Flood Telemetry Network.

xii. **WAPDA** to closely watch the weather & flood situation and ensure safe routing of likely surplus flood inflows in Tarbela and Mangla reservoirs during the monsoon season 2016 as per existing approved SOPs. Flood flows through Atta Abad Lake may also be monitored by WAPDA in view of likely threat of any GLOF event upstream of the lake.

xiii. **PIDs & concerned Federal Line Agencies** to ensure removal of encroachments from flood plains/waterways causing hindrance in flood flows. The compliance report would be submitted to FFC.

xiv. **PIDs, NHA, Pak Railway** to ensure arrangements of explosive and others flood fighting material at sites of designated breaching sections and stone reserve stock/ flood fighting material at all critical reaches of flood embankments as identified during pre-flood inspections.

xv. **NHA** to ensure installation of flood flow measurement gauge at Benazir Shaheed Bridge near Mithan Kot soon after its completion, which will help PMD and lower riparian in flood estimation.

xvi. **NHA** to submit to FFC the implementation status of 57 proposals (identified on the directions of Honourable Supreme Court of Pakistan under a separate study carried out by the consultants) till completion of task.

xvii. **NDMA** in coordination with PDMAs/FDMA/GBDMA/SDMA to ensure provision of rescue and relief equipment to concerned Corps of Engineers, Pak. Army as highlighted by the representative of Engineer Directorate GHQ Rawalpindi.

xviii. **PCIW** to ensure that all necessary arrangements are in place for obtaining reservoir and rivers flows data and other information from Indian counterpart (ICIW) regarding River Chenab and Eastern Rivers during monsoon season 2016 and its timely transmission to all stakeholders including FFD, Lahore.

xix. **District Coordination Officer Rawalpindi** will ensure removal of encroachments from the waterway/banks and stoppage dumping solid wastes/building material in the banks/bed of Lai Nullah. WASA Rawalpindi to ensure completion of de-silting work in all critical reaches of Lai Nullah before **31st July 2016**.

xx. **PID, Balochistan** to ensure submission of all necessary flood information/rivers flow data to all concerned agencies including FFD, Lahore, on daily basis, during monsoon season 2016.

xxi. **Ministry of Water & Power** to organize the joint meeting of Planning Commission, Finance Division, FFC and other stakeholders for review the issue related to meager budget allocation for Normal/Emergent Flood Programme under PSDP (2016-17) and discontinued monitoring arrangements of FFC through Normal/Emergent Flood Program.

xxii. **Ministry of Water & Power/FFC** to arrange special meeting of all concerned organizations at Federal & Provincial government level on Watershed Management issue in order to chalk out possible measures & exploring funds availability for implementation of proposed interventions.

xxiii. **PMD** to carefully watch and determine the validity/reliability of data provided by India through its own Radar Network and other Flood Forecasting &Warning System facilities, while using the same for flood management operation in the country.

xxiv. All concerned organizations to ensure appropriate level representation in FFC's future meetings. Representative of GB-PWD was not present in the meeting.

xxv. Next meeting of FFC would be held in **first week of August 2016** to review the progress on the above listed decisions and flood situation in country. Representative of Climate Change Division, Islamabad would also be invited in FFC's future meetings

4.6 Follow up Meeting on decisions of 51st Annual Meeting of Federal Flood Commission, held on 16.08.2016

A follow up meeting of FFC was held on 16th August 2016 under the Chairmanship of the Honourable Federal Minister for Water & Power in Ministry of Water & Power, Islamabad to review progress on decisions taken during 51st Annual meeting of FFC held

on 13th July 2016 besides prevailing flood situation in the country. The following directions were issued to PIDs/ Federal Line Agencies, WAPDA & PMD etc.:

i. **FFC** to submit proposal for establishment of flash floods early warning system on Sialkot nullahs (tributaries of River Chenab) like the one installed in Lai nullah Basin to Ministry of Water & Power for onward submission to Economic Affairs Division for exploring financial assistance through foreign donor agencies.

ii. The **Team of FFC** to jointly visit the Lai Nullah along with DCO Rawalpindi and representatives from concerned Corps of Engineers, Pak Army, WASA, TMA and Cantonment Boards Chaklala & Rawalpindi in order to check the encroachments in Lai nullah waterway and submit report to Ministry of Water & Power for taking further action in the matter.

iii. **Ministry of Water & Power** to arrange meeting for reviewing the modified draft NFPP-IV and chalk out measures for approval and implementation.

iv. **PID, Punjab** to accelerate the progress on execution of "Minchin Flood Bund project", so as to complete the same within the target period ***(before 15th September 2016)*** as agreed during the meeting. The progress on job may be submitted to FFC on weekly basis till completion of the task.

v. **PID, Punjab to** expedite action on preparation of PC-I of project "Protection of Kashmore Garrison and adjoining area from flood flows of Shori nullah", so as to approve and execute the same well before the start of next monsoon season (2017).

vi. **PID, Punjab** to prepare proposal for strengthening/raising Jhelum Flood Protection Bund and process the same on fast track basis for approval and implementation through Provincial resources before start of next monsoon season (2017).

vii. **PID, Punjab** to expedite action on conducting model study of Munawar Tawi and preparation of proposal for consideration under NFPP-IV.

viii. **PID, Punjab** to expedite action on evaluation and checking the feasibility of relocating of breaching section of Chiniot – Sargodha Railway Embankment (2 x sections). The progress on the task would be shared with FFC & Pak. Army on regular basis till completion of feasibility study.

ix. **PID Punjab & Sindh** to arrange joint site visit of Mashka Flood Bund in consultation with FFC and have a meeting immediately in order to review the maintenance issue of Mashko Flood Bund. The outcome of the visit & meeting must be shared with FFC.

x. **PIDs & Federal Line Agencies** to remain vigilant and keep all necessary arrangements in place for safe passage of flood flows during monsoon season 2016, besides to ensure removal of encroachments from flood plains/waterways causing hindrance in flood flows.

xi. **PDMAs/FDMA/GBDMA/SDMA** to provide rescue & relief equipment to concerned Corps of Engineer at the earliest under intimation to NDMA & FFC for smooth relief & rescue operation during monsoon season.

xii. **PID, Punjab & Pakistan Railways** to address the long outstanding issue of "Increasing discharge capacity of Shahdara Railway bridge across River Ravi" on top priority basis in consultation with other concerned organizations. The comprehensive proposal i.e. long term measures *(based upon model study recommendations)* may submit to FFC without further delay for approval of concerned forum. Meanwhile, effective contingency plan be kept in place for safe passage of monsoon season 2016.

xiii. **WAPDA's (H&W Wing)** to pursue the matter with Ministry of Water Power/PMPIU for getting the requisite funds through World Bank funded project (WCAP) for rehabilitation and up-gradation the damaged/out of order Flood Telemetry Stations. Meanwhile, efforts be made to get and transmit the rainfall & rivers flow data of out of order stations to FFD, Lahore through other source during current monsoon season.

xiv. **WAPDA** to expedite action regarding revisiting the existing SOPs of Tarbela Dam Project in order to enhance its role in flood mitigation. For that purpose, a meeting may be arranged immediately after monsoon season 2016 is over.

xv. **PIDs & Federal Line Agencies** to expedite the implementation of flood protection schemes taken up under Normal/Emergent Flood Programme to ensure their completion within the target period. The completion reports of schemes may be submitted to FFC well in time.

4.7 Follow up Meeting of FFC held on 10.11.2016 to review the Watershed Management issues and chalk out possible measures

The follow up meeting of FFC was held on 10th November 2016 under the Chairmanship of Chief Engineering Advisor/Chairman Federal Flood Commission in the Committee Room of office of CEA/CFFC, Islamabad in order to review the Watershed Management issues besides, exploring sources of funding for implementation of proposed interventions in the country. The following decisions were taken during the meeting;

i. Following draft TORs of the proposed study titled "*Formulation of National Watershed Management Plan*" were formulated during the meeting and circulated alongwith the minutes of meeting among all concerned organizations;

   a. To identify the existing as well as emerging problems/issues related to watershed management across the country including the Watershed Management of private lands.

   b. To identify the stakeholders & their role in Watershed Management.

   c. To review Watershed Management related projects carried out so far, in progress & future planned by the various organizations in the four provinces & Federally Administered Areas including AJ&K.

   d. To develop a Base Line to access health of all Watersheds in Pakistan.

   e. To identify the critical Watersheds after analyzing the existing & emerging issues.

f. To suggest remedial measures and formulate National Watershed Management Plan (NWMP) on countrywide basis giving priority to the critical area.

g. To explore/suggest various sustainable sources for funding for implementation of national watershed management plan.

h. To assist the concerned organizations and client while processing of the proposed plan at various fora till approval by the Government of Pakistan.

Irrigation & Forest Departments of the four Provinces & Federal Line Agencies i.e. WAPDA, PMD, PCIW, NHA, Pak Railway, NDMA & IRSA etc. to submit to FFC their views/comments on the draft TORs within next two (2) weeks.

ii. The Provincial Irrigation & Forest Department of each province, besides Federal Line Agencies would nominate focal person for establishment of Working Group, who will interact/coordinate with FFC and Working Group in all future matters till formulation of National Watershed Management Plan. The nomination would be submitted to FFC before next meeting.

iii. WAPDA will nominate three officers (one each from Mangla & Tarbela Dam Projects including WAPDA House Lahore) whereas other concerned agencies like PMD, PCIW, NHA, Pak Railway, NDMA & IRSA would nominate their focal persons to brief the forum and coordinate all activities regarding formulation of National Watershed Management Plan.

iv. FFC to arrange next meeting in 1st week of December 2016 for review of the views/comments on draft TORs received from stakeholders and finalize the draft TORs of the study titled *"Formulation of National Watershed Management Plan"*.

4.8 Post Flood Meeting of FFC held on 24.11.2016

The Post Flood meeting of Federal Flood Commission was held on November 24, 2016 in office of the Chief Engineering Advisor/ Chairman Federal Flood Commission, Islamabad under the Chairmanship of Chief Engineering Advisor/ Chairman FFC, Islamabad in order to review the damages caused to irrigation, drainage and flood protection infrastructure due to 2016 rains/floods. The following major directions were also issued to PIDs/ Federal Line Agencies, WAPDA & PMD for improving the flood management during monsoon season 2017.

i. **PIDs & Federal Line Agencies** to complete all ongoing flood protection works being executed through Public Sector Development Programme (PSDP) and Provincial Annual Development Programme well before the start of monsoon season 2017.

ii. **PIDs & Federal Line Agencies** to process the flood protection schemes taken up under PSDP (2016-17) on fast track basis so that all proposed schemes could be approved at the earliest and implemented before start of monsoon season 2017.

iii. **PIDs & Federal Line Agencies** to rehabilitate the Irrigation, Drainage & Flood Protection Infrastructure damaged during previous floods including 2016 floods on war footing basis. The urgent nature O&M Civil & E/M works of Barrages/Headworks may also be carried out well before start of monsoon season 2017.

iv. **PIDs & Federal Line Agencies** to carry out fresh field survey and identify encroachments in flood plains & waterways of major & other rivers including hill torrents and drains network, besides, settlement on flood protection structures in the light of Flood Plain Maps prepared by FFC through consultants (M/s NESPAK) and circulated among all concerned organizations in May 2016. Efforts would be made to ensure removal of encroachment well before the start of Monsoon Season 2017. The detailed reports in that respect would be submitted to SUPARCO for further verification.

v. **PID, Punjab** to ensure the completion of strengthening works of "Minchin Flood Bund", "Mashko Flood Bund" & Jhelum Flood Protection Bund through Provincial resources well before the start of monsoon season 2017.

vi. **PID, Punjab** to expedite action on conducting model study of Munawar Tawi and preparation of a comprehensive project proposal in close coordination with concerned Corps of Engineers, GHQ Rawalpindi and other concerned organizations. The progress on the task would be shared with FFC on regular basis till completion of model study/feasibility study.

vii. **PID, Punjab** to expedite action on evaluation and checking the feasibility of relocating of breaching section of Chiniot – Sargodha Railway Embankment (2 x sections) in coordination with Pak. Railways and concerned Corps of Engineer, GHQ Rawalpindi. The progress on the job would be shared with FFC on regular basis till completion of the task.

viii. **PID, Punjab** to coordinate with concerned Corps of Engineers/Engineer Directorate, GHQ Rawalpindi in order to determine the viability of their project proposal titled "Protection of Kashmore Garrison and adjoining area from flood flows of Shori nullah", in line with the ongoing scheme titled "Construction of flood protective bund around Kashmore Cantt. Mile O/o to 5/5+300" costing Rs 111.373 million" already taken up by PID Sindh. The outcome of the case may be intimated by PID Punjab to FFC.

ix. **PID, Punjab** {Chief Engineer (Irrigation), Lahore Zone} to arrange special meeting of all concerned organizations including concerned Corps of Engineers of Pak Army in order to review the long outstanding issue of "Enhancing the discharge capacity of Shahdara Railway Bridge across River Ravi" in order to find a viable & implementable solution (socially, environmentally & politically acceptable proposal). Thereafter, PC-I may be prepared by PID Punjab in consultation with concerned organizations and process the same on priority basis for approval and funding arrangements. Meanwhile, action on appropriate pre-emptive/short term measures may be initiated by PID Punjab on war footing basis so that the same may be at place well before the start of monsoon season 2017.

x. **PID, Sindh** to ensure completion of project i.e. "Construction of flood protective bund around Kashmore Cantt. Mile O/o to 5/5+300" costing Rs 111.373 million" being funded through Provincial resources before start of monsoon season 2017.

xi. **PID, Balochistan** to ensure submission of all necessary flood information/rivers flow data to all concerned agencies including FFD, Lahore, on daily basis, during monsoon season 2017.

xii. **WAPDA** to restore the 24 number damaged/out of order Flood Telemetry Stations from its own resources as per decision taken in meeting held recently in Ministry of Water & Power, well before the start of monsoon season 2017. The action on upgradation of entire Flood Telemetry Network through World Bank funded Water Sector Capacity Building & Advisory Services Project (WCAP) may be expedited, so that the task is completed in minimum possible time.

xiii. **WAPDA** to expedite action on revisiting SOPs of Tarbela Dam Project in order to enhance its role in flood mitigation. The task *(preparation of SOPs and their approval from Ministry of Water & Power)* would be completed before 30th June 2017.

xiv. **Pakistan Metrological Department/ FFD, Lahore** will carry out all essential O&M works of Flood Forecasting and Warning System equipment & Radar network, well in time and ensure that System is fully functional before start of monsoon season 2017.

xv. **Pakistan Metrological Department/FFD, Lahore** to coordinate with PID, Punjab and other concerned organizations regarding proposal for establishment of flash floods early warning system on Sialkot nullahs (tributaries of River Chenab) on top priority basis. The status report will be shared with FFC for taking further action in the matter.

xvi. **National Highway Authority (NHA)** to take necessary measures regarding raising of flood embankments on upstream side, which were essential to counter the afflux of water, which was likely to be experienced in coming monsoon seasons due to construction of bridge.

xvii. **NHA** to share the updated implementation status of 57 vulnerable sites (identified on the directions of Honourable Supreme Court of Pakistan under a separate study) with FFC on monthly basis till completion of task.

xviii. **PCIW** may continue its efforts on making necessary arrangements with Indian Counterpart for obtaining discharges of Eastern Rivers and Chenab River flood flow data at Salal HEP, 56 KM upstream of Akhnoor bridge across Chenab River, besides inflows & levels of reservoirs across Eastern rivers i.e. Bhakra, Pong & Thein Dam Projects and its transmission to end users (FFC, PMD/FFD, Lahore, WAPDA, NDMA & PDMAs) during Monsoon Season 2017.

xix. **FFC** to arrange follow up meeting during the 4th week of December 2016 in order to review the necessary steps taken by City District Government Rawalpindi & associated TMAs/Cantonment Boards regarding removal of encroachments and restricting further encroachments, besides, stoppage dumping solid wastes/garbage & building material in bed of Lai Nullah.

xx. **WASA Rawalpindi** to initiate actions on short & long term measures including desilting work of constricted sections of Lai Nullah, for smooth passage of flood flows during the next monsoon season 2017.

xxi. **FFC** to organize the joint meeting of Planning Commission, Finance Division, FFC and other stakeholders (PIDs & FLAs) for review the issues related to slow progress regarding implementation of Normal/Emergent Flood Programme of PSDP and chalk out viable mechanism for smooth implementation of Normal/ Emergent Flood Programme.

xxii. **PDMAs/FDMA/GBDMA/SDMA** to ensure that demands of Pak Army regarding rescue & relief equipment for concerned Corps of Engineers, have been met before start of monsoon season 2017 for smooth relief & rescue operation during the monsoon season.

xxiii. **PIDs, NHA and Pak. Railways** to coordinate with concerned Corps of Engineers of Pak. Army and initiate action on making necessary arrangements of explosive and others flood fighting material at sites of pre-determined breaching sections well before the start of monsoon season 2017.

4.9 Special meeting of FFC to review the draft TORs of study titled "Formulation of National Watershed Management Plan" held on 28.12.2016 in office of CEA/CFFC, Islamabad

A special meeting of FFC was held on 28th December 2016 under the chairmanship of Chief Engineering Advisor/Chairman FFC, Islamabad, to review and finalize the draft TORs of the proposed study titled "Formulation of National Watershed Management Plan". The following decisions were taken during the meeting;

i. TORs of the study, as agreed during the meeting, for the proposed study titled "*Formulation of National Watershed Management Plan*" would be finally reviewed by the Irrigation & Forest Departments of the four Provinces & Federal Line Agencies i.e. WAPDA, PMD, PCIW, NHA, Pak Railway, NDMA & IRSA etc. and comments, if any, would be submitted to FFC within next two (2) weeks.

ii. WAPDA will take the lead role and prepare PC-II for the proposed study regarding formulation of National Watershed Management Plan in the light of TOR finally agreed by the concerned provincial and federal level organizations (Irrigation & Forest Departments of the four Provinces & Federal Line Agencies including PMD, PCIW, NHA, Pak Railway, NDMA & IRSA and WAPDA etc.).

iii. FFC will take up the case with PMPIU/WCAP for seeking possible funding for carrying out the study titled "Formulation of National Watershed Management Plan".

4.10 Other Specific Activities/Initiatives undertaken by Federal Flood Commission to mitigate damages/losses due to 2016-Rains/Floods

The following steps were taken by Federal Flood Commission for safe and smooth passage of Monsoon Season 2016:

i. FFC wrote D.O. letters to Chief Secretaries of the Provincial Governments & Federally Administered Areas (Gilgit-Baltistan & AJ&K) including ACS (Development), FATA on 14th March 2016 advising for immediate allocation & release of adequate O&M funds for repair and rehabilitation/strengthening of Irrigation, Drainage & Flood Protection Infrastructure so that all necessary O&M works and flood preparedness activities may be completed at all vulnerable sites before 15th June 2016.

ii. Federal Flood Commission organized a meeting on February 17, 2016 to review existing SOPs of Tarbela Dam Project for enhancing its role in flood management.

iii. A follow up meeting of FFC was held on April 06, 2016 to review progress on decisions of Post-Flood Conference of Pak. Army held on 22nd December 2015 in Engineer Directorate, GHQ Rawalpindi.

iv. Work on long-term measures for increasing the discharge capacity of Shahdara Railway Bridge on River Ravi has been initiated. The long-term measures (designing/approval & implementation) would take enough time. Hence, PID, Punjab was advised to take necessary precautionary measures for safe passage of monsoon season 2016.

v. Country-wide monitoring of flood works was conducted by Federal Flood Commission (FFC), during Financial Year (2015-16), despite limited manpower and logistic support.

vi. PCIW was advised for making all necessary arrangements for obtaining river flow data of "Eastern Rivers i.e. Ravi, Sutlej & Bias" from Indian counterpart and its dissemination well in time to all concerned organizations for taking further action at their end during Monsoon Season-2016.

vii. PIDs & Federal Line Agencies were directed to complete their urgent nature flood protection schemes taken up under PSDP (2014-15) & PSDP (2015-16) by/before 30th June 2016.

viii. PID, Punjab & FLAs were advised to ensure that encroachments in the escape routes/channels/flood protection infrastructure were removed with the help of District Administration.

ix. NHA & Pak. Railway were directed to open the choked sections of the bridges so as to restore their discharge/flood flow carrying capacity before start of monsoon season 2016.

x. FFC collaborated with WASA Rawalpindi to ensure that de-silting work in critical reaches (in Rawalpindi City) was completed by WASA Rawalpindi prior to start of Monsoon Season 2016.

FLOODS-2016

5. MONSOON/FLOOD SEASON 2016

5.1 Seasonal Rainfall Forecast for Monsoon Season 2016 issued by PMD

Pakistan Meteorological Department (PMD) issued the following seasonal forecasts for Monsoon Season 2016.

5.1.1 Preliminary Monsoon 2016 Outlook for Pakistan

Pakistan Meteorological Department (PMD) issued the preliminary seasonal forecast on June 09, 2016 for Monsoon Season 2016, which is described below;

> "The El Niño phenomenon has weakened and La Niña is favored to develop during the summer 2016. Prevailing oceanic and atmospheric conditions are giving indications of good summer monsoon rainfall in the country. Based on statistical and dynamical downscaling of global circulation models, outlook for the season is prepared at 80% confidence level for planning purposes. The outlook for the season (July-September) 2016 is as under;
>
> i. Summer monsoon rainfall is likely to be 10-20% above normal over the country, averaged for three months (July-September 2016).
>
> ii. More than average rainfall is expected over Punjab, KP, Sindh, AJK and Northeastern Balochistan.
>
> iii. Some extreme rainfall events are likely to occur in the catchment areas of major rivers and other parts of the country which may cause Floods.
>
> iv. There is a high probability of heavy downpour which may generate Flash Flooding along Suleiman Range.
>
> v. Some heavy downpour events may produce urban flooding in big cities.
>
> vi. Some strong incursions of monsoon currents, coupled with high temperature, may trigger Glacial Lake Outburst Floods (GLOF), Landslides and Flash Floods in Upper KP and G-B.

PMD also intimated that outlook is based upon recent data. Keeping in view the changing behavior of different Meteorological parameters, the outlook will be updated on monthly basis i. e. first week of each month.

5.1.2 Update on Seasonal Forecast of Monsoon Season 2016

Pakistan Meteorological Department (PMD) issued its monthly update on seasonal forecast of the Monsoon Season 2016 on July 04, 2016, which is described below;

> "Prevailing atmospheric and ocean conditions confirm the above normal rainfalls in summer monsoon 2016. Therefore, there is no change in the seasonal outlook issued in June 2016".

5.2 Floods/Rains during Monsoon Season 2016

Moderate to heavy rainfall and windstorms causing floods, affected various parts of the country i.e. Punjab, Khyber Pakhtunkhwa and Balochistan including some parts of Sindh,

Gilgit-Baltistan, FATA and AJ&K during monsoon season 2016. The Ursoon village of Chitral valley in Khyber Pakhtunkhwa and adjoining areas were badly affected due to flash flood flows generated as a result of torrential rains and glacier melting/GLOFs. The village abadies, roads, bridges, drinking water supply systems, public/private property and agricultural crops were badly affected in different parts of the province.

Torrential rains/ floods affected Quetta, Sohbatpur, Harnai, Jhalmagsi, Sibbi and Lasbela Districts in Balochistan. The flood water generated from surrounding mountains caused flooding in Sindh province's Gaj Nai in District Dadu. The village abadies in Districts Sialkot & Narowal were inundated due to floods in local nullahs i.e. Palku, Deg and Aik. Heavy rain-induced flood and landslides blocked the roads and disrupted the life of people in different parts of Gilgit-Baltistan and Azad Jammu & Kashmir (AJ&K).

According to PMD, rainfall over the country was moderately above normal (+25%) during the period {July -September 2016}. Country wide rainfall was slightly above to its normal value (+10%) during the month of September. Rainfall was largely in excess across much of the country during the month of August whereas in July, the country experienced slightly deficient rainfall.

During the month of July 2016, rainfall over the country as whole was slightly below to its normal value (-14 %). On regional scale, the rainfall amounts had shown a mixed pattern with above normal over Punjab & Khyber Pakhtunkhwa and close to normal over G-B whereas slightly below normal over AJ&K but largely deficient over Balochistan & Sindh. Coastal areas of Balochistan and eastern parts of Sindh received no or very little rainfall in the whole month.

During the month of August 2016, rainfall over the country as whole was largely above normal (+76). On regional scale, the rainfall amount was generally in excess across much of the country except Balochistan and AJ&K where it was close to normal and below normal respectively.

Area weighted rainfall for the months of July & August 2016 is given in **Table-5**:

TABLE 5

Area weighted Rainfall (July & August 2016) source

Sr. No.	Province/ Region	Actual observed Value (mm)		Normal Value (mm)		Variation/ Departure (%)	
		August	July	August	July	August	July
1.	Punjab	192.7	119.2	93.3	104.0	107 %	15
2.	Sindh	133.7	1.6	53.6	60.2	149 %	97
3.	Khyber Pakhtunkhwa	183.4	146.1	117.6	121.7	56 %	20
4.	Balochistan	2.4	0.4	23.8	17.6	6 %	-41
5.	Gilgit-Baltistan	20.9	14.8	17.1	14.0	23 %	6
6.	AJ&K	97.1	110.6	114.1	129.9	-15 %	-15
Pakistan (As a whole)		**98.9**	**54.3**	**56.2**	**63.3**	**76 %**	**-14 %**

(Source: PMD)

The detail of wettest rainfall stations of July & August 2016 is given in **Table-6** below:

TABLE 6
Wettest rainfall stations of July & August 2016

Serial No.	Station	Actual observed Value (mm)	Normal Value (mm)	Variation/ Departure (%)
August 2016				
1.	Malam Jabba	341 .0	---	---
2.	Lahore city	316.8	168.9	147.9
3.	Mandi Bahuddin	291.1	---	---
4.	Islamabad	265.3	334.7	69.4
5.	Lahore Airport	264.2	174.2	90.0
6.	Sialkot Cantt	262.0	273.5	-11.5
7.	Mangla	256.6	---	---
8.	Balakot	250.5	268.4	-17.9
9.	Kasur	227.4	---	----
10.	Garhi Dupatta	201.8	233.3	-31.5
July 2016				
1.	Gujranwala Cantt	501.3	---	---
2.	Islamabad AP	358.4	285.8	72.6
3.	Kakul	347.5	252.8	94.7
4.	Islamabad HQ	341.9	354.3	-12.4
5.	Sialkot AP	341.5	---	---
6.	Sialkot Cantt	332.8	294.9	37.9
7.	Kotli	305.2	277.6	27.9
8.	Murree	302.5	336.8	-34.3
9.	Kamra	294.8	---	---

(Source: PMD)

River Indus mainly experienced Low Flood situation during the period from July 03 to August 19, 2016 at its various control points. River Kabul experienced Medium Flood at both Warsak & Nowshera on July 04, 2016 whereas it was in Low Flood stage on August 01, 07, 08 and 12, 2016 at one or both of these locations i.e. Warsak & Nowshera.

River Chenab experienced very High Flood in Khanki-Qadirabad Reach on August 07-08, 2016. It experienced High Flood situation at Marala on August 07, 2016. Low Flood was observed in Marala-Khanki & Khanki-Qadirabad Reaches on July 28, 2016 and again in Khanki–Qadirabad Reach on August 09, 2016. River Ravi experienced Low Flood on August 08, 2016 at Shahdara Bridge, whereas, Rivers Jhelum & Sutlej remained Normal during the entire monsoon season 2016.

The flood flows (inflows & outflows) of major rivers at important control structures i.e. Reservoirs & Barrages is attached as **Appendix-II,** whereas rainfall data of monsoon season 2016 is attached as **Appendix-III**. The Escapages below Kotri Barrage during the period {(1976-77) to (2015-16)} is attached as **Appendix-IV**.

5.3 Flood peaks recorded during major historical floods

Highest ever recorded flood peaks during major flood events at various control points of Indus Basin are given in **Table-7**. Flood peaks recorded at important control structures across major rivers during 2016 monsoon season are given in **Table-8**.

TABLE-7

MAJOR FLOOD EVENTS & HISTORIC FLOOD PEAKS RECORDED IN MAJOR RIVERS

Dam/ Barrage Site	Designed Capacity	Highest Recorded		1973 Peak Date	1976 Peak Date	1988 Peak Date	1992 Peak Date	2010 Peak^ Date	2011-Peak^ Date	2012-Peak^ Date	2013-Peak^ Date	2014-Peak^ Date	2015-Peak^ Date	2016-Peak	
		Year	Flow (Cusecs)											Inflow/ Date	Outflow/ Date
Indus River															
Tarbela Reservoir	1,500,000	1929	8,75,000	420,000 July 1973	304,000 3.8.76	556,900 22.7.88	500,000 10.9.92	833,000 30.7.10	272,200 28.6.11	295,000 4.8.12	392,000 14.8.13	299,000 28-7-2014	486,900 26-7-2015	324,000 17-7-2016	302,900 17-7-2016
Jinnah Barrage	950,000	1942	950,000	564,000 20.7.73	862,000 2.8.76	598,000 2.8.88	849,245 10.9.92	937,453 30.7.10	293,900 26.7.11	285,300 18.7.12	479,603 13.8.13	258,000 25-7-2014	532,998 2-8-2015	358,990 5-7-2016	351,490 5-7-2016
Chashma Barrage	950,000	2010	1,036,700	510,000 22.7.73	787,000 3.8.76	580,000 3.8.88	668,000 11.8.92	1,036,700 1.8.10	356,500 28.7.11	298,300 8.7.12	637,482 14.8.13	282,000 17-8-2014	636,512 3-8-2015	396,148 5-7-2016	373,659 5-7-2016
Taunsa Barrage	1,000,000	2010	960,000	568,000 29.7.73	675,000 7.8.76	560,000 21.7.88	655,000 14.9.92	960,000 2.8.10	249,200 31.8.11	243,400 10.9.12	516,017 17.8.13	261,000 30-7-2014	604,714 5-8-2015	369,224 7-7-2016	343,024 7-7-2016
Guddu Barrage	1,100,000	1976	1,199,672	1,084,000 18.8.73	1,199,672 15.8.76	1,163,000 30.7.88	1,087,000 18.9.92	1,148,738* 8.8.10	272,300 3.9.11	236,100 12.9.12	567,418 20.8.13	367,000 18-9-2014	769,872 3-8-2015	325,846 11-7-2016	297,928 11-7-2016
Sukkur Barrage	900,000	1976	1,161,000	1,077,000 21.8.73	1,161,000 16.8.76	1,116,000 30.7.88	1,068,000 20.9.92	1,130,995** 10.8.10	260,800 6.9.11	214,800 14.9.12	510,875 24.8.13	321,000 20.9.2014	709,316 5-8-2015	281,515 17-8-2016	225,205 19-8-2016
Kotri Barrage	875,000	1956	980,000	786,000 Aug 1973	765,000 Aug 1976	649,600 17.8.88	689,300 30.9.92	964,900 27.8.10	261,400 14.9.11	166,000 21.9.12	381,696 30.8.13	145,000 25-9-2014	634,919 15-8-2015	173,048 22-8-2016	138,455 10-8-2016
Jhelum River															
Mangla Reservoir	1,230,000	1929	1,100,000	2,20,000 9.8.73	480,060 3.8.76	425,515 16.7.88	1,030,000 10.9.92	344,400 30.7.10	141,300 16.9.11	1150,00 18.9.12	179,000 13.8.13	634,000 5-9-2014	150,000 12-8-2015	244,000 7-8-2016	62,701 28-8-2016
Rasul Barrage	8,50,000	1929	1,000,000	2,70,000 9.8.73	2,69,000 4.8.76	261,664 17.7.88	952,170 10.9.92	263,796 30.7.10	105,800 17.9.11	42500 4.8.12	43,080 19.8.13	516,000 6-9-2014	110,100 27-7-2015	57,412 30-8-2016	46,562 27-8-2016
Chenab River															
Marala Barrage	1,100,000	1957	1,100,000	770,000 9.8.73	549,000 1.8.76	751,000 25.9.88	845,000 10.9.92	314,378 6.8.10	150,400 16.9.11	183,200 4.8.12	377,290 15.8.13	861,464 6-9-2014	183,431 12-7-2015	412,065 7-8-2016	393,690 7-8-2016
Khanki Barrage	8,50,000	1957	1,066,000	1,000,000 10.8.73	615,000 2.8.76	864,000 26.9.88	910,500 10.9.92	334,437 7.8.10	171,400 17.9.11	194,800 4.8.12	410,331 15.8.13	947,000 7-9-2014	160,000 13-7-2015	418,736 7-8-2016	418,376 7-8-2016
Qadirabad Barrage	8,07,000	1992	9,48,530	854,000 10.8.73	629,000 2.8.76	892,000 26.9.88	948,530 11.9.92	329,483 7.8.10	171,000 17.9.11	194,800 5.8.12	407,803 15.8.13	904,000 7-9-2014	174,100 13-7-2015	416,492 8-8-2016	405,542 8-8-2016
Trimmu Barrage	6,45,000	1959	9,43,000	753,000 12.8.73	706,000 10.8.76	584,000 19.7.88	888,000 14.9.92	328,926 11.8.10	132,900 20.9.11	87,800 7.8.12	272,609 20.8.13	703,000 10-9-2014	150,865 29-7-2015	166,139 10-8-2016	153,339 10-8-2016
Panjnad Headworks	7,00,000	1973	8,03,000	803,000 17.8.73	710,000 12.8.76	507,000 27.7.88	744,152 18.08.92	310,117 13.8.10	151,300 24.9.11	65,600 17.9.12	317,261 28.8.13	454,000 16-9-2014	139,366 30-7-2015	130,829 13-8-2016	116,029 13-8-2016
Ravi River															
Jassar	275,000	1955	6,86,000	228,000 10.8.73	170,000 9.8.76	582,000 25.9.88	149,000 11.9.92	195,000 23.8.10	27,700 19.9.11	30,500 26.8.12	67,700 16.8.13	68,000 7-9-2014	32,350 16-7-2015	38,400 8-8-2016	38,400 8-8-2016
Shahdara	250,000	1988	5,76,000	237,380 11.8.73	170,000 10.8.76	576,000 27.9.88	63,000 12.9.92	41,900 21.8.10	43,000 14.8.11	40,800 22.8.12	74,880 17.8.13	91,000 8-9-2014	30,000 18-7-2015	44,595 8-8-2016	44,595 8-8-2016
Balloki Barrage	2,25,000	1988	3,99,000	2,44,000 13.8.73	234,000 11.8.76	399,000 28.9.88	112,157 13.9.92	69,900 23.8.10	72,100 15.8.11	60,800 23.8.12	117,770 18.8.13	132,000 9-9-2014	67,180 19-7-2015	60,425 9-8-2016	37,165 9-8-2016
Sidhnai Barrage	1,50,000	1988	3,30,000	2,10,000 18.8.73	244,000 15.8.76	330,000 2.10.88	95,500 16.9.92	27,600 28.7.10	30,300 19.8.11	28,600 14.9.12	87,904 23.8.13	86,000 12-9-2014	43,889 28-7-2015	26,175 1-8-2016	12,325 1-8-2016
Sutlej River															
Suleimanki Headworks	3,25,000	1955	5,98,872	177,000 15.8.73	119,000 6.9.76	399,000 30.9.88	197,000 3.9.92	58,300 30.9.10	82,000 29.8.11	21,700 30.8.12	82,370 22.8.13	26,000 7-9-2014	61,421 17-8-2015	32,858 31-8-2016	24,492 30-8-2016
Islam Headworks	3,00,000	1955	4,93,000	166,000 17.8.73	111,000 8.9.76	306,000 4.10.88	183,000 7.9.92	31,500 20.9.10	49,600 3.9.11	14,200 13.9.12	70,932 25.8.13	20,000 8-9-2014	45,479 21-8-2015	13,295 31-8-2016	11,145 31-8-2016

* It does not include flood flows passed through breaches occurred in LMB Guddu Barrage; ** It does not include flood flows passed through breaches occurred in Tori Flood Bund. ^ Based on the Inflows experienced upstream of the Dam/ Barrage site.

TABLE-8

FLOOD PEAKS RECORDED DURING 2016 MONSOON SEASON IN MAJOR RIVERS

RIVER	Structure	Peak Inflow (Cusecs)	Retention Date & Time	Peak Outflow (Cusecs)	Flood Stage (based on outflows)	Retention Date & Time
INDUS	Tarbela	324,000	17-07-2016 @ 1200 hours	302,900	Low Flood	17-07-2016 @ 2359 hours
	Kalabagh	358,990	05-07-2016 @ 1800 hours	351,490	Low Flood	05-07-2016 @ 1800 hours
	Chashma	396,148	05-07-2016 @ 1200 hours	373,659	Low Flood	05-07-2016 @ 0600 hours
	Taunsa	369,224	07-07-2016 @ 1800 hours	343,024	Low Flood	07-07-2016 @ 1800 hours
	Guddu	325,846	11-07-2016 @ 0600 hours	297,928	Low Flood	11-07-2016 @ 0600 hours
	Sukkur	281,515	17-08-2016 @ 0600 hours	225,205	Low Flood	19-08-2016 @ 0600 hours
	Kotri	173,048	22-08-2016 @ 0600 hours	138,455	Normal Flood	10-08-2016 @ 0600 hours
KABUL	Warsak	61,000	18-06-2016 @ 0600 hours	61,000	Medium Flood	18-06-2016 @ 0600 hours
	Nowshera	80,455	04-07-2016 @ 1800 hours	80,455	Medium Flood	04-07-2016 @ 1800 hours
JHELUM	Mangla	244,000	07-08-2016 @ 1300 hours	62,701	Normal	28-08-2016 @ 0600 hours
	Rasul	57,412	30-08-2016 @ 1800 hours	46,562	Normal	27-08-2016 @ 1200 hours
CHENAB	Marala	412,065	07-08-2016 @ 1800 hours	393,690	High Flood	07-08-2016 @ 1800 hours
	Khanki	418,736	07-08-2016 @ 2350 hours	418,736	Very High Flood	07-08-2016 @ 2350 hours
	Qadirabad	416,492	08-08-2016 @ 0300 hours	405,542	Very High Flood	08-08-2016 @ 0300 hours
	Trimmu	166,139	10-08-2016 @ 1800 hours	153,339	Low Flood	10-08-2016 @ 2350 hours
	Panjnad	130,829	13-08-2016 @ 2359 hours	116,029	Normal	13-08-2016 @ 2350 hours
RAVI	Jassar	38,400	08-08-2016 @ 1200 hours	38,400	Normal	08-08-2016 @ 1200 hours
	Shahdara	44,595	08-08-2016 @ 1800 hours	44,595	Low Flood	08-08-2016 @ 1800 hours
	Balloki	60,425	09-08-2016 @ 0600 hours	37,165	Normal	09-08-2016 @ 1200 hours
	Sidhnai	26,175	01-08-2016 @ 0600 hours	12,325	Normal	01-08-2016 @ 0600 hours
SUTLEJ	Suleimanki	32,858	31-08-2016 @ 0600 hours	24,492	Normal	30-08-2016 @ 0600 hours
	Islam	13,295	31-08-2016 @2359 hours	11,145	Normal	31-08-2016 @2359 hours

5.4 Country-Wide Losses/ Damages due to 2016 Rains/ Floods

The rains/floods of 2016 caused damages to private as well as public infrastructure in Punjab, Khyber Pakhtunkhwa, Balochistan and some parts of Sindh & federally administered areas (Gilgit-Baltistan, FATA & AJK) due to torrential rains & flash floods. According to NDMA, the 2016-rains/ floods affected 45 villages, claiming 153 lives, 113 injured and damaging 1452 houses. Province/ region-wise detail of losses/ damages is given in **Table-7**.

TABLE-9

COUNTRY-WIDE LOSSES/ DAMAGES DUE TO RAIN/FLOOD 2016

Province/ Federal Agency	Villages Affected	Cattle Perished	Houses Damaged	Persons Died	Persons Injured
Punjab	29	NR	283	29	NR
Sindh	NR	NR	NR	NR	NR
KP	4	NR	617	69	87
Balochistan	11	40	507	18	23
AJ & K	NR	4	2	6	2
G-B	1	150	42	3	1
FATA	NR	NR	NR	27	NR
Islamabad	NR	NR	1	1	NR
G. TOTAL	**45**	**194**	**1,452**	**153**	**113**

Source: NDMA
NR: Not reported

5.5 Flood Protection Infrastructure damaged during flood season 2016 and planning for Restoration/ Rehabilitation:

No significant damages occurred to flood protection infrastructure in Sindh & Khyber Pakhtunkhwa province including FATA and AJ&K during monsoon season 2016. However, 45 flood protection structures were reportedly damaged in Lahore, Sargodha & D.G Khan Irrigation zones (Punjab province). The rehabilitation cost worked out by PID, Punjab was Rs 566.958 million. The rehabilitation/restoration work carried out by PID, Punjab after flood season 2016 was over.

The flood protection works in Lasbela, Panjgoor, Sibbi, Sabakzai, Lehri area, Bhag Town & Manjuthi area in Balochistan province were affected and restoration cost as worked out by PID, Balochistan was Rs 14.00 million. Similarly, GB-PWD reported flood damages occurred to irrigation channels and flood protection infrastructure in Districts Skardu, Shigar, Karmong and Ghanche with restoration cost estimate of Rs 102 million. Irrigation Department, Government of Balochistan and GB-PWD were advised by FFC to carry out restoration works through their own resources well before start of monsoon season 2017.

APPENDIX-I

LIST OF FLOOD PROTECTION SCHEMES TAKEN UP UNDER NORMAL/ EMERGENT FLOOD PROGRAMME DURNG FINANACIAL YEAR (2015-16) & (2016-17)

STATUS OF FLOOD PROTECTION SCHEMES BEING IMPLEMENTED UNDER NORMAL/EMERGENT FLOOD PROGRAMME (2015-16)

(Rs. in Million)

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
I	**PUNJAB**			
(a)	**ON-GOING/ CARRY FORWARD PREVIOUS YEAR (S)**			
1	Construction of J-Head Spur at RD: 20 +000 and Guide Head Spur at RS: 25+000 Magasson Branch, District Muzaffargarh	590.920 11-4-2014	160.290	47%
2	Protecting Irrigation System near Head Regulator Bakaini, Area of Bait Daryai Gabbar Arrian from hectic erosive action of Indus River (Revised).	532.440 29-10-2015	426.554	92%
3	Construction of J-Head Spur at RD: 15+000 Shehr Sultan Flood Bund (Revised)	179.392 26-12-2013	176.718	100%
4	Construction of spurs on bank of Indus River at Kalur Kot Mallana, Noor Dogar Umarwali Sharif, District Bhakkar	155.656 21-3-2012	111.506	100%
5	Checking erosion on right bank of river Chenab to protect Bhekho Outfall Drain and Agriculture land of Miana Hazzara.	42.499 17-05-2012	37.193	100%
6	Protecting Agricultural land and village abadies of Pakhwal and Tawakal Pakhwal from erosion on Right bank of River Jhelum, District Jhelum	29.246 17-05-2012	30.690	100%
7	Checking Erosive Action of Chenab river of Left Bank near gangwal, Papin Village u/s Marala Barrage	171.613 31-03-2015	138.594	90%
	Sub Total (i)	**1,701.766**	**1,081.545**	
I (b)	**NEW SCHEMES (2015-16)**			
8	Restoration of J-Head Spur at RD-165+000 of Link No. 1	246.980 20-05-2016	Nil	30%
9	Restoration of J-Head Spur at RD-167+000 of Link No. 1	144.950 20-05-2016	Nil	75%
	Sub Total (ii)	**391.930**	**0.00**	
	Punjab Total (i & ii)	**2,093.696**	**1,081.545**	
II	**SINDH**			
(a)	**ON-GOING/ CARRY FORWARD PREVIOUS YEAR (S)**			
1	Raising/strengthening, providing stone pitching along F.P bund RD 169 to 263.5 & RD 502 to 120, District Kambar, Shahdad Kot, Larkana, Dadu, Jamshoro	492.236 1-3-2008	281.693	90%
2	Raising/strengthening providing stone pitching along Suprio bund RD 0 to 95 District Kambar, Shahdad Kot, Larkana, Dadu, Jamshoro	253.181 12-1-2008	238.044	100%
3	Extension of stone apron & pitching along K.K bund mile 11/3 to 12/4 and recoupment of damage stone apron and pitching from mile 10/7+500 to 11/1+110 District Kashmore	234.549 30-4-2009	221.378	80%
4	Rehabilitation of Short/Spur Stud along Sukkur Begari Bund mile 0/0 to 0/3 Vulnerable Point	54.987 8-4-2014	60.429	100%
5	Providing stone pitching along Qadirpur Bund mile from 10/4 to 12/4	44.667 8-4-2014	51.216	100%
6	Constructing stone pitching along K.K Link Bund Mile 0/0 to 0/4 and Restoration of stone apron mile 1/1+110 to 1/2 + 220.	38.678 7-3-2014	43.922	100%
7	R&S along U/S Right Marginal bund from mile 0/0 to 5/4 & U/S Right spur Bund mile 0/0 to 3/0	57.029 13-03-2015	57.522	100%
	Sub Total (i)	**1,175.327**	**954.204**	

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
(b)	**NEW SCHEMES (2015-16)**			
8	Providing Stone Pitching and Stone Apron along Sukkur Begari Bund mile 0/3 to 2/0 Vulnerable Point City.	127.084 21-12-2015	127.574	100%
9	Providing Stone Apron along Qadirpur Loop Bund mile 4/6 to 5/0.	32.274 07-01-2016	14.225	90%
10	Providing Stone Pitching along Baiji Bund from mile 2/4 to 3/4 and 7/4 to 8/4.	58.423 07-01-2016	39.678	99%
11	Closing breach mile 1/1 to 2/6 Qadirpur Shank Bund, Shank project mile 0/0 to 0/3, Raising & Strengthening mile 0/0 to 1/2 Qadirpur Bund, Qadirpur Shank Bund mile 1/7 2/6 Qadirpur Shank Bund and Shank Projection mile 0/0 to 0/3 R/S (Breach Portion).	259.112 11/2/2016	92.230	75%
12	Construction of Stone Pitching, Stone Apron & Earth Work along SM Bund mile 4/0 to 4/2 in Rohri Division Kandiaro.	59.737 04-05-2016	64.455	100%
	Sub-Total (ii)	**536.630**	**338.162**	
	Sindh Total (i & ii)	**1,711.957**	**1,292.366**	
III	**KHYBER PAKHTUNKHWA (KP)**			
(a)	**ON-GOING/ CARRY FORWARD PREVIOUS YEAR (S)**			
1	Construction of flood protection structure at critical locations in different Nullahs in District Peshawar and Nowshera	30.000 13-03-2015	30.530	100%
2	Construction of flood protection structures at critical locations in District Charsadda.	7.000 13-03-2015	7.373	100%
3	Construction of flood protection structures at critical locations in different Nullahs in District Swat.	19.868 04-05-2015	11.270	75%
4	Construction of flood protection structures at critical locations in different Nullahs in District Abbottabad and Mansehra.	10.000 04-05-2015	8.564	68%
5	Construction of flood protection structures at critical locations in different Nullahs in District Kohat & Karak.	9.630 13-03-2015	6.900	100%
6	Construction of flood protection structures at critical locations in different Nullahs in District Bannu & Lakki Marwat.	12.500 04-05-2015	12.500	100%
7	Construction of Flood Protection Structure at village Kala on Badri Nullah District Swabi.	6.106 13-03-2015	6.106	95%
8	Construction of flood protection schemes for the protection of Dheri Village Distt. Malakand on Dheri Julagram Nullah (Revised)	10.840 13-03-2015	8.089	100%
	Sub-Total (i)	**105.944**	**91.332**	
(b)	**NEW SCHEMES (2015-16)**			
9	Improvement of marginal Bund from RD:55+000 to 85+000 in reaches District D.I. Khan	10.000	Nil	Deferred. Routine maintenance work
10	Construction of Flood Protection Bund for protection of village Yarik in Takwara nullah district D.I. Khan	20.820 03.02.2017	Nil	Tendering stage
11	Providing flood protection works in Kurram River District Bannu	10.000 12-05-2016	5.564	80%
12	Providing flood protection works in different Nullahs, District Lakki Marwat	16.000 12-05-2016	1.623	70%
13	Construction of flood protection works for protection of village abadies and agriculture land on Pir Khel Totakan Khawar	6.000 12-05-2016	3.938	80%

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
14	Extension of existing flood protection work on left bank of Kalpani Nullah to protect village abadies and agriculture land and lift Irrigation schemes near Mayar Village, District Mardan	7.000 3.2.2017	Nil	Tendering stage
15	Extension of existing flood protection work for the protection work of agriculture land & graveyard in Tour area, District Mardan	7.000 12-05-2016	5.764	95%
16	Construction of flood protection works in Jughore Kuru and Shoghore, District Chitral	9.952 3.2.2017	Nil	Tendering stage
17	Construction of flood protection works along Siran River near Malik Pur village, District Manshera, Haro River Check Kamal Pur U/C Hattar District Haripur and Indus River (left side) village Jammu Ghazi Area, District Haripur.	7.000 12-05-2016	2.609	50%
18	Construction of flood protection work at Sawal Dher Bakrai Khpa, District Mardan	7.000 3.2.2017	Nil	Tendering stage
19	Construction of flood protection wall along Punjpir Madarassa & village on left Bank of Badri Nullah, District Swabi	7.000 12-05-2016	4.100	95%
20	Providing flood protection works in different Nullahs in District Dir (Lower)	10.000 12-05-2016	3.173	35%
	Sub-Total (ii)	**117.772**	**26.771**	
	KP Total (i & ii)	**223.716**	**118.103**	
IV	**BALOCHISTAN**			
(a)	**ON-GOING/ CARRY FORWARD PREVIOUS YEAR (S)**			
SOUTH ZONE				
1	Flood Protection Bund of Shahool at Mouza Drazi Dureji area Hub River, Lasbela	2.500 13-03-2015	2.500	100%
2	Flood Protection Bund along Nehaar River okri area for Agriculturual Lands and Abadies of village Haji Ali Bakhsh Shahwani, Lasbela	2.000 13-03-2015	2.000	100%
3	Flood Protection Bund along Kundi Wari Dhora Tehsil Hub of Agricultural Lands, Lasbela	2.000 13-03-2015	2.000	100%
4	Flood Protection Wall Mastung Town.	2.500 13-03-2015	2.500	100%
5	Flood Protection Bund, Sing Sulahi, Kalat	2.500 13-03-2015	2.500	100%
6	Flood Protection Bund Kheson Don, Kalat	2.500 13-03-2015	2.500	100%
7	Flood Protection Bund for Agriculture Lands of Mir Mohammad Ayoub and others Allah Dumb area Nal, Khuzdar	2.000 13-03-2015	2.000	100%
8	Flood Protection Bund for Agriculture Lands of Kundi Umrani village Tehsil Jhao, Awaran	2.000 13-03-2015	1.164	100%
9	Flood Protection Bund Kharan Town along Kullan River, Kharan	2.500 13-03-2015	2.500	100%
10	Construction of Flood Protection Mirani Kaur Jusak, Kech	2.000 13-03-2015	2.000	100%
11	Flood Protection works of Agricultural Lands of Killi Aslam Mehnaz, Bit Buleda, Kech	1.987 13-03-2015	1.987	100%
12	Flood Protection Bund at Killi Haji Muhammad Azim Sabrap, Panjgor	2.000 13-03-2015	2.000	100%
13	Flood Protection Wall (Killi Kareem Jan) old Poultry Farm Chitkan, Panjgor	2.500 13-03-2015	2.500	100%

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
14	Flood Protection of water Supply scheme Ormara Town and Navy Base, Gawadar	5.000 13-03-2015	4.792	100%
	(South Zone) Sub Total (i)	**33.987**	**32.943**	
b	**NORTH ZONE**			
15	PC-I/Estimate for	**3.000**		
i.	Flood Protection of Zinda Pir area village Haji Hussain (Cost Rs 2.00 million)	13-03-2015	2.000	100%
ii.	Flood Protection wall Khudaidad and other Khost area, District Haranai (Court Case) (Cost Rs 1.000 million)	13-03-2015	1.000	100%
16	PC-I/Estimate for	**8.500**		
i.	Flood Protection of PCC Wall Meharbzai Nooruddin Bazai Aghberg Area, Quetta (Cost Rs 2.000 million)	13-03-2015	2.000	100%
ii.	Flood Protection Bund/wall at Hazara Town (Cost Rs 2.000 million)	13-03-2015	2.000	100%
iii.	Flood Protection of Agricultural land and grave yard Nohisar area, Quetta (Cost Rs 2.500 million)	13-03-2015	2.500	100%
iv.	Flood Protection of Mashwani Town Punjpai, Quetta (Cost Rs 2.000 million)	13-03-2015	2.000	100%
17	Constrcution of 1 No. Spur for Flood Protection of Trehar Village, District Sibi	2.000 13-03-2015	NIL	100%
18	PC-I/Estimate for	**4.000**		
i.	Flood Protection Bund Kachhi Khachar Gurgoi Druq, Musa Khel (Cost Rs 2.00 million)	13-03-2015	2.000	100%
ii.	Flood Protection Bund for Killi Sardar Raza Khan Musakhail, Musa Khel (Cost Rs 2.00 million)	13-03-2015	2.000	100%
19	Flood Protection Work of Chotair area Ziarat Vill. & Orchards Malik Lal Mohammad & Malik Lal Gul, Ziarat	2.000 13-03-2015	2.000	100%
20	Flood Protection for Agricultural Land and houses Killi Yaqoob Karez Suri Mehterzai area District Killa Saifullah	2.000 13-03-2015	2.000	100%
21	PC-I/Estimate for	**8.000**		
i.	Flood Protection Works of Killi Nill Ahmed Khan Bostan Pishin (Cost Rs 2.00 million)	13-03-2015	2.000	100%
ii.	Flood Protection of Lands /Orchards of Haji Abdul Hameed Bazai Koze Kach Rud Mulazai, Pishin (Cost Rs 2.00 million)	13-03-2015	2.000	100%
iii.	Flood Protection Scheme of Lands/Orchards for Haji Ghulam Murtaza Mara Jalazai Toba Achakzai, Killa Abdullah (Cost Rs 2.00 million)	13-03-2015	2.000	100%
iv.	Flood Protection of Lands of Machka Manda, District Killa Abdullah (Cost Rs 2.00 million)	13-03-2015	2.000	100%
22	Flood Protection of Kohlu Town at Various Location	2.000 13-03-2015	2.000	100%
23	Construction of 02 Nos. Flood Protection schemes in District Zhob	2.500 13-03-2015	2.500	100%
	(North Zone) Sub Total (ii) :	**34.000**	**32.000**	
	Total (i & ii)	**67.987**	**64.943**	
(b)	**NEW SCHEMES (2015-16)**			
NORTH ZONE				
1	Construction of flood protection wall Killi Noroz Khan and others **(District Kohlu)**	1.500 12-05-2016	1.500	100%
2	Umbrella PC-I for:	**2.000**	**1.120**	
i	Construction of flood protection wall killi Mohibullah Khan Matyan Malik Gul Jan & others Drug area **(District Musakhail)** (Cost Rs 1.00 million)	12-05-2016	1.120	75%

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
ii	Construction of flood protection wall for Mohammad Siddiq Khan Drug Musakhel **(District Musakhail)** (Cost Rs 1.00 million)	12-05-2016	0.000	Nil
3	Umbrella PC-I for:	**3.500**	**2.000**	
i	Construction of flood protection wall for Tayyab Shah Killi Shakan **(District Harnai)** (Cost Rs 1.00 million)	12-05-2016	1.000	26%
ii	Construction of flood protection wall of Killi Dargai Zardloo Area **(District Harnai)** (Cost Rs 1.00 million)	12-05-2016	1.000	32%
iii	Construction of protection wall for the Khost Bazar **(District Harnai)** (Cost Rs 1.500 million)	12-05-2016	0.000	22%
4	Construction of flood protection Bund Maree Sui Area **(District Dera Bugti)**	1.500 12-05-2016	0.000	10%
5	Umbrella PC-I for:	**3.000**	**1.000**	
i	Construction of flood protection wall for agriculture land of Haji Abdul Raheem Chanali area **(District Loralai)** (Cost Rs 2.00 million)	12-05-2016	Nil	22%
ii	Flood protection wall killi kach Sodozai Abdul Looni Tehsil Duki **(District Loralai)** (Cost Rs 1.00 million)	12-05-2016	1.000	14%
6	Construction of flood protection wall/bund for agriculture land of Yahya Khan and Shari Yar Khan village Zindra **(District Loralai)**.	2.000 07-01-2016	Nil	Nil
7	Umbrella PC-I for:	**7.500**	**6.000**	
i	Construction of flood protection walls (Stone Masonry) for the land of Karez Akhwanzada Killi Mughtian Bostan area**(District Pashin)** (Cost Rs 1.500 million)	12-05-2016	0.000	19%
ii	Construction of flood protection wall for the land of Ameer Jan Orchards/Lands (Surkach) Dilsora, Khanzai area. **(District Pashin)** (Cost Rs 1.500 million)	12-05-2016	1.500	23%
iii	Construction of flood protection wall of Malik Rud Mulla Zai area **(District Pashin)** (Cost Rs 1.500 million)	12-05-2016	1.500	Nil
iv	Construction of flood protection wall for Agriculture land of Dr. Bashir Kakar Kanozai Balozai area Pishin **(District Pashin)** (Cost Rs 1.500 million)	12-05-2016	1.500	12%
v	Flood protection work for Agriculture land of Rashid Khan Nasir Killi Nasran Tehsil Bostan **(District Pishin)** (Cost Rs 1.500 million)	12-05-2016	1.500	18%
8	Umbrella PC-I for:	**3.500**	**3.500**	
i	Construction of flood protection of Haji Muhammad Din Tareen Darag for protection of houses/agriculture land Kan Bunglow and construction of flood protection works Jangeer Zindra area **(District Ziarat)** (Cost Rs 2.000 million)	12-05-2016	2.000	48%
ii	Construction of flood protection wall for agriculture land of Molvi Ghousdin, Chotair area, **(District Ziarat)** (Cost Rs 1.500 million)	12-05-2016	1.500	45%
9	Umbrella PC-I for:	**5.250**	**4.250**	
i	Flood protection wall (for water supply scheme in Tabbai Nohisar) **(District Quetta)** (Cost Rs 1.00 million)	12-05-2016	1.000	20%
ii	Flood protection wall in Aghbarg area killi Ghabizai **(District Quetta)** (Cost Rs 1.00 million)	12-05-2016	1.000	20%
iii	Flood protection wall in Saraghurgai (for Agriculture lands shair jan Bazai and others) **(District Quetta)** (Cost Rs 1.00 million)	12-05-2016	1.000	12%

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
iv	Flood protection wall in Baleli area (for Agriculture lands Abdul Raziq Khan & others) **(District Quetta)** (Cost Rs 1.00 million)	12-05-2016	0.000	18%
v	Construction of flood protection Allah Gul Shamsozai **(District Quetta)** (Cost Rs 1.250 million)	12-05-2016	1.250	17%
10	Umbrella PC-I for:	**4.250**	**3.250**	
i	Construction of flood protection scheme of Taw Wal Killa Nawab Muhammad Khan and Umer Khitab and Khusro Jogezai **(District Killa Saifullah)** (Cost Rs 1.00 million)	12-05-2016	1.000	10%
ii	Construction of flood protection wall in Bundat Musazai Murad khan and others **(District Killa Saifullah)** (Cost Rs 1.00 million)	12-05-2016	1.000	10%
iii	Flood protection of Agriculture land/Houses of Mohammad Hanif and others Ragha Sultanzai Muslim Bagh area Killa Saifullah **(District Killa Saifullah)** (Cost Rs 1.00 million)	12-05-2016	0.000	15%
iv	Flood Protection of Agriculture land of Killa Mulla Baz Wali Rud Jogezai area **(District Killa Saifullah)** (Cost Rs 1.250 million)	12-05-2016	1.250	15%
11	Construction of flood protection Gabion Wall along Killi Dabari (Ikhlas Khan) Chaman area **(District Killa Abdullah)**	1.500 12-05-2016	0.702	Nil
	Sub Total (North Zone)	**35.500**	**23.322**	
SOUTH ZONE				
12	Umbrella PC-I for:	**4.000**	**4.000**	
i	Construction of flood protection Bund for Washuk town **(District Washuk)** (Cost Rs 2.00 million)	12-05-2016	2.000	Nil
ii	Construction of flood protection Bund for Rehmatullah Baloch Bandband **(District Kharan)** (Cost Rs 2.00 million)	12-05-2016	2.000	Nil
13	Umbrella PC-I for:	**5.500**	**3.625**	
i	Construction of flood protection wall Kaftari Jhal Janat Khatoon Baghbana Bajoi area **(District Khuzdar)** (Cost Rs 1.00 million).	12-05-2016	1.000	20%
ii	Construction of flood protection Bund for Bulanzer Kehan Zehri **(District Khuzdar)** (Cost Rs 1.500 million)	12-05-2016	0.000	10%
iii	Construction of flood protection Bund Killi Khuda Bukhs Khandozai Nal Khuzdar **(District Khuzdar)** (Cost Rs 1.500 million)	12-05-2016	1.125	18%
iv	Construction of flood protection Bund Killi Soorgaz Muhammad Umer Khuzdar **(District Khuzdar)** (Cost Rs 1.500 million)	12-05-2016	1.500	20%
14	Umbrella PC-I for:	**3.000**	**1.500**	
i	Flood protection wall for agriculture land/houses in Iskalkoo area **(District Kalat)** (Cost Rs 1.500 million)	12-05-2016	1.500	22%
ii	Flood protection wall for agriculture land/houses in Johan area village Haji Muhammad Alam Bungulzai **(District Kalat)** (Cost Rs 1.500 million)	12-05-2016	0.000	18%
15	Umbrella PC-I for:	**3.000**	**3.000**	
i	Flood protection wall Killi Sheikhan **(District Mastung)** (Cost Rs 1.500 million)	12-05-2016	1.500	100%
ii	Flood Protection wall for Ispilingi area **(District Mastung)** (Cost Rs 1.500 million)	12-05-2016	1.500	100%
16	Umbrella PC-I for:	**2.000**	**2.000**	
i	Construction of flood protection bund Sheenh Lakhi Bent in Tehsil Dureji **(District Lasbela)** (Cost Rs 1.00 million)	12-05-2016	1.000	100%

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
ii	Construction of flood protection bund at Main Lasbela Canal Near Minor No. 2 in Sakran Tehsil Hub **(District Lasbela)** (Cost Rs 1.00 million)	12-05-2016	1.000	100%
17	Umbrella PC-I for:	**3.000**	**3.000**	
i	Construction of flood protection bund for agriculture land/Houses of Goth Qazi Ghulam Muhammad Bela, **(District Lasbela)** (Cost Rs 1.500 million)	12-05-2016	1.500	100%
ii	Construction of flood protection wall for Killi Haji Abdul Hakeem Pirkoh, Bela **(District Lasbela)** (Cost Rs 1.500 million)	12-05-2016	1.500	100%
18	Umbrella PC-I for:	**3.500**	**3.500**	
i	Construction of flood protection work Mir Zahoor Ahmed Buladi, Buleda **(District Kech)** (Cost Rs 2.00 million)	12-05-2016	2.000	17%
ii	Construction of flood protection work Ginna Turbat **(District Kech)** (Cost Rs 1.500 million)	12-05-2016	1.500	14%
19	Umbrella PC-I for:	**4.000**	**4.000**	
i	Construction of flood protection bund Chitkan Mainwar Gharibabad **(District Panjgoor)** (Cost Rs 2.00 million)	12-05-2016	2.000	100%
ii	Completion of flood protection bund of killi Haji Muhammad Azim Sabzap **(District Panjgoor)** (Phase-II)(Cost Rs 2.00 million)	12-05-2016	2.000	100%
20	Construction of flood protection bund Basool Kaur Ormara, **(District Gwadar)**	2.000 12-05-2016	2.000	100%
21	Construction of Agha Haroon Flood Protection Bund for Killi Jan Agha **(District Nushki)**	1.500 12-05-2016	1.500	15%
22	Umbrella PC-I for:	**2.500**	**0.700**	
i	Construction of flood protection Bund for agriculture lands of Sofi Allah Rakha S/o Rasool Bukhsh Kalwar and other Mouza Ganmb Tehsil Bhag **(District Kachhi)** (Cost Rs 1.500 million)	12-05-2016	0.000	15%
ii	Construction of flood protection Bund around the houses of Killi Dargha Sufi Ahmed Faqir Bhag town area **(District Kachhi)** (Cost Rs 1.000 million)	12-05-2016	0.700	15%
	Sub-Total (South Zone):	**34.000**	**28.825**	
	Total (North Zone + South Zone):	**67.50**	**52.147**	
	Balochistan Total (2014-15 & 2015-16)	**135.487**	**119.090**	
V	**Gilgit Baltistan**			
	ON-GOING/ CARRY FORWARD PREVIOUS YEAR (S)			
1	Const. of flood protective and river training works at Darel / Tangir valley.	30.900 05-04-2007	22.315	90%
2	Const. of flood protective bund at Sailing Ph-II District Ghanche	12.786 16-02-2010	11.619	100%
3	Const. of protective bunt at Ghursey Ph-IV District Ghanche	24.113 17-05-2012	5.492	65%
4	Const. of protective works District Ghanche.	16.428 17-05-2012	10.692	75%
5	Construction of flood protection works at Pakora Hoto District Skardu (Revised)	25.000 04-05-2016	19.000	80%
	G-B Total :	**109.227**	**69.118**	

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
	FATA			
(a)	**ON-GOING/ CARRY FORWARD PREVIOUS YEAR (S)**			
1	Flood Protection Scheme for Protection of Village abadies & agriculture land of Qabal Khan Kach Kurailia Algad in Pir Tangi Area in FR Tank	5.994 14-2-2013	5.945	100%
2	Flood Protection Scheme for Protection of Umer Shah Kach in Khoi Payer Ustrana Area FR D.I Khan	4.414 14-2-2013	4.405	100%
3	Construction of Flood protection Bund for agricultures land and village abadies of Noor Alam kach Shahoor and Dana Wat Algad Sarwakai Tehsil SW Agency	4.523 14-2-2013	4.502	100%
4	Construction of Flood Protection Bund for the Protection of land Bahadar khan kach near Khar village in Bajur Agency	3.500 17-5-2012	3.264	100%
5	Flood Protection bund at Kacha Algad Morang Valley FR Lakki	4.000 17-5-2012	3.979	100%
6	Flood Protection Bund for Protection of land Waheed Kach Haji Lawang Khawar in Bajur Agency	2.980 17-5-2012	2.979	100%
7	Construction of flood protection scheme of Nazar Jan S/o Ghazi Marjan village Mangleen Area, F.R. Tank	5.294 17-5-2012	5.559	100%
8	Construction of Flood Protection works for the safety of village abadies and culturable land of Manri Kanri (Saif-ur-Rehman Kach) Tehsil Sararogha S.W.A	5.944 13-10-2009	5.921	100%
9	Flood Protection Schemes for the protection of cultural land & village abadies of Umar Kach Sada Tehsil Kurram Agency.	3.500 17-5-2012	3.468	100%
10	Flood Protection scheme for Gawako Khawar insadda Kurram Agency	2.990 17-05-2012	2.917	100%
11	Construction of Flood Protection Bund for the land of Bakhta Jan Kach Ping Area F.R. Tank	2.751 17-05-2012	2.740	100%
	Sub Total (i)	**45.890**	**45.679**	
(b)	**NEW SCHEMES 2015-16**			
12	Construction of flood protection bund for the protection of Agriculture land of L/R sides of Dhana Algad in Sholam Birmal Tehsil S.W.A	4.933 7-01-2016	4.906	100%
13	Construction of flood protection bund at Zam kach Bangi Wala (Liaquat Ali Kach) Tehsil Sararogha, S.W.A	6.000 7-01-2016	3.255	100%
14	Construction of flood protection bund for the protection of land of Gulistan kach on tank Zam Algad Sobati area in F.R Tank	6.934 7-01-2016	6.649	100%
15	Construction of flood protection bund for the protection of Zaido Kach on R/S of Shuza Algad in F.R Tank	6.689 7-01-2016	6.689	100%
16	Construction of flood protection bund for the protection of land of Pir Zaman kach on R/S of Tank Zam Algad in F.R Tank	7.203 7-01-2016	6.918	100%
17	Construction of flood protection bund for the protection of land & village abadies of Mir Azam kach on matakar Algad in F.R Tank	7.112 7-01-2016	7.067	100%
18	Construction of flood protection bund for the protection of agriculture land of Abdul Qayyum and Hasti Khan Kach in Ustarana area in FR DI Khan	6.862 7-01-2016	6.801	100%
	Sub Total (ii)	**45.733**	**42.285**	
	FATA Total (i +ii)	**91.623**	**87.964**	

Serial No.	Name of flood protection scheme	Approved Cost / Date of Approval	Up to date Expenditure (Upto Feb 2017)	Status/ Physical Progress
VII	**AJ&K**			
(a)	**ON-GOING/ CARRY FORWARD PREVIOUS YEAR (S)**			
1	Protecting & Checking of Erosion Against flood on River Kunhar Brarkot Distt. Muzaffarabad (Revised)	18.652 04-05-2015	18.652	100%
2	Protecting & checking of erosion against flood along left edge of River Mahl near Bhount Chowk in District Bagh (Ongoing/ carry forward)	13.575 13-10-2009	8.670	87%
3	Restoring of Damages for Protection of Military Installation at Khandaq Post Near LOC on Right Bank of River Munawar Tawi District Bhimber Azad Kashmir	59.005 24-06-2014	31.877	59%
	Sub Total (i)	**91.232**	**59.199**	
(b)	**NEW SCHEMES 2015-16**			
4	Protecting and Checking of Erosion against flood on River and left bank of River Poonch at Buttle and Mondhole District Poonch	14.096	2.741	40%
	Sub total (ii)	**14.096**	**2.741**	
	AJK total (i & ii)	**105.328**	**61.940**	
	Grand total:	**4,471.034**	**2,830.126**	

FLOOD PROTECTION SCHEMES TAKEN UP UNDER NORMAL/EMERGENT FLOOD PROGRAM FOR FINANCIAL YEAR (2016-17)

(Rs in Million)

Serial No.	Name of the flood protection scheme	Estimated Cost Approval date	Upto date Expenditure (Feb 2017)	Physical Progress (%age)
I	**PUNJAB**			
	NEW SCHEMES (2016-17)			
1	River training works to save the Bhikiwind village/post of Pak Army at River Sutlej U/S Ferozepur Headworks, **District Kasur**	75.033 Under submission to FFC	Nil	Nil
2	Extension of existing J-Head Spur by 2400 feet at RD 188+000 of Link No. 1, **District D.G. Khan**	124.324 Under process for CDWP approval	Nil	Nil
	Total (Punjab)	**199.357**	**0.000**	**0.000**
II	**SINDH**			
	CARRY FORWARD PREVIOUS YEAR(s)			
1	Extension of stone apron & pitching along K.K bund mile 11/3 to 12/4 and recoupment of damage stone apron and pitching from mile 10/7+500 to 11/1+110 **District Kashmore**	234.549 30/4/2009	221.378	80%
2	Raising/strengthening, providing stone pitching along F.P Bund RD 169 to 263.5 & RD 502 to 120, **District Kambar, Shahdad Kot, Larkana, Dadu, Jamshoro.**	492.236 1/3/2008	281.693	90%
3	R&S along U/S Right Marginal bund from mile 0/0 to 5/4 & U/S Right spur Bund mile 0/0 to 3/0.	57.029 13/3/2015	57.522	100%
4	Providing Stone Pitching and Stone Apron along Sukkur Begari Bund mile 0/3 to 2/0 Vulnerable Point City.	127.084 21/12/2015	127.574	100%
5	Providing Stone Apron along Qadirpur Loop Bund mile 4/6 to 5/0.	32.274 7/1/2016	14.225	93%
6	Providing Stone Pitching along Baiji Bund from mile 2/4 to 3/4 and 7/4 to 8/4.	58.423 7/1/2016	39.678	99%
7	Closing breach mile 1/1 to 2/6 Qadirpur Shank Bund, Shank project mile 0/0 to 0/3, Raising & Strengthening mile 0/0 to 1/2 Qadirpur Bund, Qadirpur Shank Bund mile 1/7 2/6 Qadirpur Shank Bund and Shank Projection mile 0/0 to 0/3 R/S (Breach Portion).	259.112 11/2/2016	92.230	75%
8	Construction of Stone Pitching, Stone Apron & Earht Work along SM Bund mile 4/0 to 4/2 in **Rohri Division** Kandiaro	59.737 4/5/2016	64.455	100%
	NEW SCHEMES (2016-17)			
9	Providing Stone Apron, Stone Pitching and Earth Work along Moria Loop Bund mile 0/0 to 1/0 in Northern Dadu **Division Larkana.**	201.110 4/8/2016	Nil	Work order issued
10	Providing Stone Apron along Qadirpur Bund mile 10/4 to 11/4.	160.000 4/8/2016	Nil	Tendering stage
	Total(Sindh):	**1,681.554**	**898.755**	
III	**KHYBER PAKHTUNKHWA**			
	NEW SCHEMES (2016-17)			
1	Construction of flood Protection work for protection of agricultural lands & abadies of Qasim Khan Takht Khel and other areas from flood flows in Khaisoor nullah in **District Bannu**	15.000 3.2.2017	Nil	Tendering stage
2	Construction of Flood Embankment Protection work for the protection of agricultural lands & abadies near Paharpur **District D.I. Khan**	5.500 3.2.2017	Nil	Dropped (Non feasible scheme) Alternative proposal is awaited from PID, KP
3	Construction of Nazif spur on R/S of Kurram river	7.135 3.2.2017	Nil	Tendering stage

Serial No.	Name of the flood protection scheme	Estimated Cost Approval date	Upto date Expenditure (Feb 2017)	Physical Progress (%age)
4	Construction of Flood Protection Work at critical locations in Chitral Irrigation Division, **Chitral**	17.300 3.2.2017	Nil	Tendering stage
5	Construction of Flood Protection work along Bahar Nullah for the protection of Mardan Dobian Road and village abadies of **District Mardan**	10.000 3.2.2017	Nil	Tendering stage
	Total (KP)	**54.935**	**0.000**	
IV	**BALOCHISTAN**			
	NEW SCHEMES (2016-17)			
1	Construction of Protection Spur along left bank of Nari river for protection of Agricultural lands and abadies of village Malik Muhammad Akhtar and others **(District Sibbi)**	10.000 3.2.2017	Nil	Tendering stage
2	Construction of Flood Protection Bun for Houses and Agricultural Land at Pashtoon Bagh **(District Quetta)**	2.000 3.2.2017	Nil	Tendering stage
3	Construction of Flood Protection Bund Dohra Sayani at Muhammad Seyapad Goth Pirkas Hub **(District Lasbela)**	2.500 3.2.2017	Nil	Tendering stage
4	Construction of Flood Protection Wall for Gullo Goth Shahnoorani area Tehsil Wadh **(District Khuzdar)**	15.000 3.2.2017	Nil	Tendering stage
5	Construction of Flood Protection PCC Wall for Agricultural Land and Houses along Gaitanai Kaur Washbood **(District Panjgoor)**	2.500 3.2.2017	Nil	Tendering stage
6	Construction of Flood Protection Bund for Agricultural Lands of Village Karmabad along the left bank of Saib River **(District Loralai)**	2.000 3.2.2017	Nil	Tendering stage
7	Construction of Flood Protection Bund for Village Fateh Muhammad Apozai and others **(District Zhob)**	2.000 3.2.2017	Nil	Tendering stage
8	Construction Flood Protection Wall for Killi Sikandar Abad Dairy Farm area **(District Kohlu)**	2.000 3.2.2017	Nil	Tendering stage
9	Construction Flood Protection Wall for Houses Killi Bibar Tak area **(District Barkan)**	2.000 3.2.2017	Nil	Tendering stage
	Total (Balochistan)	**40.000**	**0.000**	
V	**GILGIT-BALTISTAN**			
	CARRY FORWARD PREVIOUS YEAR(s)			
1	Const. of flood protective and river training works at Darel/ Tangir valley	30.900 5/4/2007	22.815	90%
2	Const. of flood protective bund at Sailing Ph-II **District Ghanche**	12.786 16/2/2010	11.619	100%
3	Const. of protective bunt at Ghursey Ph-IV **District Ghanche**	24.113 17/5/2012	5.492	65%
4	Const. of protective works at Surmo (Phase-II) **District Ghanche**	16.428 17/5/2012	10.692	75%
5	Construction of flood protection works at Pakora Hoto **District Skardu** (Revised)	25.000 4/5/2016	19.000	80%
	Total (G-B):	**109.227**	**69.618**	
VI	**FATA**			
I	**CARRY FORWARD PREVIOUS YEAR(S)**			
1	Construction of flood protection bund for the protection of Agriculture land of L/R sides of Dhana Algad in Sholam Birmal Tehsil S.W Agency	4.933 7/1/2016	4.906	100%
2	Construction of flood protection bund for the protection of agriculture land of Abdul Qayyum and Hasti Khan Kach in Ustarana area in FR D.I. Khan	6.862 7/1/2016	6.801	100%

Serial No.	Name of the flood protection scheme	Estimated Cost Approval date	Upto date Expenditure (Feb 2017)	Physical Progress (%age)
3	Construction of flood protection bund at Zam kach Bangi Wala (Liaquat Ali Lach) Tehsil Sararogha, S.W Agency	6.000 7/1/2016	3.255	100%
	NEW SCHEMES (2016-17)			
4	Flood Protection scheme Raza Kach on Kurram River Shewa Tehsil NWA	6.500 3.2.2017	Nil	Tendering stage
5	Flood Protection scheme in Kurram Agency	6.000 3.2.2017	Nil	Tendering stage
i.	Flood Protection at Agra Kirman Toi Upper Kurram			
ii.	Flood Protection at Tauda China/Rawaz Lower Kurram			
6	Construction of flood protection bund for protection of land of Inayat-Ur-Rehman Kach on Tank Zam SWA.	7.357 3.2.2017	Nil	Tendering stage
7	Construction of flood protection bund for protection of land of Sher Jan Kach, Noor Gul Kach and Niazam Gul Kach on Gatt Algad in Sherani Area, FR DIKHAN	7.359 3.2.2017	Nil	Tendering stage
8	Construction of flood protection bund for protection of land of Anwar Kach on Local Algad in Sherani Area FR DIKHAN	6.170 3.2.2017	Nil	Tendering stage
9	Flood Protection scheme for the land of Asghar & Mulvi Rashid Kach in KAZA Nar near Torwan area/land near Torwan Bridges in Tiarza Tehsil South Waziristan Agency.	8.000 3.2.2017	Nil	Tendering stage
10	Construction of Flood Protection Bund for the Protection of Land of Tairza Khullah algad, Tehsil Wana, South Waziristan Agency	3.900 3.2.2017	Nil	Tendering stage
11	Construction of Flood Protection Bund for Protection of Land of Gahazai Payaza, Tehsil Wana South Waziristan Agency	4.092 3.2.2017	Nil	Nil
12	Flood Protection Scheme at Ashraf khel, Wana, South Waziristan Agency	4.841 3.2.2017	Nil	Nil
	Total (FATA):	**72.014**	**14.962**	
VII	**AJ&K**			
	CARRY FORWARD PREVIOUS YEAR(s)			
1	Protecting and Checking of Erosion against flood on River and left bank of River Poonch at Buttle and Mondhole, **District Poonch**	14.096 4/5/2016	2.741	40%
	NEW SCHEMES (2016-17)			
2	Construction of Guide Walls for protection of Khandaq Right to Munawar forward situated along right Bank of River Munawar Tawi	108.622 Under process for CDWP approval	Nil	Nil
	Total (AJ&K)	**122.718**	**2.741**	
	Grand Total:	**2279.805**	**986.076**	

Appendix-II

MAJOR RIVERS FLOW DATA DURING MONSOON SEASON 2016 (JULY – OCTOBER)

Discharge in Cusec

DATE	TIME	INDUS			Kabul	INDUS						
		TARBELA			Nowshera	KALABAGH		CHASHMA			TAUNSA	
		Reservoir Level (Ft)	U/S	D/S	Flow	U/S	D/S	Reservoir Level (Ft)	U/S	D/S	U/S	D/S
1-Jul-16	600	1508.04	243000	199700	64900	255400	247400	648.50	278100	247100	215000	187200
2-Jul-**16**	600	1509.48	250900	214900	69500	247500	221700	648.40	256700	233000	218200	191400
3-Jul-**16**	600	1510.83	262600	228000	70900	299400	291900	640.50	285700	257100	226800	203100
4-Jul-**16**	600	1511.08	286000	289000	80700	301100	294100	647.50	364700	338600	237500	221300
5-Jul-**16**	600	1511.00	286400	287900	76200	349700	342200	645.10	355600	359100	273100	247200
6-Jul-**16**	600	1511.00	264000	263400	73400	343500	336000	643.70	374500	370500	333900	308200
7-Jul-**16**	600	1511.00	250300	249700	66900	328900	321400	643.00	380800	369300	352800	328100
8-Jul-**16**	600	1511.00	242500	241900	61100	296200	288600	643.00	367600	348300	369200	343000
9-Jul-**16**	600	1511.00	233800	233200	57400	324100	316600	642.50	339500	323700	345900	319200
10-Jul-**16**	600	1511.00	214300	213700	55100	286800	279300	642.50	337600	314700	322800	296800
11-Jul-**16**	600	1511.00	211600	210800	54500	274500	267000	642.00	284700	267000	311200	285200
12-Jul-**16**	600	1511.00	213000	212200	50200	275200	267700	642.00	275500	252400	267600	240900
13-Jul-**16**	600	1511.87	213000	190000	50400	276100	268600	644.00	264700	220000	257300	230600
14-Jul-**16**	600	1512.87	222800	196600	58000	224000	216200	644.80	253300	253300	220000	192700
15-Jul-**16**	600	1513.87	250200	224300	54900	247200	239400	644.40	251500	233000	208400	181900
16-Jul-**16**	600	1514.87	273500	247500	61400	301600	293800	644.00	298600	280100	207000	179400
17-Jul-**16**	600	1515.87	297700	271800	60400	320200	312400	644.00	325000	301800	244500	216900
18-Jul-**16**	600	1516.87	288500	262700	56300	332700	324900	644.00	349300	326700	279500	252900
19-Jul-**16**	600	1517.87	267700	242000	56700	306500	299000	644.00	351400	329300	302100	277500
20-Jul-**16**	600	1518.87	245800	220000	54300	305600	298100	644.00	344500	312400	308600	282000
21-Jul-**16**	600	1519.45	205300	190000	45000	272100	264600	644.00	310200	287600	295500	268900
22-Jul-**16**	600	1519.40	189300	190000	40600	218600	108300	643.00	252000	240000	292600	265000
23-Jul-**16**	600	1517.96	198700	235000	40500	242800	235000	641.00	241000	240000	241600	214000
24-Jul-**16**	600	1516.80	205900	235000	40300	253600	245800	643.00	276900	240000	230600	203500
25-Jul-**16**	600	1516.01	205400	225000	38200	278300	270500	644.40	278500	240000	230600	202900
26-Jul-**16**	600	1515.32	208000	225000	40900	280200	272400	645.10	272100	24000	230600	203200
27-Jul-**16**	600	1515.24	223500	225000	42400	261300	253500	645.10	263300	24000	230600	203200
28-Jul-**16**	600	1516.30	242200	215000	50200	317300	309500	645.60	270500	24000	236500	210900
29-Jul-**16**	600	1517.30	249100	223400	46200	278700	270900	647.80	301800	24000	231400	205600
30-Jul-**16**	600	1518.30	251700	226000	43100	285700	277900	648.50	244600	19600	230800	205000
31-Jul-**16**	600	1519.30	229700	204000	43300	292400	286400	648.00	303000	291700	231200	205800

Discharge in Cusec

DATE	INDUS						JHELUM				
	GUDDU		SUKKAR		KOTRI		MANGLA			RASUL	
	U/S	D/S	U/S	D/S	U/S	D/S	Reservoir Level (Ft)	U/S	D/S	U/S	D/S
1-Jul-16	183700	152500	123900	69200	57000	20100	1215.05	51900	15000	19800	5300
2-Jul-**16**	189800	154900	124200	69200	52500	14400	1215.70	52800	30000	31200	19700
3-Jul-**16**	190800	154900	131900	76200	49300	9900	1216.25	49300	30000	23800	5300
4-Jul-**16**	194800	157900	132000	76200	51400	12000	1216.85	51100	30000	26200	5300
5-Jul-**16**	219600	181500	134700	78900	54000	14400	1217.20	42300	30000	25900	5300
6-Jul-**16**	219900	181500	140000	84300	51600	12000	1217.70	47600	30000	24300	5300
7-Jul-**16**	255800	218400	148700	93000	51300	12000	1218.15	45800	30000	31000	11900
8-Jul-**16**	277200	239000	163200	107400	53800	14400	1218.45	40500	30000	31000	11900
9-Jul-**16**	288800	250300	175200	119400	55800	16700	1218.90	37500	21700	24600	5300
10-Jul-**16**	317500	282500	212500	156700	56100	16700	1219.65	41300	15000	17100	5200
11-Jul-**16**	325800	297900	223600	168000	60900	23300	1220.25	36600	15000	11700	5200
12-Jul-**16**	311800	277900	238900	184100	66600	30100	1220.85	37300	15000	8900	5300
13-Jul-**16**	291000	257700	231100	176300	80000	49100	1221.35	33600	15000	8300	5300
14-Jul-**16**	275400	242500	229800	174700	95600	62800	1222.15	44700	15000	8300	5300
15-Jul-**16**	237500	201800	216100	160700	125400	87700	1222.90	37900	10000	8300	5300
16-Jul-**16**	202300	166300	199400	143900	135700	97000	1223.70	39700	10000	8200	5300
17-Jul-**16**	192100	156100	157200	101700	145400	106000	1224.40	36000	10000	8100	5300
18-Jul-**16**	181900	146500	137300	81600	149700	110400	1225.00	32300	10000	8100	5300
19-Jul-**16**	221800	190100	131600	75900	145900	106300	1225.85	41600	10000	7600	5300
20-Jul-**16**	234700	202300	148300	92500	142200	100200	1226.40	30400	10000	2200	Nil
21-Jul-**16**	254800	220700	180700	125000	129100	89600	1226.95	30400	10000	2600	Nil
22-Jul-**16**	273000	238600	199300	143500	112900	73400	1227.45	28600	10000	8000	Nil
23-Jul-**16**	272500	238600	219000	163200	88100	49100	1228.10	34100	10000	8000	5300
24-Jul-**16**	257900	222900	220900	165100	75500	36300	1228.55	26700	10000	2300	Nil
25-Jul-**16**	247800	217400	214400	158600	69300	30000	1229.05	28600	10000	2600	Nil
26-Jul-**16**	208900	180000	194500	139000	84800	45500	1229.70	34100	10000	8000	5300
27-Jul-**16**	208800	177100	167200	111300	112800	73400	1230.70	48500	10000	7500	5300
28-Jul-**16**	206700	172700	157800	101900	129100	89600	1231.55	43200	10000	13400	11900
29-Jul-**16**	205300	179500	157100	101900	134900	95300	1232.20	35400	10000	8400	8000
30-Jul-**16**	211900	186100	165300	111700	135000	95300	1232.70	29000	11100	6000	5300
31-Jul-**16**	207600	177400	166300	111700	113000	73400	1233.30	29500	10000	9000	8000

Discharge in Cusecs

DATE	CHENAB								RAVI			
	MARALA		QADIRABAD		TRIMMU		PANJAND		BALLOKI		SIDHNAI	
	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S
1-Jul-16	67800	32900	28000	19500	52900	37400	30700	15100	37900	4800	16900	2600
2-Jul-**16**	83800	49000	32700	10700	55400	39900	41200	25400	37900	4800	16400	2000
3-Jul-**16**	78500	43600	53500	31500	56600	41200	37200	21300	39100	6600	15900	1900
4-Jul-**16**	67800	32900	58400	36400	53400	37900	42700	26900	39100	6600	15700	2000
5-Jul-**16**	68800	23900	45900	23900	34300	18800	42700	26900	39700	7500	15900	2000
6-Jul-**16**	73200	38300	39300	17300	48200	32900	48600	32800	38800	6600	16900	3000
7-Jul-**16**	81800	49000	43100	21100	48900	34100	49200	33700	40400	8400	16100	3000
8-Jul-**16**	65800	32900	58400	36400	47200	32700	42400	26900	40400	8400	16100	3000
9-Jul-**16**	62500	27600	45700	23700	40100	25400	37700	22100	38100	5700	16500	3300
10-Jul-**16**	73200	28300	35300	13300	46100	32100	44900	29300	38100	5700	18200	5300
11-Jul-**16**	57100	22200	34000	12000	50200	35900	45100	29500	38100	5700	18900	5300
12-Jul-**16**	68000	32900	18000	NIL	47000	32700	45100	29500	38400	5700	18700	5300
13-Jul-**16**	73500	38300	24800	4100	38600	24600	43500	27900	35600	3000	16300	3300
14-Jul-**16**	79000	43600	28700	6700	29900	15600	44200	28500	35800	3000	16600	3300
15-Jul-**16**	84400	49000	34000	12000	30100	15600	44500	28800	37800	4800	15800	2300
16-Jul-**16**	84300	49000	48500	26500	28100	13600	38200	22500	38200	4800	10900	1300
17-Jul-**16**	89400	54300	48500	26500	27700	12400	34300	18700	38700	5700	13700	Nil
18-Jul-**16**	72400	38300	50900	28900	35300	20000	32900	17200	40900	8400	15000	1300
19-Jul-**16**	72400	38300	42000	20000	46000	30700	30000	14200	46800	15000	16300	2600
20-Jul-**16**	56700	22200	36700	14700	49800	34500	27700	12000	49500	17500	13500	2600
21-Jul-**16**	56900	22200	26400	17900	49800	34500	27000	11300	48900	16400	24400	10400
22-Jul-**16**	57100	22200	18700	2700	45000	30700	29200	13500	47800	15000	23900	10400
23-Jul-**16**	73200	38300	26000	16000	37200	23200	32800	17000	38800	6000	25200	11700
24-Jul-**16**	57000	22200	40500	26500	27600	13500	35600	19900	35200	2400	20000	6500
25-Jul-**16**	57000	22200	23400	9400	17600	2900	41500	25800	33000	NIL	19900	6500
26-Jul-**16**	67700	32900	22000	8000	16000	NIL	41500	25800	34100	3100	16300	2800
27-Jul-**16**	73200	38300	27300	3300	35800	18800	38900	23100	33000	1800	15400	1600
28-Jul-**16**	144100	129300	117300	107400	30600	14900	33000	17200	35100	14900	13400	Nil
29-Jul-**16**	85200	75700	106500	95500	24500	8400	28100	12400	41500	9500	13900	Nil
30-Jul-**15**	63800	54300	67900	59700	113200	96900	24400	8700	53300	21300	14700	700
31-Jul-**16**	69300	59700	61700	46700	107200	90900	25100	9300	39500	7500	20800	6600

Discharge in Cusec

DATE	SUTLEJ				LINKS/ CANAL				SKARDU	
	SULEMANKI		ISLAM		C.J	CRBC	Q.B	T.P	Temperature ^{0}C	
	U/S	D/S	U/S	D/S	Flow	Flow	Flow	Flow	Max	Min
1-Jul-16	17100	4200	2800	800	21700	4500	22000	12000	35.6	18.2
2-Jul-**16**	17100	4200	2800	800	21700	4500	22000	12000	34.7	16.1
3-Jul-**16**	17100	4200	2800	800	21700	4500	22000	12000	34.7	21.2
4-Jul-**16**	16600	4300	3100	1800	21700	4500	22000	12000	32.0	18.4
5-Jul-**16**	16700	4300	3100	1800	21700	3600	22000	12000	29.2	13.6
6-Jul-**16**	17200	4700	3200	1500	17800	3300	22000	12000	32.2	16.2
7-Jul-**16**	17400	5600	3500	1800	15900	3300	22000	12000	29.7	14.0
8-Jul-**16**	17400	5600	3800	1800	15900	3300	22000	12000	25.7	11.3
9-Jul-**16**	18400	5800	3800	1500	19600	3300	22000	12000	31.7	14.2
10-Jul-**16**	18400	5600	3800	1500	19600	3300	22000	12000	30.6	18.2
11-Jul-**16**	18400	5600	4100	1800	19600	3300	22000	12000	27.6	16.1
12-Jul-**16**	18400	5600	4100	1800	19600	3600	22000	12000	32.7	18.2
13-Jul-**16**	18000	5200	4100	1800	19600	3800	22000	12000	35.0	23.4
14-Jul-**16**	18000	5200	4100	1800	19600	3800	22000	12000	33.0	17.4
15-Jul-**16**	18100	5200	3800	1500	19600	3800	22000	12000	32.8	17.4
16-Jul-**16**	18500	5500	4000	1500	19600	3800	22000	12000	27.2	15.2
17-Jul-**16**	18500	5600	4000	1500	19600	3500	22000	12000	26.7	14.3
18-Jul-**16**	16400	3700	4000	1500	19600	2500	22000	12000	26.6	16.0
19-Jul-**16**	17900	5100	4000	1500	19600	2500	22000	12000	25.5	13.0
20-Jul-**16**	20300	7400	4000	1500	49800	2500	22000	12000	26.6	10.4
21-Jul-**16**	21000	8000	4000	1500	19600	3300	22000	12000	31.2	12.1
22-Jul-**16**	19100	6000	4000	1500	19600	3700	16000	12000	35.3	14.1
23-Jul-**16**	18200	5200	5500	2900	15000	3700	10000	12000	29.2	12.0
24-Jul-**16**	18200	5200	6300	5000	16200	3700	14000	11700	32.6	13.1
25-Jul-**16**	16500	3500	5500	2900	19700	3700	14000	11700	35.3	14.1
26-Jul-**16**	16500	3500	4000	1500	19600	3700	14000	11700	35.6	18.4
27-Jul-**16**	15400	2400	2500	Nil	19600	3700	14000	11100	35.6	20.0
28-Jul-**16**	15400	2400	1600	Nil	19600	4000	10400	12000	26.5	14.1
29-Jul-**16**	15700	2400	1600	Nil	19600	4000	11000	12000	26.1	15.2
30-Jul-**16**	16800	3500	1200	Nil	19600	4000	8200	10700	30.7	15.4
31-Jul-**16**	18200	4900	1100	Nil	19600	4000	15000	12000	29.2	14.2

Discharge in Cusec

DATE	TIME	INDUS			Kabul	INDUS						
		TARBELA			Nowshera	KALABAGH		CHASHMA			TAUNSA	
		Reservoir Level (Ft)	U/S	D/S	Flow	U/S	D/S	Reservoir Level (Ft)	U/S	D/S	U/S	D/S
1-Aug-16	600	1520.30	228300	202300	43100	270800	266000	647.50	315700	302000	270700	245300
2-Aug-**16**	600	1521.40	229500	200000	41000	235500	230700	648.50	266400	220000	28000	253300
3-Aug-**16**	600	1522.40	228800	202000	40100	246200	241400	648.50	272100	248300	234500	207700
4-Aug-**16**	600	1523.50	229300	200000	38100	251500	246700	648.50	254400	230800	240500	220700
5-Aug-**16**	600	1524.40	224100	200000	36600	247000	241000	648.50	251100	227600	234200	214800
6-Aug-**16**	600	1525.65	226200	192400	33900	240600	233300	648.50	243700	220400	218400	198800
7-Aug-**16**	600	1526.90	238700	204900	33000	220900	213600	648.50	239900	216600	212500	220300
8-Aug-**16**	600	1528.15	274000	240300	33200	247300	240000	648.50	237100	213800	216400	207600
9-Aug-**16**	600	1529.40	303100	269300	35000	281100	273800	648.00	274200	263000	201400	187600
10-Aug-**16**	600	1530.65	291600	257100	42400	308600	301300	647.50	308400	294700	244800	231000
11-Aug-**16**	600	1531.90	271600	236400	39000	314400	307900	647.50	325100	301100	270300	256500
12-Aug-**16**	600	1533.15	259800	224600	40500	266300	259800	647.50	326100	302100	277700	261900
13-Aug-**16**	600	1534.40	259500	224200	38600	280100	273600	647.50	288100	264100	288600	273000
14-Aug-**16**	600	1535.65	239600	204200	34800	244700	238200	647.50	288000	264200	262400	246600
15-Aug-**16**	600	1536.90	213900	178600	29800	214200	207700	647.50	259400	235800	252000	235700
16-Aug-**16**	600	1538.15	199400	164800	33600	207500	201100	648.00	223800	190000	236600	220000
17-Aug-**16**	600	1539.40	192600	157600	18800	188000	181000	648.20	214600	190000	184000	167400
18-Aug-**16**	600	1540.40	181200	152400	27300	193200	186700	648.10	190800	180000	175800	153400
19-Aug-**16**	600	1541.16	172700	150000	24900	152500	146000	648.50	209400	189000	178500	156300
20-Aug-**16**	600	1541.59	163200	150000	25400	163000	156000	648.00	174300	180000	177100	155300
21-Aug-**16**	600	1541.67	153100	150000	22200	160800	153500	647.80	181900	180000	179100	156100
22-Aug-**16**	600	1541.47	145000	150000	19800	152500	145200	647.60	181900	180000	174900	152900
23-Aug-**16**	600	1541.45	145200	145000	19400	158800	157500	648.10	174600	158000	169900	148600
24-Aug-**16**	600	154.55	148600	145000	18700	130700	123400	648.30	168900	158000	161700	141400
25-Aug-**16**	600	1541.73	140900	135000	19200	133300	126000	648.30	161600	158000	163800	158800
26-Aug-**16**	600	1541.71	135200	135000	18900	140000	122400	648.00	159200	158000	146400	129400
27-Aug-**16**	600	1541.60	132500	135000	19500	137500	129900	647.50	154000	158000	144000	127400
28-Aug-**16**	600	1541.97	164400	135000	19100	155100	147500	646.90	152400	158000	151400	135100
29-Aug-**16**	600	1542.58	153200	135000	20400	146200	138600	647.00	165800	158000	146700	130700
30-Aug-**16**	600	1543.16	152300	135000	22100	138000	130400	646.70	159300	158000	145000	129100
31-Aug-**16**	600	1543.67	150400	135000	21000	159000	151400	646.60	162400	158000	147000	131000

Discharge in Cusec

DATE	INDUS						JHELUM				
	GUDDU		SUKKAR		KOTRI		MANGLA			RASUL	
	U/S	D/S	U/S	D/S	U/S	D/S	Reservoir Level (Ft)	U/S	D/S	U/S	D/S
1-Aug-16	202500	170600	157200	101400	102400	62800	1233.65	27600	10000	9200	8000
2-Aug-**16**	200000	166500	145500	89400	92700	52300	1234.30	35400	10000	6700	5300
3-Aug-**16**	238400	205300	145400	89400	92700	53300	1234.80	29500	10000	9400	8000
4-Aug-**16**	272800	285800	180800	132600	102800	80700	1235.20	25600	10000	6900	5300
5-Aug-**16**	262700	253500	229300	180100	102200	94300	1235.60	25600	10000	9800	8000
6-Aug-**16**	251100	245600	220000	174400	84800	80700	1236.00	25600	10000	1300	Nil
7-Aug-**16**	225400	220300	220700	182200	77900	76200	1236.50	29500	10000	6700	5300
8-Aug-**16**	202200	195000	209800	168000	84800	83100	1237.85	62800	10000	13400	11900
9-Aug-**16**	225600	212500	198900	154800	110300	108600	1238.65	41300	10000	1800	Nil
10-Aug-**16**	222000	199800	185000	137100	142000	138500	1239.35	37400	10000	6900	5300
11-Aug-**16**	270300	256500	222200	199800	179600	127700	1239.85	29500	10000	9400	8000
12-Aug-**16**	223800	197400	173900	120000	147400	136400	1240.30	28200	10000	7500	5200
13-Aug-**16**	260200	229800	172000	117000	134000	114200	1240.80	30500	10000	2700	Nil
14-Aug-**16**	288100	256000	199700	144000	123400	98500	1241.25	28500	10000	7700	5200
15-Aug-**16**	320600	288300	231400	175500	112700	86000	1241.65	26400	10000	2400	Nil
16-Aug-**16**	310600	282300	273400	217200	106000	76200	1242.00	28300	139000	7300	5200
17-Aug-**16**	285800	259800	281500	225200	101900	68200	1242.00	25600	25600	24800	22800
18-Aug-**16**	265500	244400	272700	216400	101600	68200	1242.00	26600	26600	25100	11500
19-Aug-**16**	215300	188700	264300	207800	122000	86000	1242.00	26100	26100	28600	11500
20-Aug-**16**	188600	158100	192100	135400	147900	111300	1242.00	19400	19400	17200	Nil
21-Aug-**16**	188700	158100	150000	93100	167500	131000	1241.75	19700	30000	24000	7700
22-Aug-**16**	179400	152900	179400	150200	139000	82000	1241.50	19700	30000	28700	11500
23-Aug-**16**	178500	149500	132600	76600	164200	128900	1241.20	21500	33800	28700	11500
24-Aug-**16**	160200	131200	127100	73000	144500	113400	1240.70	19500	40000	32200	15300
25-Aug-**16**	153300	125200	118500	64800	103300	83900	1240.20	21200	41700	33300	15300
26-Aug-**16**	145100	124100	115000	61100	79900	60500	1239.50	22200	50000	46900	30300
27-Aug-**16**	125400	103100	111100	57000	69200	49100	1238.75	20700	50000	43500	26700
28-Aug-**16**	115900	99500	98000	49900	65200	53200	1238.15	26500	50000	47400	30300
29-Aug-**16**	112800	97500	97200	49900	59800	53300	1237.60	28500	50000	43200	26600
30-Aug-**16**	118800	94600	97000	97000	47000	55500	1235.25	36300	50000	57200	40400
31-Aug-**16**	126400	96100	91600	40500	53200	28400	1237.00	30900	40600	43300	26600

Discharge in Cusec

DATE	CHENAB								RAVI			
	MARALA		QADIR ABAD		TRIMMU		PANJAND		BALLOKI		SIDHNAI	
	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S
1-Aug-16	58200	43600	55500	40500	77100	62100	21900	6200	37000	4200	26200	12300
2-Aug-**16**	69900	54300	49100	34100	79600	64600	64500	48500	36200	3700	21500	7800
3-Aug-**16**	86100	70400	68600	53600	78700	63700	82800	67300	35800	3100	17000	3300
4-Aug-**16**	60900	43600	52100	34100	73600	59100	77400	61900	36000	3100	16400	2600
5-Aug-**16**	61000	43600	40800	22800	71100	57600	70400	56700	43700	10700	14400	1000
6-Aug-**16**	72200	54300	37000	19000	84000	70500	69000	56700	40200	7200	13300	Nil
7-Aug-**16**	94100	75700	69500	51500	72300	58800	69500	55200	37800	4800	13900	Nil
8-Aug-**16**	145400	133200	416000	405500	54900	41700	58800	44400	35400	2400	16000	2000
9-Aug-**16**	99100	88800	117900	109000	108300	95500	65100	52900	60400	27300	17400	3900
10-Aug-**16**	88000	75700	89000	74000	141500	128700	65100	52900	52300	19200	17400	3900
11-Aug-**16**	92300	81100	76700	58700	148200	135400	71700	58700	40600	7500	23400	9800
12-Aug-**16**	66900	48200	76700	18000	118900	104700	87900	74400	43400	10300	24600	9500
13-Aug-**16**	72100	49000	56000	18000	110500	97500	90500	77000	41500	8400	18800	5300
14-Aug-**16**	66900	43600	49500	18000	94000	80700	130800	116000	42500	9300	16600	2900
15-Aug-**16**	70900	43600	44400	18000	81200	67700	112900	97900	41600	8400	17900	4200
16-Aug-**16**	77500	49000	37900	19900	77000	63500	93600	78700	38900	5700	18000	4200
17-Aug-**16**	56300	27600	33000	15000	71400	57900	85400	70500	38900	5700	18300	4200
18-Aug-**16**	60200	27600	33000	15000	62400	48900	76700	61700	42700	9500	18300	4200
19-Aug-**16**	56100	22200	35500	17500	56700	43200	72900	57600	38900	5700	16100	2000
20-Aug-**16**	56100	22200	32600	14600	38100	24600	63700	48400	3700	Nil	14200	Nil
21-Aug-**16**	56100	22200	18600	10100	40000	26100	59600	44300	38000	4800	17300	3000
22-Aug-**16**	50700	16900	28700	10700	37000	23500	54900	39200	37200	3900	16300	2000
23-Aug-**16**	56100	22200	28700	10700	25100	11600	51000	35500	37200	3900	15000	700
24-Aug-**16**	56100	22200	28700	10700	18900	5400	51100	35500	37200	3900	14500	Nil
25-Aug-**16**	53000	19100	23400	5400	18800	5400	45700	29900	37600	4800	15200	Nil
26-Aug-**16**	52600	22200	23400	5400	20500	7800	26900	11200	43400	11900	14600	Nil
27-Aug-**16**	52200	19100	24900	16200	20000	7300	22900	7200	44700	11900	13000	Nil
28-Aug-**16**	48300	19100	31300	13300	23700	11900	15700	Nil	45700	16700	17000	4000
29-Aug-**16**	58700	27600	41800	23800	24900	13000	16400	4100	46200	19700	19900	6600
30-Aug-**16**	59900	27600	41800	23800	34700	22400	16800	2100	42000	15500	21600	7900
31-Aug-**16**	59900	27600	34000	16000	37700	25700	16700	1600	42800	14300	23700	9800

Discharge in Cusec

DATE	SUTLEJ				LINKS/CANAL				SKARDU	
	SULEMANKI		ISLAM		C.J	CRBC	Q.B	T.P	Temperature ^{0}C	
	U/S	D/S	U/S	D/S	Flow	Flow	Flow	Flow	Max	Min
1-Aug-16	19200	5900	1500	Nil	19900	4000	15000	12000	31.4	16.7
2-Aug-**16**	19200	5900	1800	Nil	19900	4000	15000	12000	31.5	14.2
3-Aug-**16**	17100	4000	2000	Nil	19600	4000	15000	12000	29.0	17.8
4-Aug-**16**	15600	2400	2000	Nil	19600	4000	18000	12000	29.0	13.1
5-Aug-**16**	15700	2400	4600	Nil	19600	3700	18000	12000	33.6	15.4
6-Aug-**16**	15700	2400	3300	1800	19600	3700	18000	12000	36.1	18.3
7-Aug-**16**	17800	4400	2300	800	19600	3700	18000	12000	36.6	20.0
8-Aug-**16**	17800	4400	2000	Nil	19600	3700	18000	1000	31.6	18.4
9-Aug-**16**	18000	4700	2000	Nil	20000	3700	18000	1000	28.2	17.4
10-Aug-**16**	17500	4100	2000	Nil	19900	4000	18000	1000	36.6	18.1
11-Aug-**16**	18700	5600	5600	2000	20000	4000	18000	1000	28.1	17.4
12-Aug-**16**	23200	10300	2000	800	20000	4000	18000	1000	27.6	14.4
13-Aug-**16**	25500	12500	3200	1300	20000	4000	18000	1000	29.2	14.4
14-Aug-**16**	23600	10600	3700	1800	19600	4000	18000	1000	32.1	16.2
15-Aug-**16**	24400	11100	5100	2900	19600	4000	18000	1000	32.5	17.4
16-Aug-**16**	2400	11100	7200	5000	19600	4000	18000	1000	28.4	15.1
17-Aug-**16**	23300	10000	7800	5800	11700	4000	18000	1000	30.2	17.4
18-Aug-**16**	18100	4800	9300	7100	8000	4000	18000	6200	31.2	18.4
19-Aug-**16**	15800	2500	8000	5800	6700	4000	18000	6000	29.4	13.2
20-Aug-**16**	14300	1000	5700	3600	2500	4000	18000	7700	28.2	14.3
21-Aug-**16**	14900	1600	2900	800	2000	4000	18000	6600	32.5	12.4
22-Aug-**16**	14300	1000	2200	Nil	2000	4000	18000	5900	31.9	14.1
23-Aug-**16**	15800	2700	2200	Nil	2000	4000	18000	7300	22.1	11.2
24-Aug-**16**	16500	3200	2200	Nil	2000	4000	18000	3900	26.6	10.6
25-Aug-**16**	16600	3400	1700	Nil	2000	4000	18000	2100	29.8	17.4
26-Aug-**16**	18400	6100	1700	Nil	2000	4000	18000	2400	23.6	15.4
27-Aug-**16**	18500	5600	1900	Nil	2000	4200	18000	1100	28.4	16.0
28-Aug-**16**	21000	12600	2400	1300	2000	4200	18000	5500	24.2	13.3
29-Aug-**16**	29000	23700	3200	1300	2000	4200	18000	3200	17.6	13.0
30-Aug-**16**	25500	16300	4500	2300	2000	4200	18000	800	21.6	11.2
31-Aug-**16**	32900	23000	9600	7500	2000	3800	18000	4000	21.4	12.1

Discharge in Cusec

DATE	TIME	INDUS			Kabul	INDUS						
		TARBELA			Nowshera	KALABAGH		CHASHMA			TAUNSA	
		Reservoir Level (Ft)	U/S	D/S	Flow	U/S	D/S	Reservoir Level (Ft)	U/S	D/S	U/S	D/S
1-Sep-16	**600**	1544.07	147100	135000	21200	148100	140500	646.60	163800	158000	145600	129500
2-Sep-**16**	600	1544.07	127800	127000	20300	151700	144100	647.30	168200	150000	148500	131600
3-Sep-**16**	600	1543.80	120000	127000	18800	149000	141400	647.50	160300	150000	148100	130600
4-Sep-**16**	600	1543.18	109900	127000	17000	165500	157900	647.20	148100	150000	139900	122700
5-Sep-**16**	600	1542.22	105100	132000	19800	148200	140600	646.70	146000	150000	139900	122700
6-Sep-**16**	600	1541.25	104800	132000	19100	143900	136100	646.40	151000	151000	139100	121400
7-Sep-**16**	600	1540.28	104800	132000	20100	138200	130400	645.60	143900	143900	139100	121300
8-Sep-**16**	600	1538.90	107300	145000	20600	143500	135700	645.30	151900	150000	139100	121400
9-Sep-**16**	600	1537.40	104200	145000	20600	149700	141900	644.70	156200	158000	139100	122100
10-Sep-**16**	600	1535.79	101200	145000	20300	156200	148400	644.40	160400	158000	139200	122900
11-Sep-**16**	600	1534.32	105100	145000	20100	136000	128200	644.50	159300	152000	142200	126000
12-Sep-**16**	600	1532.95	107800	145000	20100	150400	142600	644.90	163000	152000	145600	129200
13-Sep-**16**	600	1531.77	113000	145000	22800	156400	148600	645.40	164900	152000	142200	126200
14-Sep-**16**	600	1530.43	108600	145000	24400	157500	149700	646.00	166500	152000	142200	126200
15-Sep-**16**	600	1528.95	106000	145000	24600	156700	148900	646.20	161400	152000	139400	123400
16-Sep-**16**	600	1527.08	96200	145000	20900	149700	141700	646.80	167900	152000	142000	125600
17-Sep-**16**	600	1525.19	88600	130000	21200	149500	141500	647.10	163400	152000	143700	127300
18-Sep-**16**	600	1523.66	82000	130000	20400	135400	127400	647.30	162200	152000	142400	126100
19-Sep-**16**	600	1522.00	76800	120000	19800	137200	129200	646.70	147100	152000	142200	126100
20-Sep-**16**	600	1520.87	75900	105000	17400	129200	121200	646.00	146700	152000	139700	123900
21-Sep-**16**	600	1519.80	77700	105000	19400	115400	107400	646.70	127500	110000	139600	123800
22-Sep-**16**	600	1518.85	82000	94000	16700	128700	120700	646.80	116600	110000	110200	97700
23-Sep-**16**	600	1597.92	82000	105000	17400	129700	121700	647.00	119400	110000	102200	86000
24-Sep-**16**	600	1517.09	79600	100000	18400	114800	106800	647.60	128100	110000	104200	88100
25-Sep-**16**	600	1516.22	77400	98900	17300	130400	122400	647.80	12000	110000	102500	86700
26-Sep-**16**	600	1515.48	76900	95000	16600	107500	99500	647.90	117600	110000	102500	86700
27-Sep-**16**	600	1514.57	72500	95000	17800	118800	110800	647.90	115700	110000	102500	86700
28-Sep-**16**	600	1513.65	72300	95000	17400	95600	87600	647.80	113800	110000	102500	86700
29-Sep-**16**	600	1512.66	70500	95000	17100	125800	117800	647.40	114600	117000	100800	85100
30-Sep-**16**	600	1512.18	71500	83000	15700	96600	88600	646.70	11000	117000	100800	85100

Discharge in Cusec

DATE	INDUS						JHELUM				
	GUDDU		SUKKAR		KOTRI		MANGLA			RASUL	
	U/S	D/S	U/S	D/S	U/S	D/S	Reservoir Level (Ft)	U/S	D/S	U/S	D/S
1-Sep-16	120600	94800	92600	40500	48600	23500	1236.70	28300	40000	35800	19000
2-Sep-**16**	126500	106100	90100	37500	43900	15100	1236.35	26300	40000	31900	15300
3-Sep-**16**	136000	116500	100000	46300	43700	11400	1236.00	26600	40000	39700	22800
4-Sep-**16**	147900	122300	100400	46300	43900	9900	1236.65	26300	40000	35800	19000
5-Sep-**16**	150100	122300	108900	54400	38500	4000	1235.35	28300	40000	32300	15300
6-Sep-**16**	141100	113400	115900	61000	38500	4000	1234.80	33500	55000	34300	15800
7-Sep-**16**	137800	108200	110300	55600	36900	2400	1234.05	25700	55000	52300	31400
8-Sep-**16**	137600	108200	106300	51700	46100	14600	1233.25	23700	55000	40700	19700
9-Sep-**16**	134200	104500	104900	50400	55400	22100	1232.35	19800	55000	40800	19700
10-Sep-**16**	132700	104500	97900	44300	59400	26200	1231.50	21800	55000	44800	23600
11-Sep-**16**	132200	104500	95000	41200	51700	18400	1230.65	21800	55000	42200	23600
12-Sep-**16**	128200	104200	94300	41200	46400	14600	1230.15	35500	55000	46400	27500
13-Sep-**16**	128200	104200	94600	41200	45600	13700	1229.30	23100	55000	42700	23600
14-Sep-**16**	127200	104200	94600	41200	45600	13800	1228.35	19700	55000	42900	27500
15-Sep-**16**	127200	111300	94400	41200	39000	7700	1227.45	21600	55000	45000	23600
16-Sep-**16**	124200	93900	89700	37400	37100	5800	1226.50	19700	55000	45000	23600
17-Sep-**16**	118700	88400	87500	35200	37100	5800	1225.50	17900	55000	44800	23600
18-Sep-**16**	114700	84400	85100	33400	37100	5800	1224.50	17900	55000	44900	23600
19-Sep-**16**	117400	86400	81800	30000	36300	5800	1223.40	14100	55000	45000	23600
20-Sep-**16**	119300	83200	84100	32300	34500	5000	1222.30	14100	55000	49000	49000
21-Sep-**16**	118700	93200	88300	35900	32300	3200	1221.35	14700	50000	45100	45100
22-Sep-**16**	118900	94800	88300	35900	30500	1600	1220.50	15000	53300	41200	19700
23-Sep-**16**	120600	95800	90600	37800	29900	1600	1219.55	15600	50000	45100	23600
24-Sep-**16**	117600	93700	90400	37700	30500	3200	1218.60	16600	50000	41200	19700
25-Sep-**16**	92300	69300	90100	37800	31100	4000	1217.60	14900	50000	45000	23600
26-Sep-**16**	85300	61700	72300	22300	31100	4400	1216.60	14900	50000	41100	1900
27-Sep-**16**	82400	60000	66500	16600	34500	7700	1215.60	14900	50000	37200	15800
28-Sep-**16**	80900	60000	59100	10800	34600	8400	1214.55	13100	50000	41200	19700
29-Sep-**16**	81400	62300	59100	10800	34600	8400	1213.50	13100	50000	44900	23600
30-Sep-**16**	81300	62700	61900	12600	33800	8400	1212.45	13100	50000	49100	27500

Discharge in Cusec

DATE	CHENAB								RAVI			
	MARALA		QADIR ABAD		TRIMMU		PANJAND		BALLOKI		SIDHNAI	
	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S
1-Sep-16	55000	22200	34000	16000	46100	33600	17700	3200	40600	10700	22400	8500
2-Sep-**16**	50200	22200	31300	13300	47900	35400	23300	6100	40800	10700	22400	8500
3-Sep-**16**	45100	16900	35300	13300	47900	35400	29800	14300	40400	8300	22500	8500
4-Sep-**16**	44100	11500	28700	6700	48800	36300	35600	19800	42300	9500	20700	6600
5-Sep-**16**	39400	5900	24700	2700	40900	28400	40400	24600	43500	10700	18800	4600
6-Sep-**16**	40500	11500	19000	Nil	39900	27400	41300	25500	42300	9500	16800	2600
7-Sep-**16**	37900	8000	20400	Nil	32300	19800	41300	25500	38700	5700	17000	2600
8-Sep-**16**	38400	8000	22000	Nil	29700	16200	36700	20900	36700	5700	17000	2600
9-Sep-**16**	37900	8000	22000	Nil	24200	10600	33400	17500	39600	6600	17300	2600
10-Sep-**16**	37900	8000	22000	Nil	28000	14400	28100	12200	38700	5700	15200	700
11-Sep-**16**	38600	8000	22000	Nil	27900	15600	24300	8400	37800	4800	15300	700
12-Sep-**16**	47000	15300	22000	Nil	29100	15600	22000	6100	36900	3900	14400	Nil
13-Sep-**16**	48600	15300	24700	2700	30100	15600	18900	3200	36800	4800	14700	Nil
14-Sep-**16**	39700	8000	24700	2700	30100	15600	18900	3200	36800	4800	15500	700
15-Sep-**16**	37200	8000	24700	2700	30100	15600	20000	4200	39200	6600	14900	Nil
16-Sep-**16**	35700	8000	22000	Nil	30100	15700	20000	4200	38500	5700	14900	Nil
17-Sep-**16**	31200	8000	22000	Nil	30100	15600	17900	2100	36900	3900	15700	700
18-Sep-**16**	30300	8000	22000	Nil	32500	18000	17100	1300	36100	3100	16000	1000
19-Sep-**16**	28600	8000	22000	Nil	32500	17500	16800	800	31000	Nil	16000	1000
20-Sep-**16**	27500	8000	22000	Nil	30000	15500	17300	1300	30000	Nil	15400	15400
21-Sep-**16**	23600	8000	22000	Nil	30500	15500	18000	2100	29200	Nil	15100	15100
22-Sep-**16**	31900	8000	22000	Nil	32300	17300	18000	2100	28700	Nil	13800	Nil
23-Sep-**16**	30300	8000	22000	Nil	31000	15500	17600	1700	29200	Nil	15000	Nil
24-Sep-**16**	30200	8000	22000	Nil	32200	15500	16000	Nil	33800	600	14400	Nil
25-Sep-**16**	28600	8000	22000	Nil	27700	10500	16000	Nil	33800	600	14800	Nil
26-Sep-**16**	28300	8000	22000	Nil	27700	10500	16000	Nil	32200	Nil	14800	Nil
27-Sep-**16**	20900	8000	22000	Nil	22700	5500	15900	Nil	28200	Nil	14800	Nil
28-Sep-**16**	20200	8000	22000	Nil	22900	5700	14500	Nil	27200	Nil	15000	Nil
29-Sep-**16**	20500	8000	21000	Nil	24400	7200	12900	Nil	24200	Nil	15000	Nil
30-Sep-**16**	22200	8000	22000	Nil	24400	7200	12400	Nil	22200	Nil	14800	Nil

Discharge in Cusec

DATE	SUTLEJ				LINKS/CANAL				SKARDU	
	SULEMANKI		ISLAM		C.J	CRBC	Q.B	T.P	Temperature ^{0}C	
	U/S	D/S	U/S	D/S	Flow	Flow	Flow	Flow	Max	Min
1-Sep-16	32100	20600	14300	12100	2000	3800	18000	2600	21.6	13.4
2-Sep-**16**	25600	13700	17500	15300	2000	3400	18000	3800	21.3	13.2
3-Sep-**16**	20300	8500	17500	15300	2000	3700	18000	Not Received	22.9	12.4
4-Sep-**16**	18600	6600	17600	15300	2000	3900	22000	Not Received	26.6	10.8
5-Sep-**16**	18200	5900	12500	10200	2000	3900	22000	Not Received	28.5	21.1
6-Sep-**16**	17200	5000	9800	7500	2000	3900	19000	Not Received	29.6	16.5
7-Sep-**16**	15000	2500	7500	5000	2000	4100	20400	2200	25.6	15.2
8-Sep-**16**	16000	3400	5900	3600	2000	4100	22000	Not Received	26.4	10.2
9-Sep-**16**	15800	2900	3800	1500	2000	4100	22000	1200	29.4	9.3
10-Sep-**16**	15800	2900	2500	Nil	2000	4100	22000	900	30.6	11.3
11-Sep-**16**	15700	2900	2500	Nil	2000	4100	22000	1900	31.3	11.2
12-Sep-**16**	14200	1800	2500	Nil	2000	4100	22000	1900	25.6	12.3
13-Sep-**16**	14400	2200	2200	Nil	2000	4100	22000	1300	20.6	9.2
14-Sep-**16**	14400	2200	2500	Nil	2000	4100	22000	1300	23.6	12.2
15-Sep-**16**	16300	3500	2200	Nil	2000	4100	22000	1400	22.6	9.3
16-Sep-**16**	15500	2600	2400	Nil	2000	4100	22000	1200	23.6	9.2
17-Sep-**16**	15500	2600	2400	Nil	2000	4100	22000	1300	25.6	9.2
18-Sep-**16**	15700	2600	2400	Nil	2000	4100	22000	1100	26.4	7.4
19-Sep-**16**	15700	2600	1900	Nil	2000	4100	22000	800	29.6	8.2
20-Sep-**16**	14200	1100	2300	Nil	2000	4100	22000	900	26.4	7.4
21-Sep-**16**	14000	1100	2300	Nil	2000	4100	22000	900	29.7	10.4
22-Sep-**16**	13500	300	1200	Nil	2000	4100	22000	Not Received	26.6	11.2
23-Sep-**16**	13500	300	600	Nil	2000	4100	22000	800	23.6	7.2
24-Sep-**16**	13700	600	600	Nil	2000	3600	22000	1200	27.2	16.4
25-Sep-**16**	14700	1700	1200	Nil	2000	3600	22000	900	27.6	9.2
26-Sep-**16**	14800	1700	1200	Nil	2000	3600	22000	900	26.5	6.2
27-Sep-**16**	14300	1300	1200	Nil	2000	3800	22000	900	27.6	6.4
28-Sep-**16**	13300	300	1600	Nil	2000	3800	22000	900	28.5	5.3
29-Sep-**16**	13000	Nil	1600	Nil	2000	3800	22000	600	27.7	6.8
30-Sep-**16**	12500	Nil	1600	Nil	2000	4000	22000	600	27.8	7.3

Discharge in Cusec

DATE	TIME	INDUS			Kabul	INDUS						
		TARBELA			Nowshera	KALABAGH		CHASHMA			TAUNSA	
		Reservoir Level (Ft)	U/S	D/S	Flow	U/S	D/S	Reservoir Level (Ft)	U/S	D/S	U/S	D/S
1-Oct-16	**600**	1511.73	72200	83000	15400	100800	100800	646.70	103000	98000	107600	85500
2-Oct-**16**	600	1511.26	71700	83000	16000	104900	104900	646.00	90600	98000	107600	85500
3-Oct-**16**	600	1510.82	72500	83000	15900	91800	91800	646.00	102000	98000	91400	69000
4-Oct-**16**	600	1509.90	69900	92500	15200	100500	100500	645.50	95000	98000	91400	69000
5-Oct-**16**	600	1508.98	71200	93000	15000	100400	100400	645.30	99200	99200	91400	69000
6-Oct-**16**	600	1508.12	72600	93000	15200	84300	76300	646.70	104200	104200	91300	68900
7-Oct-**16**	600	1508.18	67200	65000	15300	98800	92800	647.50	98100	79000	90100	68000
8-Oct-**16**	600	1508.04	62300	55000	16000	80500	72500	648.00	93200	79000	79600	64500
9-Oct-**16**	600	1508.14	58200	55000	15000	85000	77100	647.50	72800	79000	76100	61600
10-Oct-**16**	600	1508.06	53700	55000	14100	76800	69000	647.20	76900	79000	77900	63000
11-Oct-**16**	600	1507.84	50300	55000	12600	84500	78500	646.70	64000	69000	77900	63100
12-Oct-**16**	600	1507.50	47400	55000	11500	68900	62900	646.40	68100	69000	77900	63100
13-Oct-**16**	600	1507.08	44400	54000	11300	74800	68800	645.80	63700	69000	72500	67200
14-Oct-**16**	600	1507.02	42200	43000	10500	74300	68300	645.30	61000	64000	65600	60800
15-Oct-**16**	600	1506.95	41000	42000	10900	65900	59900	644.60	58800	64000	65600	60800
16-Oct-**16**	600	1506.89	41200	42000	11100	70100	64100	644.00	46200	50000	65800	65800
17-Oct-**16**	600	1506.75	39900	42000	10100	64100	64100	643.30	45800	50000	64100	64100
18-Oct-**16**	600	1506.22	39800	52000	9500	74600	68600	642.60	46200	50000	60600	60600
19-Oct-**16**	600	1505.61	38000	52000	9300	64800	58800	642.70	49700	45000	57100	57100
20-Oct-**16**	600	1505.10	38400	50000	8900	72200	66200	643.80	60700	45000	54800	54800
21-Oct-**16**	600	1504.56	37600	50000	8900	54300	48300	644.00	51000	45000	52500	52500
22-Oct-**16**	600	1504.20	37000	45000	11100	63700	57700	644.10	50000	45000	49000	49000
23-Oct-**16**	600	1503.76	35000	45000	9700	69400	63400	644.30	51300	45000	49000	49000
24-Oct-**16**	600	1503.36	35900	45000	8500	70200	64200	644.00	45100	45000	47800	47800
25-Oct-**16**	600	1502.93	35200	45000	9600	76700	70700	643.60	44500	45000	46600	46600
26-Oct-**16**	600	1502.29	30000	45000	8500	58900	52900	643.90	47300	40000	45500	45500
27-Oct-**16**	600	1501.77	33000	45000	6900	55300	49300	644.10	46300	40000	44300	44300
28-Oct-**16**	600	1501.21	32100	45000	7800	54700	48700	644.80	47600	35000	44300	44300
29-Oct-**16**	600	1500.85	31100	39100	6800	58200	52200	645.30	45600	35000	42000	42000
30-Oct-**16**	600	1500.25	31100	45000	7000	61700	55700	645.80	46000	35600	42000	42000
31-Oct-**16**	600	1499.65	31100	45000	7200	61200	55200	646.00	41800	35000	39400	39400

Discharge in Cusec

DATE	INDUS						JHELUM				
	GUDDU		SUKKAR		KOTRI		MANGLA			RASUL	
	U/S	D/S	U/S	D/S	U/S	D/S	Reservoir Level (Ft)	U/S	D/S	U/S	D/S
1-Oct-16	79600	60800	61900	12600	20700	Nil	1211.35	11400	50000	45100	23600
2-Oct-**16**	77900	59200	59400	10800	15500	Nil	1210.25	11400	50000	49100	27500
3-Oct-**16**	80000	65800	59300	10800	10000	Nil	1209.15	13200	50000	45300	23600
4-Oct-**16**	81000	67200	59300	10800	10000	Nil	1208.00	12000	50000	49100	27500
5-Oct-**16**	73600	58600	58700	10800	11800	Nil	1207.00	12000	45000	45100	40100
6-Oct-**16**	65000	51500	55200	8800	11800	Nil	1206.10	15300	45000	36300	19700
7-Oct-**16**	62400	47600	53500	8800	10100	Nil	1205.00	8700	45000	44100	27500
8-Oct-**16**	66300	51500	49400	6900	10100	Nil	1203.95	10300	45000	40200	23600
9-Oct-**16**	64300	51500	47600	9500	10000	Nil	1202.90	10100	45000	32400	15800
10-Oct-**16**	64300	51500	49500	11100	10000	Nil	1201.85	10600	45000	36300	19700
11-Oct-**16**	61500	51100	48100	12000	8400	Nil	1201.05	10100	35000	36300	19700
12-Oct-**16**	61000	50800	50900	17500	8500	Nil	1200.30	11700	35000	28600	11900
13-Oct-**16**	61000	50800	47500	14100	6800	Nil	1199.50	11400	35000	36400	19700
14-Oct-**16**	61200	49000	41200	8700	8900	Nil	1198.80	10000	35000	24600	8000
15-Oct-**16**	61300	51100	41100	7600	9800	Nil	1198.10	10000	30000	28500	11900
16-Oct-**16**	61300	51100	45400	11000	10400	Nil	1197.40	10000	30000	28600	11900
17-Oct-**16**	61300	51100	49000	14800	15700	Nil	1196.65	8600	30000	32500	15800
18-Oct-**16**	61300	51100	48800	17500	13100	Nil	1195.95	10000	30000	28400	11900
19-Oct-**16**	61300	51100	44300	13000	8100	Nil	1195.75	9300	15000	12400	Nil
20-Oct-**16**	60100	51100	43300	12600	7200	Nil	1195.55	9300	15000	11300	Nil
21-Oct-**16**	52600	43900	42500	12500	9900	Nil	1195.50	8600	10000	12000	Nil
22-Oct-**16**	52600	43900	40900	10800	13700	Nil	1195.40	7100	10000	8300	Nil
23-Oct-**16**	51400	42700	40700	10800	16700	Nil	1195.30	7100	10000	7000	Nil
24-Oct-**16**	51400	39600	39600	10000	12300	Nil	1195.20	7100	10000	7000	Nil
25-Oct-**16**	51400	39200	39200	10000	12300	Nil	1195.10	7100	10000	7000	Nil
26-Oct-**15**	51400	42700	39300	39300	12300	Nil	1194.36	7200	30000	22800	15800
27-Oct-**15**	53300	44700	40600	40600	10300	Nil	1193.50	7200	30000	29800	19000
28-Oct-**15**	57100	48400	42400	42400	10300	Nil	1192.70	7200	30000	32200	19000
29-Oct-**15**	57100	48400	44100	44100	9500	Nil	1191.95	8600	30000	30900	15300
30-Oct-**15**	53800	45200	47100	47100	9500	Nil	1191.20	8600	30000	36000	19000
31-Oct-**15**	53800	45200	44000	44000	9500	Nil	1190.45	8600	30000	25100	8000

Discharge in Cusec

DATE	CHENAB								RAVI			
	MARALA		QADIR ABAD		TRIMMU		PANJAND		BALLOKI		SIDHNAI	
	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S
1-Oct-16	22300	8000	22000	Nil	26300	9100	11800	Nil	22300	Nil	14500	Nil
2-Oct-**16**	27400	8000	22000	Nil	21900	4700	11600	Nil	23400	Nil	14000	Nil
3-Oct-**16**	27500	8000	22000	Nil	21900	4700	11200	Nil	22300	Nil	14200	Nil
4-Oct-**16**	26500	6000	22000	Nil	23100	5900	13100	Nil	22300	Nil	14200	Nil
5-Oct-**16**	26400	6000	23400	Nil	22600	5200	13800	Nil	25300	Nil	14200	Nil
6-Oct-**16**	26000	6000	22000	Nil	22600	5200	14500	Nil	26300	Nil	14200	Nil
7-Oct-**16**	25900	6000	22000	Nil	22600	5200	15100	Nil	22800	Nil	14200	Nil
8-Oct-**16**	25100	6000	22000	Nil	22000	4700	15500	Nil	25000	Nil	14200	Nil
9-Oct-**16**	23500	6000	22000	Nil	24000	6700	15500	Nil	27200	Nil	14200	Nil
10-Oct-**16**	23300	6000	22000	Nil	21700	4400	16300	800	27200	Nil	14200	Nil
11-Oct-**16**	18500	6000	22000	Nil	24000	6700	15000	Nil	25800	Nil	14200	Nil
12-Oct-**16**	17500	NIL	22000	Nil	24000	6700	19900	Nil	24800	Nil	14200	Nil
13-Oct-**16**	15700	6000	22000	Nil	24000	6700	11900	Nil	22300	Nil	14200	Nil
14-Oct-**16**	12800	6000	22000	Nil	24000	6700	11500	Nil	21800	Nil	14200	Nil
15-Oct-**16**	12800	6000	22000	Nil	17300	Nil	10800	Nil	10800	Nil	14200	Nil
16-Oct-**16**	12600	6000	22000	Nil	Nil	Nil	12000	Nil	19000	Nil	13500	Nil
17-Oct-**16**	12900	6000	22000	Nil	Nil	Nil	11100	Nil	20500	Nil	13600	Nil
18-Oct-**16**	12800	6000	22000	Nil	12300	Nil	9300	Nil	20500	Nil	11400	Nil
19-Oct-**16**	11200	6000	22000	Nil	10400	Nil	6700	Nil	2000	Nil	10700	Nil
20-Oct-**16**	11500	6000	18000	Nil	11800	Nil	5500	Nil	19500	Nil	9000	Nil
21-Oct-**16**	11300	6900	19000	Nil	13100	Nil	2800	2800	15000	Nil	2000	2000
22-Oct-**16**	10400	6000	22000	Nil	11000	11000	3600	3600	19400	2000	1300	1300
23-Oct-**16**	12100	7700	18000	Nil	8900	8900	3600	3600	25000	15000	1000	700
24-Oct-**16**	10400	6000	19000	Nil	6500	6500	5700	5700	23900	13900	1200	700
25-Oct-**16**	10900	6500	12000	Nil	6500	6500	9000	9000	22700	12700	700	Nil
26-Oct-**15**	12600	8200	14000	Nil	6400	6400	10400	10400	18200	8200	2700	2000
27-Oct-**15**	10400	6000	14000	Nil	6400	6400	16700	16700	18200	8200	5900	5300
28-Oct-**15**	10400	6000	15100	Nil	4900	4900	12400	12400	17000	7000	5800	5200
29-Oct-**15**	9900	6000	15800	Nil	4900	4900	14200	14200	18400	10400	5200	4600
30-Oct-**15**	9600	6000	18900	Nil	23400	23400	12200	12200	19600	11600	5200	4600
31-Oct-**15**	9700	3200	18000	Nil	18900	18900	14500	14500	19600	11600	5200	4600

Discharge in Cusec

DATE	SUTLEJ				LINKS/CANAL				SKARDU	
	SULEMANKI		ISLAM		C.J	CRBC	Q.B	T.P	Temperature ^{0}C	
	U/S	D/S	U/S	D/S	Flow	Flow	Flow	Flow	Max	Min
1-Oct-16	10800	Nil	1200	Nil	Nil	4000	22000	8000	28.5	7.3
2-Oct-**16**	9800	Nil	700	Nil	Nil	4000	22000	8000	29.6	6.2
3-Oct-**16**	10500	Nil	Nil	Nil	Nil	4000	22000	8300	29.7	9.3
4-Oct-**16**	10500	Nil	Nil	Nil	Nil	4000	22000	8300	26.7	11.1
5-Oct-**16**	10100	Nil	Nil	Nil	Nil	4000	21000	9400	25.0	12.2
6-Oct-**16**	11800	Nil	Nil	Nil	Nil	4000	16000	9400	23.9	11.1
7-Oct-**16**	13700	Nil	Nil	Nil	Nil	4000	22000	9800	23.3	12.8
8-Oct-**16**	11500	Nil	Nil	Nil	Nil	4000	22000	2800	22.2	10.0
9-Oct-**16**	12600	Nil	Nil	Nil	Nil	4000	22000	2200	19.4	11.1
10-Oct-**16**	12800	500	Nil	Nil	Nil	4000	22000	4000	17.8	8.3
11-Oct-**16**	13400	1300	Nil	Nil	Nil	4000	22000	4700	20.6	6.1
12-Oct-**16**	13000	900	Nil	Nil	Nil	4000	22000	4100	20.0	5.6
13-Oct-**16**	12100	Nil	Nil	Nil	Nil	4000	22000	5300	21.1	5.6
14-Oct-**16**	11000	Nil	Nil	Nil	Nil	4000	21000	4800	22.2	6.1
15-Oct-**16**	10000	Nil	Nil	Nil	Nil	3600	22000	4800	21.1	9.4
16-Oct-**16**	9900	Nil	Nil	Nil	Nil	3600	22000	Not Received	22.8	8.3
17-Oct-**16**	10900	900	Nil	Nil	Nil	3600	22000	Not Received	22.2	6.1
18-Oct-**16**	10900	900	Nil	Nil	Nil	3600	22000	Not Received	22.8	5.0
19-Oct-**16**	11000	1100	Nil	Nil	Nil	3700	22000	Not Received	21.1	6.1
20-Oct-**16**	13800	3900	Nil	Nil	Nil	3800	18000	Not Received	21.3	7.2
21-Oct-**16**	10900	10900	1300	800	Nil	3800	19000	Not Received	19.4	10.0
22-Oct-**16**	12300	12300	1100	NIL	Nil	3800	22000	Not Received	18.3	5.6
23-Oct-**16**	20300	20300	3000	1800	Nil	3800	18000	Not Received	18.3	5.6
24-Oct-**16**	21400	21400	8700	7500	Nil	3800	19000	Not Received	17.2	6.1
25-Oct-**16**	17800	15800	11	10200	Nil	3900	12000	Not Received	15.6	5.0
26-Oct-**16**	12500	10500	15400	15400	Nil	4000	14000	Not Received	15.1	4.4
27-Oct-**16**	12800	12800	15400	15400	Nil	4000	14000	Not Received	18.3	5.6
28-Oct-**16**	12800	12800	10500	10500	Nil	4000	15100	Not Received	15.6	3.9
29-Oct-**16**	12800	12800	10500	10500	Nil	4000	15800	Not Received	15.0	1.7
30-Oct-**16**	9700	9700	9600	9600	Nil	4000	18900	Not Received	15.6	1.7
31-Oct-**16**	9700	9700	8700	8700	Nil	4000	18000	Not Received	15.6	2.8

Appendix-III

MONTHLY RAINFALL DATA (JULY-SEPTEMBER 2016) (SOURCE: PMD)

RAINFALL (MM) STATEMENT FOR THE MONTH OF JULY-2016

Stations | indicates daily highest rainfall.

	PUNJAB	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Monthly Normal	Deviation from normal	Rainy days: Current Month	Rainy days: Historical	Highest Rain in 24 hrs: Current Month	Highest Rain in 24 hrs: Historical
1	B.NAGAR	0	0	4	0.1	0	0	0	0	6	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	14.1	70.8	-56.7	5.0	5.6	6.0	125.0
2	B.PUR, CITY	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	34.1	40.4	-6.3	2.0	3.3	34.0	67.0
3	B.PUR , A/P	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0.1	16.1	12.8	3.3	3.0	1.9	13.0	37.0
4	BHAKKAR	0	0	26	1	0	13	0	0	5	0	0	0.1	6	0	0	1	42	11	0	0	0	0	0	0	0	0	0	2	0	0	1	108.1	83.4	24.7	11.0	7.0	42.0	58.6
5	CHAKWAL	0	0	19	0	0	6	0	0	0	0	0	4.8	13.2	8	0	15	0.1	47	0	0	0	0	0.1	0	0.2	0	43	5.3	0.6	6.2	11.2	179.7	**	**	15.0	8.3	47.0	69.0
6	D.G.KHAN	0	0	0.1	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0.1	0	0	0	0	2.1	1	0	0	26.5	39.5	-13.0	7.0	3.2	23.0	49.6
7	FAISALABAD	0	0	0	0	0	1	25.4	0	5	11.2	0	0	0	0	0	0	0.1	25	0	0	0	0	0	5	0	0	0	36.5	0	0	0	109.2	100.8	8.4	8.0	6.5	36.5	180.3
8	ISB,A/P	0	8	3	44	0	28	1	0	8	0	0	0	0.1	32	39	19	8	29	0.1	0.1	0	19	3	2	1	0.1	69	19	0	26	0	358.4	307.8	50.6	22.0	14.9	69.0	200.0
9	ISB,Z/P	0	0	14	20	0	24	0.1	0	2	0	0	0	0	23	75.4	16	0.1	5	0.1	0	0	29	0.1	30	5	0.1	56	18	0	24	0	341.9	368.6	-26.7	19.0	15.4	75.4	591.9
10	ISB. S.Pur	0	0	32	5	0	10	0	0	0	0	0	0	0	21	55	4	18	3	0	0	0	51	3	40	8	1	23	10	0	23	0	307.0	**	**	16.0	**	55.0	**
11	ISB.S.ABAD	0	0	37	14	0	24	0	0	4	0	0	0	0	17	59	30	4	12	0	0	0	29	0	9	1	0	58	25	0	30	0	353.0	**	**	15.0	**	59.0	**
12	ISB. GOLRA	0	0	28	3	0	12	0	0	2	0	0	0	0	25	32	27	18	5	0	0	0	8	0	15	0	0	69	25	0	17	0	286.0	**	**	14.0	**	69.0	**
13	ISB.BOKRA	0	2	16	7	0	16	0	0	19	0	0	0	0	6	44	37	13	15	0	0	0	9	0	1	0	0	35	24	0	20	0	264.0	**	**	15.0	**	44.0	**
14	JHANG	0	0	3	0	0	39	0	0	34	9	0	0	0	0	0	1	71	5	0	0	0	0	0	0	0	0	0	0	0	0	1.6	163.6	88.0	75.6	8.0	5.4	71.0	64.2
15	JOHARABAD	0	0	1	0.1	0	0	0.4	0	9	1	0	0	0	0	0	30	4	8	0	0	0	0	3	0	0	0	0	2	0	17	6	81.5	130.1	-48.6	12.0	6.8	30.0	95.0
16	JHELUM	0	0.1	20	0	0	30	0	0	0	0	0	0	0	0	71.4	4	0	0	0	0	0	1	0	2	17	12	0	8	0	19	7.6	192.1	243.1	-51.0	12.0	14.4	71.4	242.2
17	KASUR	0	0	34	0	0	0.1	0.1	0	0	29	0	18	0.1	0	0	0	33	1	0.1	0	0	0	0	0	0	0.1	0	2	0	0.1	0.1	117.7	**	**	13.0	6.0	34.0	47.0
18	KHANPUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0.1	0	0	0	3.1	33.3	-30.2	3.0	2.6	2.0	81.3
19	KOT ADDU	0	0	6	0	0	0	0	0	0	7.2	0	0	0.1	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	26	0	0	0	39.4	**	**	5.0	**	26.0	**
20	KAMRA	0	0	60	0.1	0	0.1	0.1	0.1	0.1	0	0	0	0	2	7	18	0.1	27	0	0	0	0	40	11	0	0.1	69	0.1	0	27	33	294.8	216.5	78.3	18.0	**	69.0	240.0
21	LAHORE, A/P	0	0.1	3	0	0	32	1	0.1	4	9	0	0	0	0	8.2	2	40.6	0.1	0	0	0	3	7	0.1	0	29	0	20	0	0	5	164.2	196.8	-32.6	17.0	12.5	40.6	332.5
22	LAHORE, PBO	0	0	8	0	0	19	4.3	1	4	7.2	0	21.6	0	0	0.1	0.1	33.7	0	0	0	0	0	0	25.8	0	2.2	0	20.1	0	0	3.8	150.9	190.9	-40.0	14.0	12.7	33.7	207.6
23	SHAHLQILLA	0	0	1	0	0	34	0.1	0	8	4	0	0	0	0	18	0	47	0	0	0	0	0	0	11	0	2	0	62	0	0	0	187.1	**	**	10.0	**	62.0	**
24	MISRI SHAH	0	0	1	0	0	31	0.1	0	6	5	0	0	0	0	26	0	52	0	0	0	0	0	0	20	0	10	0	77	0	0	0	228.1	**	**	10.0	**	77.0	**
25	UPPER.MALL	0	0	1	0	0	20	0.1	0	3	5	0	0	0	0	0	0	28	0	0	0	0	0	0	18	0	3	0	31	0	0	25	134.1	**	**	10.0	**	31.0	**
26	SHAHDARA	0	0	0.1	0	0	28	0.1	0	0	12	0	0	0	0	0	0	38	5	0	0	0	0	0	8	0	0.1	0	2	0	0	0	93.3	**	**	9.0	**	38.0	**
27	GULBERG	0	0	2	0	0	38	0.1	0	5	4	0	25	0	0	9	0	33	2	0	0	0	0	0	22	0	4	0	37	0	0	1	182.1	**	**	13.0	**	38.0	**
28	LUCKSHAMI	0	0	3	0	0	25	0.1	0	8	6	0	0	0	0	30	0	39	2	0	0	0	0	0	19	0	2	0	63	0	0	0	197.1	**	**	11.0	**	63.0	**
29	GULSHAN RAVI	0	0	17	0	0	19	0.1	0	3	15	0	0	0	0	0	0	35	0	0	0	0	0	0	40	0	0	0	2	0	0	0	131.1	**	**	8.0	**	40.0	**
30	IQBAL TOWN	0	0	1	0	0	10	0.1	0	2	13	0	0	0	0	0	0	45	0	0	0	0	0	0	43	0	0	0	16	0	0	0	130.1	**	**	8.0	**	45.0	**
31	SAMNABAD	0	0	1	0	0	13	0.1	0	2	10	0	0	0	0	0	0	45	0	0	0	0	0	0	42	0	0	0	11	0	0	0	124.1	**	**	8.0	**	45.0	**
32	JOHAR TOWN	0	0	4	0	0	44	0.1	0	0	16	0	0	0	0	0	0	61	0	0	0	0	0	0	52	0	0	0	18	0	0	0	195.1	**	**	7.0	**	61.0	**
33	TOWNSHIP	0	0	5	0	0	11	0.1	0	0	9	0	0	0	0	8	0	50	0	0	0	0	0	0	50	0	0	0	18	0	0	0	151.1	**	**	8.0	**	50.0	**
34	MUGAL PURA	0	0	2	0	0	22	0.1	0	2	4	0	0	0	0	0	0	30	0	0	0	0	0	0	0.1	0	5	0	57	0	0	33	155.2	**	**	10.0	**	57.0	**
35	TAJPURA	0	0	2	0	0	22	0.1	0	3	2	0	0	0	0	0	0	30	0	0	0	0	0	0	0.1	0	20	0	27	0	0	25	131.2	**	**	10.0	**	30.0	**
36	LAYYAH	0	0	14	0	0	18	0	0	0.1	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	33	0	0	0.5	85.6	**	**	6.0	**	33.0	**
37	M.B.DIN	0	0.1	35	0.1	0	6	14	0	27	12	0	0	0	0	30	0	0	5	0	0	0	0	0	6	0	1	40	25	0	0	31	232.2	175.1	57.1	14.0	12.5	40.0	130.2
38	MIANWALI	0	0	90	0.1	0.1	0.1	5	0	0	0	0	0	0	0	6	3	0	29	0	0	0	0	0.1	0	0	0	0.1	1	0	55	18	207.5	144.6	62.9	13.0	**	90.0	149.0
39	MULTAN	0	0	34	0	0	0	0	0	0	0.1	0	2	2.4	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	14.4	0	0	0	52.6	49.6	3.0	6.0	4.0	34.0	127.0
40	MANGLA	0	0	3	0	0	25	0.5	0	0.1	11	0.1	0	0	8	48	16	0.3	1	0.1	0	0	7	2.6	0.1	6	2	66	8	0	32	4.4	241.2	269.2	-28.0	21.0	12.6	66.0	140.0
41	MURREE	0	16	4	7	1	4	25	0	33	5.4	15.4	7	7	1	11	1	0	21	1	0	0	18	0	8	10.1	46	42	14.6	0	4	0	302.2	339.5	-37.3	23.0	18.3	46.1	166.9
42	N.P.THAL	0	0	0	0	0	2	3	9	69	0	0	0	0	0	0	0	116	10	0	0	0	0	0.1	0	0	0	0	0	0	0	8	217.1	117.5	99.6	8.0	6.0	116.0	77.2
43	OKARA	0	0	0.1	0	0	2	0	0	0	32	0	0	0	0	0	0	23	75	14	0	0	0	0.1	0	0	0	0	0.1	0	0	0	146.3	80.4	65.9	8.0	5.4	75.0	77.0
44	R.Y. KHAN	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0.3	14.8	-14.5	3.0	1.7	0.1	31.0
45	GUJRANWALA	0	64	3	0	0	25	1.4	0	0	7.4	0	0	0	0	39.3	68	42.2	0.1	0	0	0	0	0	0	0	3.6	99	103	0.2	0.1	45	500.7	200.1	300.6	15.0	8.0	102.8	130.0
46	GUJRAT	0	18	0.1	0	0.1	1	0	0	0	4	0.1	0	0	0	7	6	0.2	22	1	0	0	0	0	12.8	0	0.6	135	39	0	0	0.1	247.0	168.0	255.7	16.0	9.0	135.0	92.4
47	SAHIWAL	0	0	0.1	0	0	1	2	2	0	3	0	0	0	0	0	0	2	50	0.1	0	0	0	0	0	0	0	0	1	0	0	0	61.2	64.8	-3.6	9.0	4.4	50.0	78.3
48	SARGODHA A/P	0	0	2	0	0	0.1	3	0	12	0	0	7	5	0	0	5	15	68	0	0	0	0	0	70	0	0	47	26	0	10	5	275.1	120.8	154.3	14.0	6.3	70.0	108.0
49	SARGODHA CITY	0	0	0.1	0	0	0	0	0	7	0	0	12	10	0	0	6	12	103	0	0	0	0	0	85	0	0	35	28	0	11	1	310.1	**	**	**	**	**	**
50	SHORKOT	0	0	33	0	0	39	0	0	0	0.1	0	0	0	0	0	0	7	0.1	0	0	0	0	0	0	0	0	0	57	0	0	10	146.2	95.0	51.2	7.0	**	57.0	152.0
51	SIALKOT CANTT	0	85	3	0	0	11	0.1	0	0	1	0	0	0	0	70.4	8	0.1	3	2	0	0	0	0	2.4	0	1.8	100	25.4	0.1	19.5	0	332.9	312.6	20.3	17.0	15.7	100.0	273.7
52	SIALKOT A/P	0	116	0.1	0	0	3	0	0	0.1	5.6	0	0	7.2	0	46.2	6	0.1	25	2	0	0	0	0	4	0	10	79	36.6	0.1	0	0.5	341.5	187.4	154.1	17.0	14.4	116.0	110.8
53	T.T. SINGH	0	0	0	0	0	34	0.1	0	19	3.6	0	0	0	0	0	0	63	32	0	0	0	0	0	6.8	0	0	0	0	0	0	0	158.5	71.7	86.8	7.0	4.8	63.0	66.3

G.B / AZAD KASHMIR																																				
54	ASTORE	0	0	0	0	0.1	1	3	0	0	0	0	0	0	0	0	3	0	1	5	1	0	0.1	0.2	0	0	0	0	3	2.6	0	0	20.0	26.4	-6.4	11.0	6.1	5.0	74.7
55	BUNJI	0	0	0	0	0	0	1.8	1	0	0	0	0	0	0	0	5	0	3	5	0.8	0	0	0	0	0	0	0	3.1	1.9	0	0	21.6	17.9	3.7	8.0	4.7	5.0	57.7
56	BAGROTE	0	0	0	7	0	0	0	0	0	0	0.4	0	0	3	18	0	4	10	6.3	0	2	0	0	0.4	0	0	9.1	0.7	9	0	69.9	**	**	12.0	**	18.0	**
57	CHILAS	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	2	2	0.1	2	0	0	2	0	0	0	0	0	0.1	0	0.5	0	8.9	15.3	-6.4	9.0	4.4	2.0	67.9
58	G.DOPATTA	0	29	15	34	0	26	4	0	7	14	15	0	10	0	10	5	4	6	0	0	0	8	0	2	0	9	5	0	0	13	0	216.0	263.3	-47.3	18.0	15.4	34.0	189.4
59	GILGIT	0	0	0	1	0	0	1.4	0	0	0	0	0.2	0	0.1	7.5	0.1	0	2	5	4.3	0	0	0	0	0	0	0	3	0.1	0.1	0	24.8	14.7	2.6	12.0	5.4	7.5	38.4
60	GUPIS	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	5	0	6	6	22.0	19.0	3.0	6.0	2.8	6.0	37.8
61	KOTLI	0	33	2	6	1	10	2	0	5	0	7	0	97	19	3	2	0	1	15	0	0	2	0.1	0	2	5	77	10	0	0.1	6	305.2	284.4	20.8	22.0	15.6	97.0	326.9
62	MUZAFFARABAD	0	17	21	10	2	10	5	0	0	2	0	0	23	5	12	0	0	2	0	0	0	23	0	23	19	5	2	0	0	10	0	191.0	349.3	-158.3	17.0	17.6	23.0	177.8
63	RAWALAKOT	0	41	10	14	0.1	0	5	0	8	0.1	24.8	0	0.1	0	2.2	1	0	4	0.1	0	0	0.1	0	3.8	0	22.1	19	17	0	0.6	6.6	179.6	263.5	-83.9	20.0	14.8	41.0	171.2
64	HUNZA	0	0	0.1	6	0	0	0.4	0.1	0	0	0	0	0	0	0	10	0	3.4	2	7.6	0	0	0	0	0	0	0	0	0.4	0	0	30.0	56.6	-26.6	9.0	6.6	10.0	163.0
65	SKARDU	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0.1	0	1.4	0	0.1	0	1	0	0	0	0.1	0	0	0	0	1.2	2.2	0	0.1	6.4	11.2	-4.8	10.0	4.2	2.2	84.3
K.PAKHTUNKHWA																																				
66	BALAKOT	0	1	5	9	0	0	18	0	3	10	0	0	61	2	2	0	0	15	14	0	0	2	0	4	0	0	7	0.5	0	25	0	178.5	324.4	-145.9	16.0	15.4	61.0	291.8
67	BANNU	0	0	32	0	0	0	0	0	0	0	0	0	0	0	16	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	49.0	63.6	-14.6	3.0	4.7	32.0	101.0
68	CHERAT	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	12	9	0	0	0	0	0	0	0	0	19	4	0	0	25	75.0	85.5	-10.5	7.0	6.6	25.0	257.0
69	CHITRAL	0	0	0	0	0	3	1	0	0	0	0	0	0	0	3.6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1.5	10.1	7.0	1.6	5.0	2.3	3.6	41.4
70	D.I.KHAN	0	0	64	0.1	0	12	0	0	0.1	0.1	0	24	0.1	0	0	20	41	53	0	0	0	0	0	0	0	0	0	7	0	0	0	221.4	69.6	151.8	11.0	6.1	64.0	116.0
71	DIR	2	0	13	4	2	15	9	0	0	0	0	0	0	0	27	0	12	0	1	0	0	3	0	0	0	0	8	7	0	7	4	114.0	154.5	-40.5	13.0	10.9	27.0	149.0
72	LOWER DIR	0	0	0	0	0	0	0	0	0	0	0	0	43	0	0	2	5	0	0	0	0	0	0	0	0	0	0	32	0	0	0	82.0	122.9	-40.9	4.0	7.6	43.0	192.0
73	DROSH	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	5.4	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	13.5	21.4	-7.9	3.0	4.7	8.0	61.2
74	KAKUL	0	15	14	2	1	0	0	0	0	12	7	17	88	0	18	5	0	29	0	0	0	0	0	0	1	40.5	90	1	0	5	2	347.5	257.5	90.0	17.0	18.1	90.0	163.6
75	KALAM	0	0	13	0	0	0	1	0	0	4	0	0	0	0	0	1	4.5	3	6	0	0	0	0	0	0	0	0	0	0	2	0	34.5	44.0	-9.5	8.0	7.5	13.0	84.0
76	KOHAT	0	0	0	0	0	0.1	0	3	0.1	0	0	0	0	0	34	22	5	8	1	0	0	0	0	0	0	0	20	1	0	0	3	97.2	83.2	14.0	11.0	**	34.0	233.0
77	M. JABBA	0	0	8	32	0	6	0	0	21	0	32	0	17	0	26	4	10	13	7	0	0	20	24	0	0	3	44	10	0	0	0	277.0	225.9	51.1	16.0	15.1	44.0	67.0
78	MIRKHANI	0	0	9	0	0	0	0	0	0	0	0	0	0	6	6	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	29.0	**	**	4.0	**	9.0	**
79	PARACHINAR	3	0	0	0	0	0	0	6	15	9	0	0	0	0	7	0	30	5	50	0	0	0	0	8	7	0	5	0	8	3	5	161.0	83.5	77.5	13.0	10.6	50.0	134.7
80	PESH A/P	0	0	1	0.1	0	7	0	0	0	0	0	0	0	0	0	0	1	0.1	0.1	0	0	0	0	0	0	0	10	18	0	0.1	0	37.4	58.3	-20.9	9.0	6.1	18.0	113.5
81	PESH CITY	0	0	0.1	0	0	4	2	0	0	0	0	0	0	0	0	0	14	0.1	0	0	0	0	0	0	0	0	10	10	0	0.1	0	40.3	58.3	-18.0	8.0	**	14.0	**
82	PATTAN	0	0	6	0	0	0	0	0	0	0	0	0	0	0	8	0	0	5	0	0	0	0	0	0	0	0	18	8	0	0	0	45.0	90.2	-45.2	5.0	6.2	18.0	97.1
83	RISALPUR	0	0	16	0	0	1	18	2	0	0	0	0	0	0.1	0	0	11	1	0	0	0	0	0.1	0	0	0	21	0.1	0	18	1	89.3	143.2	-53.9	12.0	**	21.0	280.0
84	SAIDU SHARIF	0	0	0.1	0	0	0	14	0	3	0	5	0.1	45	2	22	23	2	0	3	0	0	0	0	0	0	0	9	13	0	0	0	141.2	166.0	-24.8	13.0	11.0	45.0	187.0
SINDH																																				
85	BADIN	0	0	0	0.1	0	0	0	0.1	0	0	0	0	0	0.1	0	0.1	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	79.5	-78.0	6.0	2.4	1.0	249.4
86	CHHOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	82.2	-82.2	0.0	3.0	0.0	137.2
87	HYDERABAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	47.9	-47.9	0.0	2.1	0.0	190.5
88	JACOBABAD	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	7.0	39.0	-32.0	2.0	2.0	4.0	133.0
89	KARACHI A/P	0	0	0	0.1	0	0	0.1	0.1	0.1	0.2	0.2	0	0	0	0	0	0	1	0	0.1	0.1	0.1	0	0.1	0	0	0	0.1	0.1	0	0.1	2.5	60.0	-57.5	14.0	3.6	1.0	207.0
90	LARKANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	48.6	-48.6	0.0	1.3	0.0	165.5
91	MITHI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4.4	0	0	0	0	0	6.4	70.5	-64.1	2.0	1.5	4.4	**
92	SH.B.ABAD	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.0	58.3	-54.3	1.0	**	4.0	256.5
93	PADIDAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0.1	41.8	-41.7	1.0	2.2	0.1	138.0
94	ROHRI	*	*	*	*	*	*	*	*	*	2	*	*	*	*	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0.1	0	0	0	2.1	39.7	-37.6	2.0	1.5	2.0	184.5
95	SUKKUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	20.8	-20.8	0.0	1.0	0.0	**
96	M.JO.DARO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1.0	39.9	-38.9	1.0	1.9	1.0	69.0
97	THATTA	0	0	0	0	0	0	0	0	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	64.3	-63.1	1.0	**	1.2	**
98	DADU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	29.4	-29.4	0.0	**	0.0	**
99	MIRPUR KHAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	56.8	-56.8	0.0	**	0.0	**
BALOCHISTAN																																				
100	BARKHAN	0	0	0	1	0	0	0	0	0	47	0	0	1	0	0	0	56	1	4	0	0	0	0	0	0	0	0.1	0	0	0	0	110.1	98.7	11.4	7.0	6.2	56.0	88.0
101	DALBANDIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	4.0	-4.0	0.0	0.3	0.0	83.8
102	GAWADAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	1.5	-1.5	0.0	**	0.0	**
103	JIWANI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	3.1	-3.1	0.0	0.3	0.0	90.7
104	KALAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	21.9	-21.9	0.0	2.2	0.0	68.6
105	KHUZDAR	0	0	0	0	0	0	0	0	0	0	0	0	2.6	2	0	0	0	0	0	2	0	0	0	0	0	0	2	29	0	0	0	37.6	58.3	-20.7	5.0	5.5	29.0	223.0
106	LASBELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	51.4	-51.4	0.0	2.4	0.0	135.6
107	NOKKUNDI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2.0	0.7	1.3	1.0	0.1	2.0	16.5
108	PANJGUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	10	0	0	0	0	12.0	11.9	0.1	2.0	1.4	10.0	68.6
109	PASNI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	6.9	-6.9	0.0	0.7	0.0	119.4
110	Qta. (SH MANDA)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5.0	**	**	1.0	2.0	5.0	**
111	Qta. (SAMUNGLI)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3.0	11.2	-8.2	1.0	**	3.0	42.0
112	SIBBI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	7	0	0	0	0	0	0	0	0	0	13	0	0	0	57.0	38.4	18.6	3.0	1.7	37.0	88.9
113	TURBAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	8.1	-8.1	0.0	0.6	0.0	36.6
114	ORMARA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0	0	0.0	10.7	-10.7	0.0	0.5	0.0	57.4
115	ZHOB	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	2	0	0	2	0	0	6	25.0	66.4	-41.4	5.0	5.0	12.0	73.0

NOTE: ** not available

RAINFALL (MM) STATEMENT FOR THE MONTH OF AUGUST-2016

Stations		indicates daily highest rainfall.																																Rainy days		Highest Rain in 24 hrs	
PUNJAB		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Till Date	Monthly Normal	Deviation from normal	Current Month	Historical	Current Month	Historical
1	BAHAWALNAGAR	0	0	0	0	3	0	0	0	0	0	5	37	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	66	12	0	0	132.0	34.2	97.8	7.0	3.8	66.0	109.0
2	BAHAWALPUR,CITY	0	0	0	1	2.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	1	0	0	0	4.9	39.1	-34.2	5.0	2.2	2.7	214.9
3	BAHAWALPUR,AIRP	0	0	0	0	16	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	16.4	**	**	3.0	3.5	16.0	83.0
4	BHAKKAR	0	0	0.1	0	0	16	0	0	0	21	0	30	0	0	2	0	0	16	0	0	0	0	0	0	0	0	0	13	0	0	0.1	98.2	**	**	8.0	5.0	30.0	57.7
5	CHAKWAL	0	0	0	0	0	0	15	0	0	40.5	4.2	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	2	0	9	4	84.7	78.1	6.6	8.0	7.8	40.5	108.2
6	D.G.KHAN	0	0	0	1	0	0	0	0	0	0	3	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	29.0	**	**	5.0	3.2	20.0	93.0
7	FAISALABAD	1	0	0.1	0.1	0	0	1.8	25	4	0	62	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0	94.3	87.0	7.3	10.0	5.6	62.0	136.0
8	ISLAMABAD,AIRPOR	0	19	0	0	0	0	0	4	0	0	0.1	0	0	0	0.1	0	0	1	0	0	0	0.1	0	0	0.1	0	0	8	1	19	1	53.4	340.3	-286.9	11.0	15.7	19.0	200.0
9	ISLAMABAD,ZEROPO	0	0.1	0	0	0	0	0.1	63	0	31	0	0.1	0	0	1	0	0	6	0	0	0	2	0	0	72	0	0	84	0	4	2	265.3	334.7	-69.4	12.0	15.4	84.0	199.8
10	ISLAMABAD,SAIDPUI	0	0	0	0	0	0	0	3	0	71	0	3	0	0	5	0	0	5	0	0	0	1	0	0	20	0	0	80	0	0	1	189.0	**	**	9.0	**	80.0	**
11	ISLAMABAD,SHAMS/	0	0	0	0	0	0	0	32	0	47	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	30	0	0	0	112.0	**	**	5.0	**	47.0	**
12	ISLAMABAD,GOLRA	0	2	0	0	0	0	0	11	0	61	0	0	0	0	1	0	0	15	0	0	0	0	0	0	0	0	0	43	0	0	0	133.0	**	**	6.0	**	61.0	**
13	ISLAMABAD,BOKRA	0	66	0	0	0	0	0	3	2	18	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	22	0	0	0	113.0	**	**	7.0	**	66.0	**
14	JHANG	0.1	0	0	0	0	3	0	14	0.1	0	52	0	0.1	0	1	0	0	0	0	0	0	0	0	0	57	0	0	17	0	0	0	144.3	**	**	9.0	4.0	57.0	98.2
15	JOHARABAD	0	0	0.1	0	0	0	0.1	0	0	63.6	2.6	0	0	0	0.1	0	0	30	0	0	0	6	0	0	0	0	0	16.2	0	1.4	0.1	120.2	**	**	10.0	5.0	63.6	70.0
16	JHELUM	0	47	0	0	0	0	0.1	26	0	39.9	2.8	0	0	0	2	0	0	3.4	0	0	0	4	0	0	0	0.1	0	65	0	7.4	0	197.7	231.6	-33.9	11.0	13.1	65.0	167.9
17	KASUR	0	0	3	0	0	13	17	0	0.1	0	20	28	0.1	0	22	0	4	37	0	0	0	8	0.1	0	17	3	0	55	0	0.1	0	227.4	**	**	16.0	**	55.0	20.0
18	KHANPUR	0	0	0	2	0	29	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.4	0.1	0	0	43.5	33.2	10.3	5.0	2.0	29.0	125.0
19	KOT ADDU	0.1	0	1	0	49.4	7.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	3	1	0	0	0	62.0	**	**	7.0	**	49.4	**
20	KAMRA	0	37	35	0	0	0.1	0	0.1	0	13	0	2	0	0	6	0	0	4	0	0	0	3	0	0	0	0	0	0	0	0	0	100.2	276.7	-176.5	9.0	12.9	37.0	200.0
21	LAHORE, AIRPORT	0	0	0.1	0	0	16	1	0	4	0	17.2	0.2	0	0	0.1	0	1.6	3.4	0	0	0.1	0.1	0	0.1	42	43.5	49	70.8	0	15	0	264.2	182.9	81.3	17.0	11.7	70.8	221.0
22	LAHORE,CITY	0.1	0	0.1	0	0	33	0.1	3	33.2	1	29.6	0.1	13	0	0.1	0	10	10.5	0	0	3	0.1	0.1	0.1	18	65.6	0.1	59	0	37	0	316.8	179.4	137.4	22.0	12.7	65.6	211.1
23	LAHORE,SHAHI QILI	0	0	0	0	0	8	0	0	12	0	34	0	0	0	0	0	10	0	0	0	10	0	0	0	10	48	0	30	0	24	0	186.0	**	**	9.0	**	48.0	**
24	LAHORE,MISRI SHAI	0	0	0	0	0	10	0	0	12	0	38	0	0	0	0	0	7	0	0	0	8	0	0	0	11	62	0	40	0	26	0	214.0	**	**	9.0	**	62.0	**
25	LAHORE,UPPER MAI	0	0	0	0	0	18	0	0	26	0	13	0	0	0	0	0	11	6	0	0	7	0	0	0	17	43	0	63	0	52	0	256.0	**	**	10.0	**	63.0	**
26	LAHORE,SHAHDARA	0	0	0	0	0	20	0	0	16	0	30	0	0	0	0	0	4	0	0	0	8	0	0	0	10	50	0	0	0	0	0	138.0	**	**	7.0	**	50.0	**
27	LAHORE,GULBERG	0	0	0	0	0	22	0	0	25	0	13	0	0	0	0	0	12	19	0	0	8	0	0	0	23	52	0	60	0	31	0	265.0	**	**	10.0	**	60.0	**
28	LAHORE,LUKSHMI	0	0	0	0	0	15	0	0	12	0	51	0	12	0	0	0	9	1	0	0	7	0	0	0	15	45	0	40	0	61	0	268.0	**	**	11.0	**	61.0	**
29	LAHORE,GULSHAN E	0	0	0	0	0	6	0	0	2	0	12	0	0	0	0	0	24	0	0	0	6	0	0	0	13	39	0	16	0	2	0	120.0	**	**	9.0	**	39.0	**
30	LAHORE,IQBAL TOW	0	0	0	0	0	36	0	0	0.1	0	24	0	0	0	0	0	13	9	0	0	3	0	0	0	23	52	0	28	0	9	0	197.1	**	**	10.0	**	52.0	**
31	LAHORE,SAMNABAD	0	0	0	0	0	33	0	0	0.1	0	27	0	0	0	0	0	17	16	0	0	3	0	0	0	21	43	0	32	0	6	0	198.1	**	**	10.0	**	43.0	**
32	LAHORE,JOHAR TOV	0	0	0	0	0	18	18	0	0	0	42	0	0	0	0	0	8	15	0	0	2	0	0	0	64	46	0	44	0	12	0	269.0	**	**	10.0	**	64.0	**
33	LAHORE,TOWNSHIP	0	0	0	0	0	0	7	0	0.1	0	18	0	0	0	0	0	3	0	0	0	0	0	0	0	39	31	0	18	0	0	0	116.1	**	**	7.0	**	39.0	**
34	LAHORE,MUGAL PUI	0	0	0	0	0	0	0	0	20	0	21	0	0	0	0	0	3	0	0	0	0	0	0	0	7	58	0	25	0	20	0	154.0	**	**	7.0	**	58.0	**
35	LAHORE,TAJPURA	0	0	0	0	0	0	0	0	23	0	18	0	0	0	0	0	2	2	0	0	1	0	0	0	25	57	0	89	0	35	0	252.0	**	**	9.0	**	89.0	**
36	LAYYAH	0	0	0	0	4	0	0	0.1	0	0	0.1	9.6	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	14	0	0	0	60.8	**	**	6.0	**	33.0	**
37	MANDIBAHAUDDIN	12	54	0.1	0	0	0	8	9	0	73	15	0	0	0	14	0	0	0	0	0	0	4	0	0	1	0	6	22	0	73	0	291.1	**	**	13.0	**	73.0	118.0
38	MIANWALI	0	0	4	0	0	0	0	0	0	21	0.1	0.1	0.1	0	14	0	1	14	0	0	0	3	0	0	0	0	0	3	0	0	35	95.3	115.7	-20.4	11.0	8.8	35.0	259.1
39	MULTAN	0	0	0	0.1	5	0	0	0	34	0	0.1	0	1.6	0	0	0	0	0	0	0	0	0	0	0	1	0	9	19.1	0	0	0	69.9	41.8	28.1	8.0	2.8	34.0	127.0
40	MANGLA	0	30	0.1	0	0	0	22	12	0	42.5	0.1	0	0	0	0.1	0	0	1.8	0	0	0	37	0	0	0	0	1	51	14	45	0	256.6	219.2	37.4	13.0	**	51.0	100.0
41	MURREE	0	0	2	0	0	0.1	21	10	0	1	0.3	18	0	0	4	0	0	18	0	0	0	7	0	0	5	0.1	0	94.8	2	1	12	196.3	302.4	-106.1	16.0	17.1	94.8	233.8
42	NOORPUR THAL	0	0	0	0	0	4.6	23	3	0	27.2	7.4	1	0	0	0	0	0	47	0	0	0	20	0	0	0	0	0	0	0	0	0	133.2	**	**	8.0	6.6	47.0	96.8
43	OKARA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	50.2	0	30	24	0	0	130.2	**	**	4.0	6.0	50.2	83.3
44	RAHIM YAR KHAN	0	0	0	0	0	0	0	6	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.5	0.1	0	0	22.7	39.6	-16.9	4.0	2.4	16.5	71.0
45	GUJRANWALA	3	3	0.1	0	0	0	0	18	0	23.6	16.2	0	0	0	3	0	0	0	0	0	0	0	0	0	3	21.4	0	0.2	0.1	9.4	0	101.0	**	**	12.0	9.0	23.6	123.3
46	GUJRAT	1	38	0	0	0	0	0	16	0	12.6	6.4	0	0	0	0.1	0	0	0	0	0	0	0.1	0	0	0.1	0.1	0	2.3	0.1	0	0	76.8	**	**	11.0	9.0	38.0	79.8
47	SAHIWAL	0	17	0	7	0	0	0	0.1	0	0	22	0	0.1	0	0	0	0	0	0	0	0	0	0.1	0	1	2.4	0	38	35	0	0	122.7	**	**	10.0	4.7	38.0	138.3
48	SARGODHA A/P	0	0.1	0	0	0	2	0	0	0	26	21	0	0	0	0.1	0	0	0.1	0	0	0	4	0	0	7	0	0	0.1	0	27	0	87.4	109.2	-21.8	10.0	6.5	27.0	176.7
49	SARGODHA CITY	0	0	0	0	0	0	0	0.1	0	2	40	0	0	0	0	0	0	1	0	0	0	7	0	0	18	0	0	0.1	0	35	0	103.2	**	**	**	**	40.0	**
50	SHORKOT	9	0	0	10	0	0	0	10	0	0	0	0	30	0	0	0	0	10	0	0	0	0	0	0	2	0.1	0.1	1	0	0	0	72.2	57.4	14.8	9.0	5.0	30.0	121.3
51	SIALKOT CANTT	0	92	0	0	0	0	37	16	0	94.4	2.2	0	0	0	0.1	0	0.1	0	0	0	1	3	0	0	0.1	9.7	0.1	0.2	0.1	6	0	262.0	277.3	-15.3	15.0	14.4	94.4	339.7
52	SIALKOT AIRPORT	0.1	37	0.1	0	0	0	1	27	0	36	1.6	0.1	0	0	1	0	0	0	0	0	0	1	0	0	1	5.6	0.1	1.2	0	0	0	112.8	**	**	14.0	14.1	37.0	109.2
53	T.T. SINGH	8	1	0	0	0	0	0	23	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	9	26	0	0	0.1	67.4	**	**	9.0	5.3	26.0	85.0

GILGIT B./AZAD KASHMIR																																				
52	ASTORE	0	0	0.1	2	0	0	0	1	2.3	0	0.1	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	2	8.2	0	3.4	0.1	19.7	25.3	-5.6	11.0	6.6	8.2	58.5
53	BUNJI	0.1	0.1	3.8	0	0	0	0	1	4.2	0.1	5.5	2.9	0.8	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0	0.1	19.0	24.5	-5.5	14.0	5.2	5.5	39.0
54	BAGROTE	0.1	0	6.2	0	0	0	0	1.8	8.8	0.6	1.8	2	0.1	0	3.7	0	0	0	0.6	0	0	0	0.1	0	0.1	1	1	3.8	0	1.1	3.2	36.0	**	**	17.0	**	8.8	**
55	CHILAS	0	0	0	0.1	0	0	0	0	2	0.1	1	1	0.1	0	0.1	5	0	0	0	0	0	0	0.1	0	0	0.1	0.1	0.1	0	0.1	0.1	10.0	17.5	-7.5	14.0	5.4	5.0	51.8
56	G.DOPATTA	0	0	0	0	0	1.8	25	16	0	0.4	0	2.1	0	27	37	0	0	26.2	0	0	0	21	0	0	22	0	0	10.3	7	6	0	201.8	210.5	-8.7	13.0	14.2	37.0	151.4
57	GILGIT	0.1	0	0.4	1	0	0	0.1	0.1	2.4	0.1	0.1	3	0	0	0.1	0.1	0.1	0	0.1	0	0.1	0	1	0	0.1	0.1	0.1	1	0.1	0.1	0.1	10.4	15.6	-5.2	22.0	5.2	3.0	48.7
58	GUPIS	0	0	0	0	0	2	0	17	0	0	2	1	0	0	3	0	0	0.8	0	0	0	0	2.6	0	0	0	3	0	0.1	0	4	35.5	29.0	6.5	10.0	2.2	17.0	100.0
59	KOTLI	0	3	0	0	0	0	33	53	0	3	3	6	0	0	0	0	0	7	0	0	0	3	0	0	0.1	0.1	0.1	13	6	0	0	130.3	251.8	-121.5	13.0	14.4	53.0	333.5
60	MUZAFFARABAD	0	0.1	0.1	0	0	0	26	23	0	1	0	10	0	0	0	0	0	6	0	0	0	0	0	0	1	0.1	0	16	20	12	2	117.3	213.2	-95.9	13.0	15.6	26.0	133.3
61	RAWALAKOT	0	0	1	1	0	0	1	3	0	7.8	0.4	0	0	0	19	0	0	18	0	0	0	1	0	0	4	0.1	0	11.3	14	8	0	89.6	**	**	14.0	13.8	19.0	135.9
62	HUNZA	0	0	0.1	0	0	0	0	2.6	2	0	2	0	0	0	1	2.2	0	0	0.4	0	0	0	0	0	0.1	0.1	0	0.6	0	0	0.4	11.5	**	**	11.0	7.6	2.6	42.0
63	SKARDU	0	0	0	0.1	0	0	0	1	1.6	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	1	0.1	0	0.1	0.1	0.1	4	0	1.4	0.1	9.9	13.2	-3.3	14.0	5.8	4.0	139.7
K.PAKHTUNKHWA																																				
64	BALAKOT	1	4	0	0	0	5	33.8	49	0	5.5	0	61.5	0	0	39	0	0	4.5	0	0	0	0	0	0	4	0	0	26	3	10.2	4	250.5	265.5	-15.0	14.0	5.0	61.5	245.0
65	BANNU	0	0	0	0	0	0	0	64	0	39	0	0	3	0	2	0	0	13	0	0	0	2	0	0	0	0	0	5.4	0	0	11	139.4	74.3	65.1	8.0	4.8	64.0	90.0
66	CHERAT	0	3	0	0	0	0	0	1	0	0	0	1	0	0	16	0	0	31	0	0	0	1	0	0	0	0	3	0	0	0	8	64.0	94.2	-30.2	8.0	6.9	31.0	104.9
67	CHITRAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	6.6	-4.6	2.0	2.5	1.0	17.0
68	D.I.KHAN	0	0	0.1	0	0	0.1	0	0	0	0	0.1	41	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	17	0	0	20	78.4	73.7	4.7	7.0	6.0	41.0	150.0
69	DIR	5	2	63	0	0	0	0	15	0	0	18	8	0	6	11	0	0	5	0	0	0	0	0	0	0	0	5	2	0	10	26	176.0	147.5	28.5	13.0	11.0	63.0	81.8
70	LOWER DIR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	7	0	0	0	0	0	0	0	5	0	18.0	**	**	3.0	7.9	7.0	81.0
71	DROSH	0	0	9.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	10.7	18.3	-7.6	2.0	4.0	9.7	52.6
72	KAKUL	0	0	10	0	0	0	2	27	0	3	4	1	0	0	19	0	0	4	0	0	0	0	0	0	0	1	9	9.2	14	1	1	105.2	235.6	-130.4	14.0	17.0	27.0	140.4
73	KALAM	1	0	0	0	0	0	0	4	9	0	0	0	0	0	3	3	1	0	1	0	0	0	0	0	0	0	5	17	1	5	2	52.0	**	**	12.0	**	17.0	44.0
74	KOHAT	0	55	2	0	0.1	3	0	33	0	0	0	9	0	0	5	0	0	11	0	0	0	0.1	0	0	0	0	0	22	0	0	0	140.2	103.3	36.9	10.0	8.7	55.0	108.0
75	M. JABBA	0	0	37	0	0	0	0	15	19	34	17	26	0	28	71	0	0	6	0	0	0	38	0	0	0	0	38	2	0	9	1	341.0	**	**	14.0	**	71.0	88.2
76	MIRKHANI	0	0	6	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	12.0	**	**	4.0	**	6.0	**
77	PARACHINAR	5	0	9.2	0	5	5	3	5	0.1	0	0	2	5	0	3	0	0	0	0	5	0	0	0	0	5	0	27	0	30	11	0	10	130.3	110.7	19.6	16.0	11.4	30.0	106.5
78	PESHAWAR,AIRPORT	0	0	4	0	0	0.1	0	9	0	0	0	0.1	0	0	9	0	0	19	0	0	0	4	0	0	0	0	0.1	0.1	0	0.1	0	45.5	77.1	-31.6	10.0	7.8	19.0	150.9
79	PESHAWAR,CITY	0	0	20	0	0	0.1	0	4	0	0	0	0.1	0	0	3	0	0	6	0	0	0	3	0	0	0	0	0	0.1	0	3.1	0	39.4	**	**	9.0	**	20.0	**
80	PATTAN	0	0	0	0	0	0	0	2	2	1	0.1	1	0	0	4	0	1	0	0	0	0	0	0	0	0	0	12	12	0	0	0	35.1	**	**	9.0	**	12.0	62.0
81	RISALPUR	0	10	17	0	0	0.1	25	0	0	20	0	0	0	0	38	0	0	11	0	0	0	14	0	0	0	0	0	0	0	31	0	166.1	151.6	14.5	9.0	10.9	38.0	132.0
82	SAIDU SHARIF	0	0	0	0	0	0	0	11	4	16	19	1	0	0	4	0	0	4	0	0	0	2	0	0	0	0	4	0	0	8	0	73.0	124.7	-51.7	10.0	11.2	19.0	136.5
SINDH																																				
83	BADIN	0	0	0	43	34	48	0	6	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	0	0	33	3	0	0	175.1	85.9	89.2	9.0	2.4	48.0	241.0
84	CHHOR	0	0	0	23	4.8	2	14	0	8	0	0	0	0	0	0	0	0	0	0	0	0	13	0	36.4	0	0	4	13.2	0	0	0	118.4	81.8	36.6	9.0	3.2	36.4	214.6
85	HYDERABAD	0	0	0	27	0	7	77.1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	15	0	0	132.3	71.8	60.5	6.0	2.2	77.1	129.0
86	JACOBABAD	0	0	0	0.1	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	5.2	35.6	-30.4	4.0	1.2	4.0	251.5
87	KARACHI A/P (MOS)	0.1	0.1	0	0	0.1	36	7.7	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	22.6	31	0	0	97.8	60.9	36.9	9.0	3.3	36.0	166.0
88	LARKANA	0	0	0	0	0.1	2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	6.2	34.5	-28.3	4.0	1.2	4.0	131.0
89	MITHI	0	0	0	14	33	13	2	0	3	0.5	0	0	0	0	0	0	0	0	0	0	0	9	0	10	3	18	0	19	4	0	0	128.5	**	**	12.0	**	33.0	**
90	SH.B.ABAD	0	0	0	11	3	31	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0	63.2	48.8	14.4	6.0	1.4	31.0	117.1
91	PADIDAN	0	0	0	0.1	0.1	26	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	27.3	40.9	-13.6	5.0	1.9	26.0	143.0
92	ROHRI	0	0	0	12	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	47.2	24.8	22.4	4.0	0.6	35.0	139.7
93	SUKKUR	0	0	0	3	2	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	0	0	0	73.0	20.4	**	4.0	0.6	42.0	**
94	MOIN JO DARO	0	0	0	0.1	0.1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8	0	0	0	6.0	26.6	-20.6	5.0	1.4	3.8	119.6
95	THATTA	0	0	0	44	0	71.6	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	123.6	**	**	3.0	**	71.6	**
96	DADU	0	0	0	3	0	18	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	61	0	0	96.0	**	**	5.0	**	61.0	**
97	MIRPUR KHAS	0	0	0	31	0.1	7	39.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.8	7	0.1	0	0.1	23	0	0	120.6	**	**	9.0	**	39.5	**
BALOCHISTAN																																				
98	BARKHAN	0	0	3	4	0	13	3	0	0	0	23	0	36	0	0	1	0	1	0	0	9	27	0	4.5	0	0	0	0.1	0	0	44	168.6	89.6	79.0	13.0	4.6	44.0	104.2
99	DALBANDIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.7	-0.7	0.0	0.1	0.0	41.9
100	GAWADAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	**	**	0.0	**	0.0	**
101	JIWANI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	2.6	-2.6	0.0	0.5	0.0	32.3
102	KALAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	11.8	-11.8	0.0	1.3	0.0	46.2
103	KHUZDAR	0	0	0	0	0	8.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.6	0	0	0	14.9	59.9	-45.0	2.0	3.9	8.3	60.2
104	LASBELA	0	0	0	0	13	11	2	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0	37.2	32.7	4.5	7.0	2.1	13.0	62.7
105	NOKKUNDI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.3	-0.3	0.0	0.1	0.0	10.7
106	PANJGUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	7.5	-7.5	0.0	0.6	0.0	87.1
107	PASNI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	7.6	-7.6	0.0	0.1	0.0	140.7
108	QUETTA,SHAIKHMAN	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	**	**	1.0	**	0.1	**
109	QUETTA,SAMUNGLI	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	13.1	-13.0	1.0	1.9	0.1	102.0
110	SIBBI	0	0	0	0	0	48.5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.6	0	0	21	81.1	39.2	41.9	4.0	1.8	48.5	79.0
111	TURBAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	1.4	-1.4	0.0	0.3	0.0	21.0
112	ORMARA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	4.5	-4.5	0.0	0.3	0.0	60.2
113	ZHOB	0	0	0	0	0	5	0	0	0	0	16	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40.0	44.8	-4.8	3.0	3.7	19.0	120.0

NOTE: ** not available

RAINFALL (MM) STATEMENT FOR THE MONTH OF SEPTEMBER-2016

Stations			indicates daily highest rainfall.																												Till Date	Monthly Normal	Deviation from normal	Rainy days		Highest Rain in 24 hrs	
PUNJAB		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				Current Month	Historical	Current Month	Historical
1	BAHAWALNAGAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1	14.9	-14.8	1.0	1.9	0.1	94.0
2	BAHAWALPUR,CITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	16.5	-16.5	0.0	0.8	0.0	86.0
3	BAHAWALPUR,AIRPORT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	**	**	0.0	1.7	0.0	66.0
4	BHAKKAR	0	0.6	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	32.6	**	**	3.0	3.2	21.0	56.0
5	CHAKWAL	0	16	0	0	0	0	0	0	0	0	0	2	0	5.2	0	0	0	0	0	0	0	6.4	0	1.2	0	0	0	0	0	0	30.8	**	**	5.0	5.3	16.0	67.0
6	D.G.KHAN	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	**	**	1.0	2.3	0.1	76.0
7	FAISALABAD	0	6	0	0	0	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	9.6	42.5	-32.9	3.0	2.8	6.0	264.2
8	ISLAMABAD,AIRPORT	0	0.1	0.1	0	0	0	0	0	0	0	0	14	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23.2	110.7	-87.5	4.0	8.5	14.0	168.4
9	ISLAMABAD,ZEROPOINT	0	0.1	0	0	0	0	0	0	0	0	0	3	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	3.3	123.3	-120.0	4.0	8.1	3.0	243.0
10	ISLAMABAD,SAIDPUR	0	0	0	0	0	0	0	0	0	0	0	9	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13.0	**	**	2.0	**	9.0	**
11	ISLAMABAD,SHAMSABAD	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.0	**	**	2.0	**	3.0	**
12	ISLAMABAD,GOLRA	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	**	**	1.0	**	2.0	**
13	ISLAMABAD,BOKRA	0	0	0	0	0	0	0	0	0	0	0	16	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17.0	**	**	2.0	**	16.0	**
14	JHANG	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2	0	0	0	0	0	0	0	0	4.3	**	**	2.0	3.1	4.2	50.1
15	JOHARABAD	0	2.2	0	0	0	0	0	0	0	0	0	0	0	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45.2	**	**	2.0	3.0	43.0	44.0
16	JHELUM	0	0	0	0	0	1	0	0	0	0	0	48	0	5.4	0	0	0	0	0	0	0	10.4	0	0	0	0	0	0	0	0	64.8	65.4	-0.6	4.0	6.5	48.0	135.4
17	KASUR	0	3	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	3.2	**	**	3.0	**	3.0	129.2
18	KHANPUR	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14.0	12.0	2.0	1.0	0.8	14.0	173.0
19	KOT ADDU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	**	**	1.0	**	0.1	**
20	KAMRA	0	1	0	0	0	0	0.1	0	0	0	0	0.1	0	1.5	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	3.8	88.8	-85.0	6.0	8.0	1.5	105.0
21	LAHORE, AIRPORT	0	21	0	0	0	0.1	0	8	25	0	0	0	0	7	2	0	0	0	0	0	0.1	2	0	0	0	0	0	0	0	0	65.2	74.6	-9.4	8.0	6.5	25.0	278.6
22	LAHORE,CITY	1	96.6	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0.1	27.6	2.5	0	0	0	0	0	0	0	0	127.9	60.4	67.5	6.0	6.8	96.6	228.1
23	LAHORE,SHAHI QILLA	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	85.0	**	**	2.0	**	66.0	**
24	LAHORE,MISRI SHAH	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	83.0	**	**	2.0	**	66.0	**
25	LAHORE,UPPER MALL	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	3	0	0	0	0	0	0	0	0	48.0	**	**	3.0	**	40.0	**
26	LAHORE,SHAHDARA	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	35.0	**	**	2.0	**	28.0	**
27	LAHORE,GULBERG	4	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	5	0	0	0	0	0	0	0	0	52.0	**	**	4.0	**	30.0	**
28	LAHORE,LUKSHMI	0	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	90.0	**	**	2.0	**	88.0	**
29	LAHORE,GULSHAN RAVI	0	54	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	67.0	**	**	3.0	**	54.0	**
30	LAHORE,IQBAL TOWN	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	66.0	**	**	2.0	**	64.0	**
31	LAHORE,SAMNABAD	0	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	0	0	0	0	0	94.0	**	**	3.0	**	86.0	**
32	LAHORE,JOHAR TOWN	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	38.0	**	**	2.0	**	35.0	**
33	LAHORE,TOWNSHIP	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	8.0	**	**	2.0	**	5.0	**
34	LAHORE,MUGAL PURA	0	62	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	12	0	3	0	0	0	0	0	0	0	0	90.0	**	**	4.0	**	62.0	**
35	LAHORE,TAJPURA	0	70	0	0	0	4	0	0	24	0	0	0	0	0	0	0	0	0	0	15	0	2	0	0	0	0	0	0	0	0	115.0	**	**	5.0	**	70.0	**
36	LAHORE,PUNJAB UNIVERS	4	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	68.0	**	**	3.0	**	54.0	**
37	LAYYAH	0	36	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	61.0	**	**	3.0	**	36.0	**
38	MANDIBAHAUDDIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	2	0	0	0	1.5	0	0	0	0	3.6	**	**	3.0	**	2.0	119.4
39	MIANWALI	0	0.1	0	0	0	0	0	0	0	0	0	3	0	0.1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	7.2	53.1	-45.9	4.0	4.5	4.0	97.7
40	MULTAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.6	0	0	0	0	0	0	2.6	24.6	-22.0	1.0	1.5	2.6	134.2
41	MANGLA	0	0.1	0	0	0	5	0	0	0	0	0	1	0	2.5	0	0	0	0	0	0	0	4.5	0.1	0	0	0.1	0	0	0	0	13.3	**	**	7.0	**	5.0	251.3
42	MURREE	0	0	4.6	0	0	30	0	0	0	0	0	5	0	33	0	0	0	0	0	0	0	6	0	32.2	0	0.4	0	1	1	1	114.2	130.9	-16.7	10.0	9.1	33.0	255.0
43	NOORPUR THAL	0	0.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1.4	0	3.4	0	0	0	0	0	0	5.9	**	**	4.0	4.0	3.4	74.2
44	OKARA	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.0	**	**	1.0	4.4	7.0	116.0
45	RAHIM YAR KHAN	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64.0	**	**	1.0	1.1	64.0	96.4
46	GUJRANWALA	0.1	0.6	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.7	**	**	3.0	9.3	2.0	173.3
47	GUJRAT	0	0	0	0	0	0.1	0	0	0	0.4	0	1	0	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	1.7	**	**	5.0	9.0	1.0	114.2
48	SAHIWAL	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	**	**	1.0	3.1	1.0	94.0
49	SARGODHA A/P	0	12	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29.0	37.0	-8.0	2.0	4.2	17.0	66.0
50	SARGODHA CITY	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.0	**	**	1.0	**	6.0	**
51	SHORKOT	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	40.1	24.1	16.0	2.0	2.3	40.0	120.0
52	SIALKOT CANTT	31	0	0	0	0	0	0	0	0	0	0	1	0	31	0	0	0	0	0	0	0	7.6	22	0	0	0	0	0	0	0	92.6	89.0	3.6	5.0	6.5	31.0	207.5
53	SIALKOT AIRPORT	0	0	0	0	0	0	0	0	0	0	0	9	0	37	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	46.1	**	**	3.0	7.3	37.0	142.6
54	T.T. SINGH	0	38.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38.6	**	**	1.0	4.0	38.6	97.0

GILGIT B./AZAD KASHMIR																																				
55	ASTORE	1	2.2	0.6	0	0	0	0.1	0	0	0	0.1	0	5	0	0.1	0	0	0	0	0	0	1.6	0	0	0.1	0	0	0	0	0	10.8	20.9	-10.1	9.0	4.1	5.0	118.2
56	BUNJI	0.1	0.1	0.1	0	0	0	1	0	0	0	1	1	3	0	0	0	0	0	0	0	0	4.1	0	0	0	0	0	0	0	0	10.4	11.2	-0.8	8.0	2.7	4.1	53.8
57	BAGROTE	0.1	3.1	1	0	0	1	2	0	0	0	0	0	3	8	0	0	0	0	0	0	1	14.3	0	0	0	0	0	0	0	0	33.5	**	**	9.0	**	14.3	**
58	CHILAS	0	0	0.1	0	0	0	2	0	0	0	3	0	3.2	0	1	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0	9.8	8.7	1.1	6.0	3.1	3.2	109.3
59	G.DOPATTA	0	4	0	0	0	0	1	0	0	0	0	8	0	18	0	0	0	0	0	0	0	5.1	0	0	0	0	0	0	0	0	36.1	98.2	-62.1	5.0	6.9	18.0	257.1
60	GILGIT	0.1	1.6	1	0	0	0.1	2	0	0	0	5	0.1	0.7	0.4	0.1	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0	11.8	8.6	3.2	11.0	3.4	5.0	52.6
61	GUPIS	0	4	4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.0	15.0	-3.0	3.0	1.6	4.0	68.5
62	KOTLI	0	0	0	0	0	8	0	0	0	0	0	51	0	0	0	0	0	0	0	0	0	0.1	1	2.8	0	0	0	0	0	0	62.9	84.3	-21.4	5.0	7.1	51.0	188.0
63	MUZAFFARABAD	0	2	1	0	0	1	3	0	0	0	0	19	0	9	0	0	0	0	0	0	0	12	0.1	0	0	0	0	0	0	0	47.1	109.6	-62.5	8.0	8.3	19.0	200.5
64	RAWALAKOT	0.1	0.1	3.4	0	0	2	0	0	0	0	0	14	0	6.4	0	0	0	0	0	0	0	2.6	0	0.1	0	0	0	0	0	0	28.7	**	**	8.0	8.4	14.0	234.0
65	HUNZA	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.2	**	**	2.0	6.9	0.1	185.0
66	SKARDU	0.1	3.2	3.2	0	0.1	0	0	0	0	0	0.1	0	4.2	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11.0	9.9	1.1	7.0	3.1	4.2	40.6
K.PAKHTUNKHWA																																				
67	BALAKOT	0	7.2	3	0	0	12	3	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	53.2	112.5	-59.3	8.0	2.4	24.0	181.2
68	BANNU	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2	31.4	-28.2	3.0	2.6	3.0	98.6
69	CHERAT	0	0	0	0	0	0	0	0	0	0	0	3	0	22	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	28.0	35.1	-7.1	3.0	3.3	22.0	97.5
70	CHITRAL	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	13.1	-12.1	1.0	2.9	1.0	40.5
71	D.I.KHAN	0	7	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	40	0	3	0	0	0	0	0	0	50.1	31.2	18.9	4.0	2.3	40.0	70.0
72	DIR	6	0	0	0	0	0	15	0	0	0	0	0	0	6	7	0	0	0	0	0	6	3	0	0	0	0	0	0	0	0	43.0	76.0	-33.0	6.0	8.1	15.0	98.0
73	LOWER DIR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	29.0	**	**	1.0	5.9	29.0	35.0
74	DROSH	2	0	0	0	0	0	0	0	0	0	0	0	1	6.4	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.2	20.8	-8.6	4.0	4.6	6.4	95.3
75	KAKUL	0	0	0	0	0	33	2	0	0	0	0	9	0	30	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	78.0	100.6	-22.6	6.0	8.7	33.0	243.0
76	KALAM	3	11	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20.0	**	**	4.0	**	11.0	44.0
77	KOHAT	0	9	0	0	0	0	0	0	0	0	0	48	0	40	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0	97.4	45.1	52.3	4.0	5.6	48.0	75.0
78	M. JABBA	0	0	0	0	0	28	9	0	0	0	0	5	3	13	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	63.0	**	**	6.0	**	28.0	61.0
79	MIRKHANI	16	0	0	0	0	0	0	0	0	0	0	0	3	4.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23.4	**	**	3.0	**	16.0	**
80	PARACHINAR	0	8	0	0	0	10	0	0	0	0	16	4	5	2	0	0	0	0	0	0	0	16.8	0	0	0	0	0	0	0	0	61.8	53.9	7.9	7.0	7.6	16.8	90.2
81	PESHAWAR,AIRPORT	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3.0	29.4	-26.4	2.0	4.6	2.0	65.0
82	PESHAWAR,CITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.2	**	**	2.0	**	0.1	**
83	PATTAN	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	0	0	0	0	0	0	0	0	45.0	**	**	4.0	**	26.0	51.2
84	RISALPUR	0	0.1	0	0	0	0	15	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	15.3	49.5	-34.2	4.0	5.4	15.0	70.0
85	SAIDU SHARIF	0	0	0	0	0	21	0	0	0	0	11	0	8	12	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	1	58.0	73.0	-15.0	6.0	6.9	21.0	72.1
SINDH																																				
86	BADIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	24.8	-24.8	0.0	0.7	0.0	159.3
87	CHHOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	39.8	-39.8	0.0	1.2	0.0	81.3
88	HYDERABAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	13.0	-13.0	0.0	0.6	0.0	250.7
89	JACOBABAD	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19.0	5.3	13.7	1.0	0.3	19.0	85.1
90	KARACHI A/P (MOS)	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	11.0	-10.9	1.0	0.7	0.1	111.8
91	LARKANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	3.7	-3.7	0.0	0.2	0.0	72.0
92	MITHI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	**	**	0.0	**	0.0	**
93	SH.B.ABAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	16.1	-16.1	0.0	0.6	0.0	143.0
94	PADIDAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	5.4	-5.4	0.0	0.3	0.0	124.5
95	ROHRI	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.0	3.0	2.0	1.0	0.2	5.0	64.6
96	SUKKUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.9	**	0.0	0.1	0.0	**
97	MOIN JO DARO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	6.6	-6.6	0.0	0.3	0.0	83.3
98	THATTA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	**	**	0.0	**	0.0	**
99	DADU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	**	**	0.0	**	0.0	**
100	MIRPUR KHAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	**	**	0.0	**	0.0	**
BALOCHISTAN																																				
101	BARKHAN	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11.1	34.7	-23.6	2.0	2.5	11.0	97.1
102	DALBANDIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.1	-0.1	0.0	0.1	0.0	4.0
103	GAWADAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	**	**	0.0	**	0.0	**
104	JIWANI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	5.6
105	KALAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.6	-0.6	0.0	0.1	0.0	26.7
106	KHUZDAR	0	0	0	0	0	3	0	0	0	0	13	0	18	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37.0	8.0	29.0	4.0	1.5	18.0	30.5
107	LASBELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	5.5	-5.5	0.0	0.2	0.0	82.5
108	NOKKUNDI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
109	PANJGUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	2.1	-2.1	0.0	0.4	0.0	24.1
110	PASNI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.7	-0.7	0.0	0.2	0.0	12.0
111	QUETTA,SHAIKHMANDA	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	**	**	1.0	**	0.1	**
112	QUETTA,SAMUNGLI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	2.3	-2.3	0.0	0.4	0.0	28.0
113	SIBBI	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.5	10.7	-8.2	1.0	0.7	2.5	75.7
114	TURBAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.1	0.0	2.0
115	ORMARA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	29.2
116	ZHOB	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	9.0	-7.0	1.0	0.9	2.0	58.9

NOTE: ** not available

RAINFALL (MM) STATEMENT FOR THE MONTH OF OCTOBER-2016

Stations		indicates daily highest rainfall.												No Rain through out the region																				Rainy days		Highest Rain in 24	
PUNJAB		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Date	Monthly Normal	Deviation from normal	Current Month	Historical	Current Month	Historical
1	BAHAWALNAGAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.9	-7.9	0	0.9	0	35
2	BAHAWALPUR,CITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.7	-4.7	0	0.7	0	30
3	BAHAWALPUR,AIRPORT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
4	BHAKKAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
5	CHAKWAL	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	**	**	1	**	0.1	**
6	D.G.KHAN	0	0	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	**	**	1	**	0.6	**
7	FAISALABAD	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	4.7	19.3	1	0.8	24	39.1
8	ISLAMABAD,AIRPORT	0	0	0	0	0.1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.1	31.7	-26.6	2	3.7	5	55.9
9	ISLAMABAD,ZEROPOINT	0	0	0	0	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0	0	0	9.7	32.7	-23	3	3.5	6	52.1
10	ISLAMABAD,SAIDPUR	0	0	0	0	19	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	**	**	2	**	19	**
11	ISLAMABAD,SHAMSABAD	0	0	0	0	15	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	**	**	2	**	15	**
12	ISLAMABAD,GOLRA	0	0	0	0	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	**	**	2	**	8	**
13	ISLAMABAD,BOKRA	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	**	**	1	**	5	**
14	JHANG	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	**	**	1	**	0.1	**
15	JOHARABAD	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	**	**	1	**	4	**
16	JHELUM	0	0	0	0	0	5.3	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.4	22	-16.6	2	3	5.3	111.8
17	KASUR	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	**	**	1	**	0.1	**
18	KHANPUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.7	-2.7	0	0.5	0	19.3
19	KOT ADDU	0	0	0	0	0	0	0	0	0	4.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.6	**	**	1	**	4.6	**
20	KAMRA	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1.2	23	-21.8	3	3.5	1	30.8
21	LAHORE, AIRPORT	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	18.5	-18.3	2	1.9	0.1	157
22	LAHORE,CITY	0	0	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	15.3	-14.7	1	2.1	0.6	117.4
23	LAHORE,SHAHI QILLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
24	LAHORE,MISRI SHAH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
25	LAHORE,UPPER MALL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
26	LAHORE,SHAHDARA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
27	LAHORE,GULBERG	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	**	**	1	**	7	**
28	LAHORE,LUKSHMI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
29	LAHORE,GULSHAN RAVI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
30	LAHORE,IQBAL TOWN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
31	LAHORE,SAMNABAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
32	LAHORE,JOHAR TOWN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
33	LAHORE,TOWNSHIP	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	**	**	1	**	2	**
34	LAHORE,MUGAL PURA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
35	LAHORE,TAJPURA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
36	LAHORE,PUNJAB UNIVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
37	LAYYAH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
38	MANDIBAHAUDDIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
39	MIANWALI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.3	-16.3	0	2.4	0	60
40	MULTAN	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	5.6	-5.5	1	0.7	0.1	23.5
41	MANGLA	0	0	0	0	0	4.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.9	**	**	1	**	4.9	**
42	MURREE	0	0	0	0	23	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	63.1	-35.1	2	4.4	23	128
43	NOORPUR THAL	0	0	0	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	**	**	2	**	4	**
44	OKARA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
45	RAHIM YAR KHAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
46	GUJRANWALA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
47	GUJRAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
48	SAHIWAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
49	SARGODHA A/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	-9	0	1.7	0	31.5
50	SARGODHA CITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
51	SHORKOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.6	-6.6	0	1.5	0	19
52	SIALKOT CANTT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23.3	-23.3	0	2.5	0	81.8
53	SIALKOT AIRPORT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
54	T.T. SINGH	0	0	0	0	0	0.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	**	**	2	**	1	**

GILGIT B./AZAD KASHMIR

55	ASTORE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	21.6	-21.5	1	3.5	0.1	60.2
56	BUNJI	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	7.5	-7.3	2	1.8	0.1	66.4
57	BAGROTE	0	0	0.8	0.1	2	0	0.1	0.1	0.1	0.8	0	0	0	0	0	0	0	0	0	0	0	1.3	0	0	0	0	0	0	0	0	0	0	5.3	**	**	8	**	2	**
58	CHILAS	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	7.3	-7.2	1	1.9	0.1	58.9
59	G.DOPATTA	0	0	0	0	2	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	40.3	-32.3	3	4.2	5	81.8
60	GILGIT	0	0	0	0	0	0	0.4	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.6	6.8	-6.2	3	1.6	0.4	54.5
61	GUPIS	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10.2	-7.2	2	1.2	2	76.1
62	KOTLI	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	34.9	-25.9	1	3.1	9	72.9
63	MUZAFFARABAD	0	0	0	0	9	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	22	39.5	-17.5	4	4.8	11	65
64	RAWALAKOT	0	0	0	0	1	5.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	6.3	**	**	3	**	5.2	**
65	HUNZA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
66	SKARDU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.8	-7.8	0	1.8	0	62.2

K.PAKHTUNKHWA

67	BALAKOT	0	0	8	0	8	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	38	46.8	-8.8	5	1.1	13	100
68	BANNU	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6.9	0.1	1	1.3	7	37.6
69	CHERAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18.2	-18.2	0	1.8	0	75
70	CHITRAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25.2	-25.2	0	3.7	0	109
71	D.I.KHAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.9	-6.9	0	1.6	0	29.5
72	DIR	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	8	72.3	-64.3	2	4.9	6	166
73	LOWER DIR	0	0	12	0	7	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	**	**	3	**	12	**
74	DROSH	0	0	0.2	0	0	0	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.6	0	0	0	0	0	5.6	34.2	-28.6	3	5	2.8	131
75	KAKUL	0	0	0	0	63	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	50.6	22.4	2	5	63	87.6
76	KALAM	0	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	9	**	**	3	**	5	**
77	KOHAT	0	0	0	0	2	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	7.2	23.2	-16	4	3.3	5	48
78	M. JABBA	0	0	4	0	3	12	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	**	**	4	**	12	**
79	MIRKHANI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	0	0	0	0	0	0	0	0	0	0	1.4	**	**	1	**	1.4	**
80	PARACHINAR	0	0	0	0	0	10	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	34	-16	2	5.7	10	62.2
81	PESHAWAR,AIRPORT	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1.1	22.1	-21	2	3.6	1	142
82	PESHAWAR,CITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	**	**	1	**	0.1	**
83	PATTAN	0	0	1	0	1	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0.1	0.1	0	0	0	0	0	0	0	0	21.2	**	**	7	**	10	**
84	RISALPUR	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1.1	20.9	-19.8	2	3.8	1	93
85	SAIDU SHARIF	0	0	2	0	4	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	46.8	-29.8	4	4.7	6	91.8

SINDH

86	BADIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.3	-9.3	0	0.3	0	73
87	CHHOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	-9	0	0.4	0	60
88	HYDERABAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.4	-5.4	0	0.3	0	85.6
89	JACOBABAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	-1.7	0	0.1	0	49.5
90	KARACHI A/P (MOS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.6	-2.6	0	0.3	0	55.6
91	LARKANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	-1.5	0	0.3	0	21.3
92	MITHI	0	0	1	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**	**	2	**	62	**
93	SH.B.ABAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.4	-3.4	0	0.1	0	72
94	PADIDAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	-0.7	0	0.2	0	26.5
95	ROHRI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.5	-2.5	0	0.1	0	62.2
96	SUKKUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	**	0	0.1	0	**
97	MOIN JO DARO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	-0.4	0	0.1	0	7.5
98	THATTA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
99	DADU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
100	MIRPUR KHAS	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	**	**	1	**	0.1	**

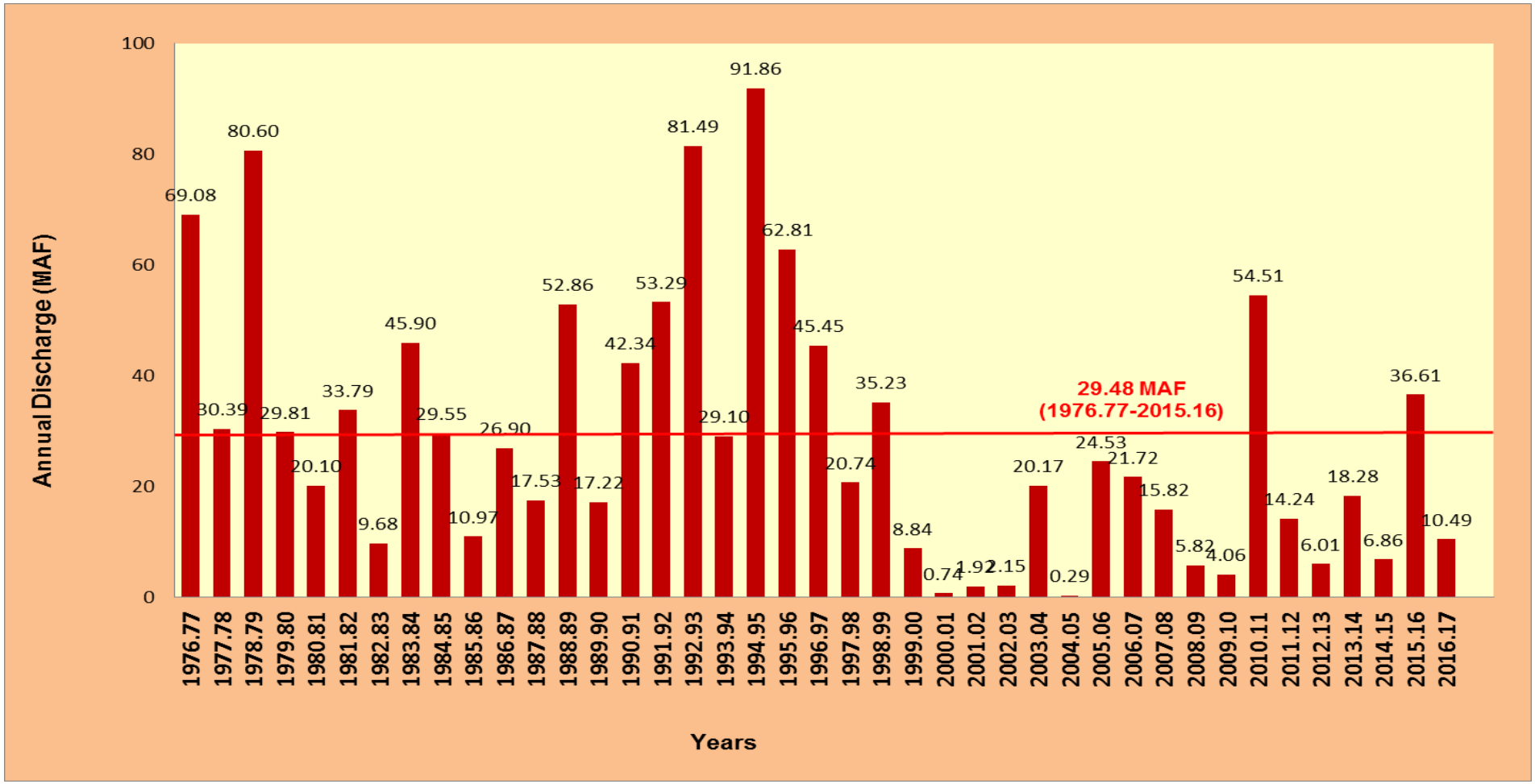
BALOCHISTAN

101	BARKHAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.2	-10.2	0	0.9	0	48
102	DALBANDIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	-1.4	0	0.3	0	16
103	GAWADAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
104	JIWANI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	-1.4	0	0.1	0	12.4
105	KALAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.4	-4.4	0	0.1	0	52
106	KHUZDAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	-7	0	0.2	0	55
107	LASBELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8	-3.8	0	0.2	0	32.3
108	NOKKUNDI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	-0.1	0	0.1	0	8.3
109	PANJGUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.2	-2.2	0	0.2	0	21.2
110	PASNI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	-1.1	0	0	0	50.9
111	QUETTA,SHAIKHMANDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**	**	0	**	0	**
112	QUETTA,SAMUNGLI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.7	-5.7	0	1.1	0	30
113	SIBBI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8	-3.8	0	0.3	0	27.2
114	TURBAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	-1.3	0	0	0	21
115	ORMARA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39
116	ZHOB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.2	-5.2	0	0.7	0	19

NOTE: ** not available Historical data upto 2014

APPENDIX-IV

ESCAPAGE BELOW KOTRI (HYDROLOGICAL YEAR FROM APRIL TO MARCH)



Source: IRSA {Based on data supplied by PID; Sindh} 2016-17{April to December 2016}