

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



Pakistan Meteorological Department

Role of PMD in Disaster Risk Reduction and National Development

By

Mr. Muhammad Riaz

Chief Meteorologist

Pakistan Meteorological Department

www.pmd.gov.pk

PMD Mission

Provide Meteorological ,Hydro-meteorological and geophysical services to support sustainable national economic growth, protection of life, infrastructure and environment on land, at the sea and in the air.

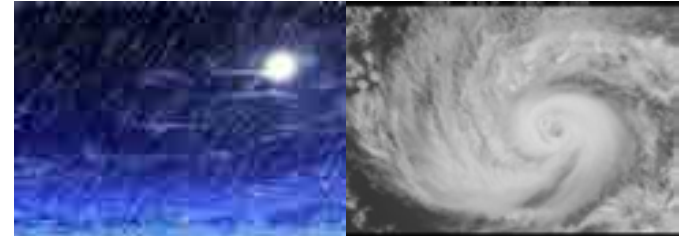


Pakistan Meteorological Department
Government of Pakistan



Services Being Extended by PMD

- Rainfall
- Floods
- Drought
- Earthquake/Seismology
- Tropical Cyclone
- Aviation
- Marine
- Agro-meteorology
- Research & Development



PMD Early Warning System

Specialized Early Warning Centres of PMD

**National Weather
Forecasting Centre
Islamabad
(NWFC)**

**Marine Meteorology &
Tropical Cyclone Early
Warning Centre
Karachi
(TCWC)**

**National Drought
Monitoring Centre
Islamabad
(NDMC)**

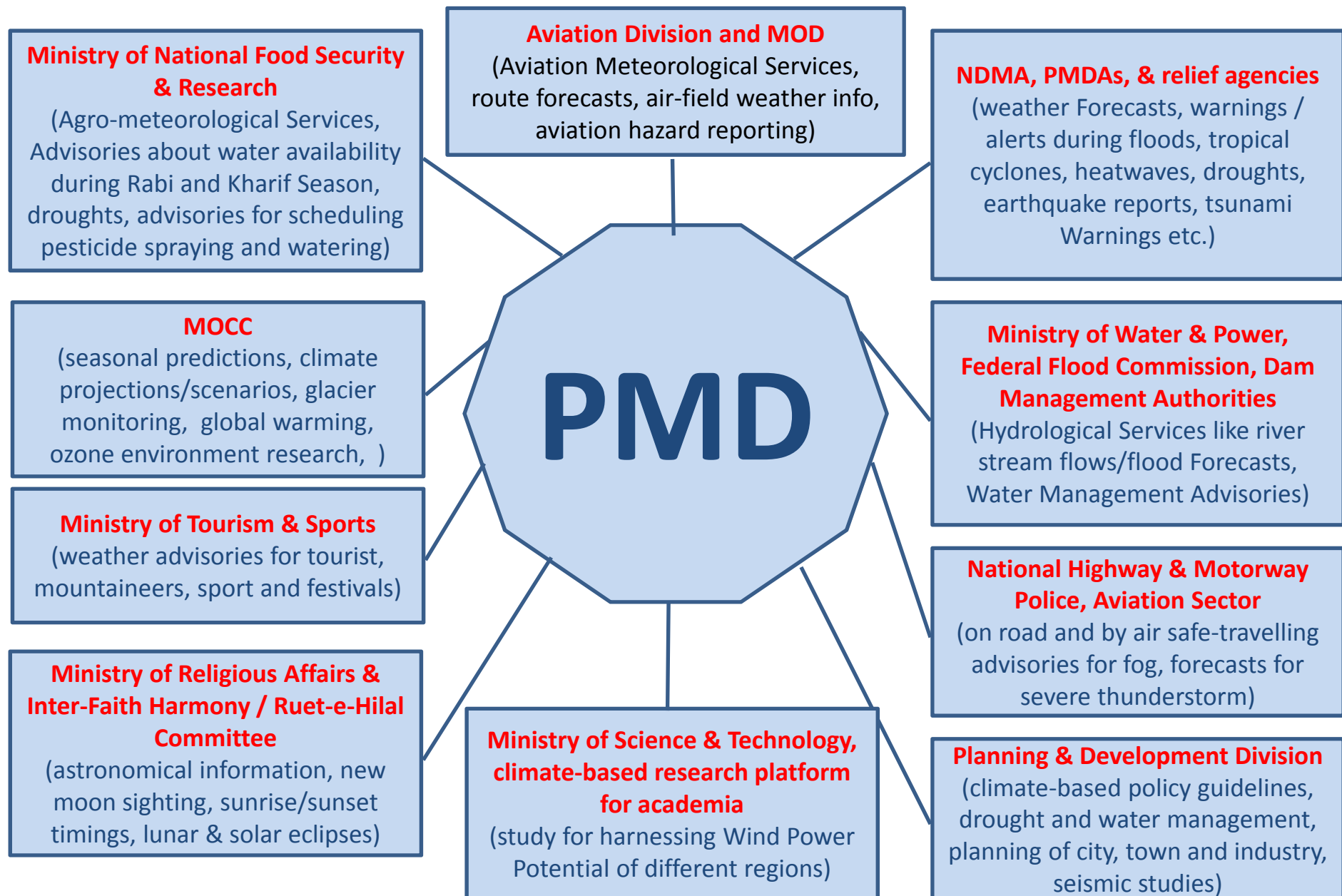
**National Seismic Monitoring &
Tsunami Early Warning Centre
Karachi
(NTWC)**

**Flood Forecasting Division
Lahore
(FFD)**

**Flood Forecasting &
Warning Centre
For Lai Nullah Basin
Islamabad**

GLOF Early Warning Center for GB and Chitral

PMD Services for Ministries / Organizations



Drought/Environment monitoring and Early warning system in Pakistan

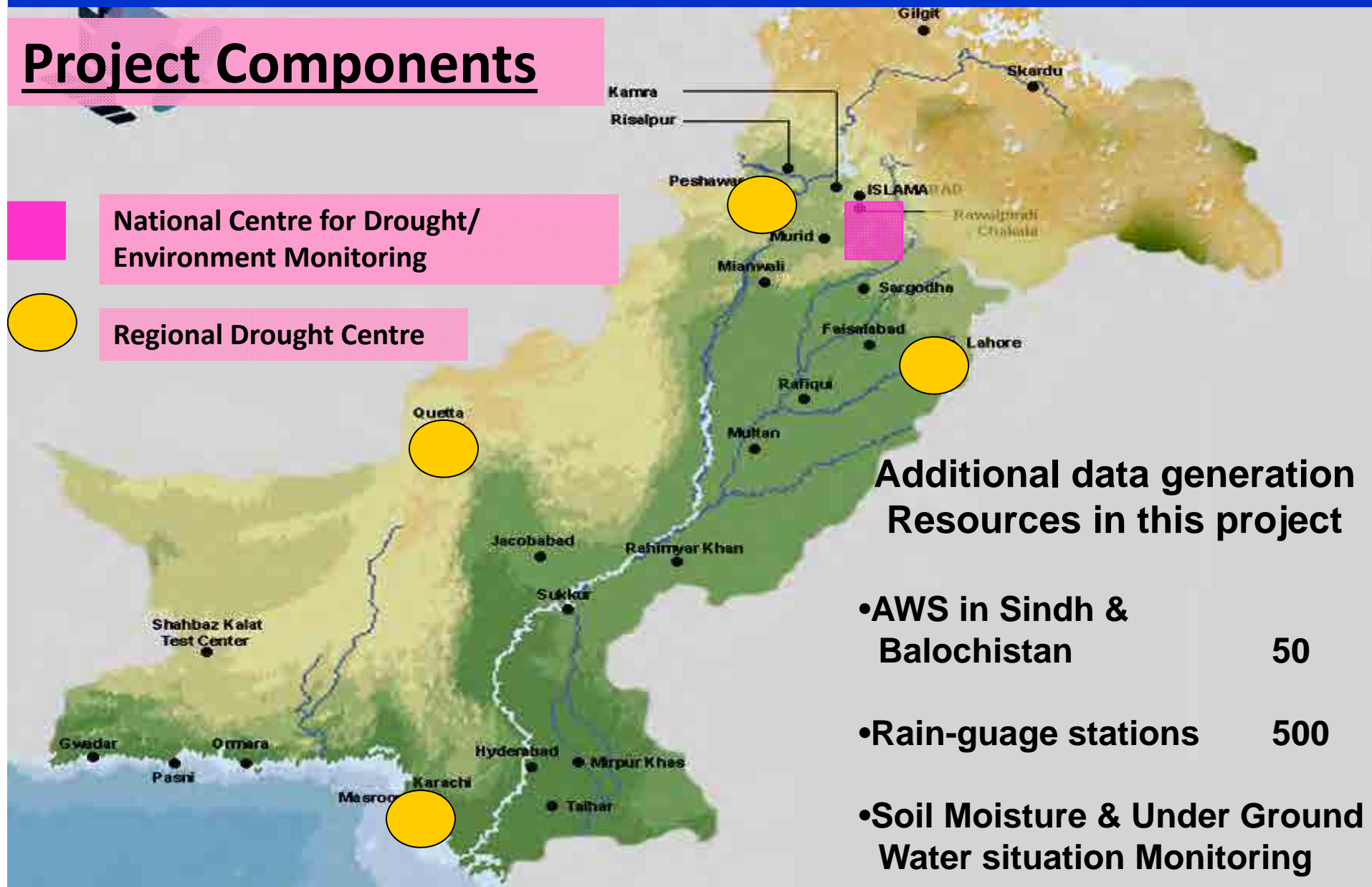


Pakistan faces all types of droughts:

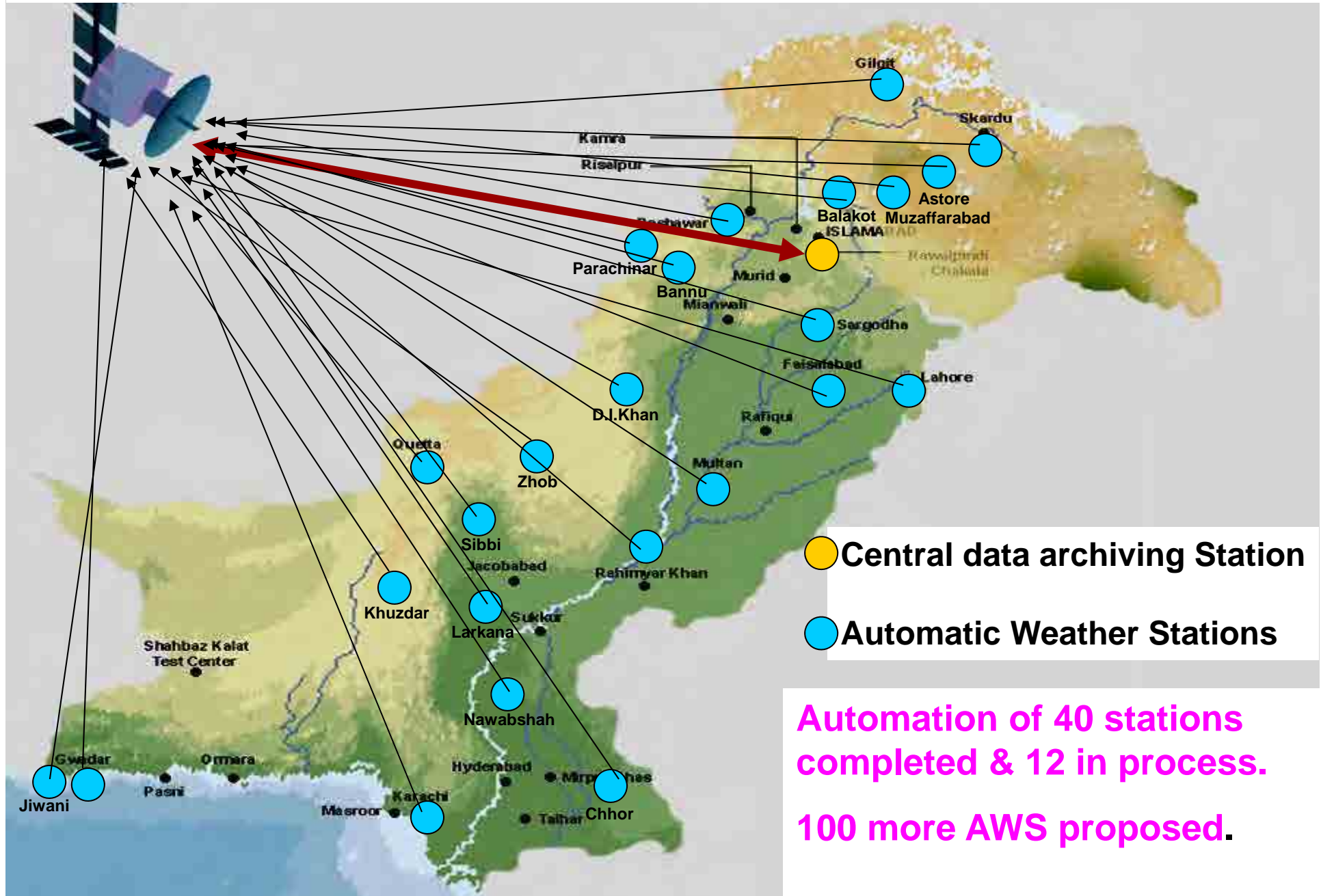
- **Meteorological** - a measure of departure of precipitation from normal.
- **Agricultural** - refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
- **Hydrological** - occurs when surface and subsurface water supplies are below normal.
- **Socioeconomic** - refers to the situation that occurs when physical water shortage begins to affect people

Drought/Environment Monitoring & Early Warning Centre

Project Components



Automation of Meteorological Observing Network



Drought Monitoring Products

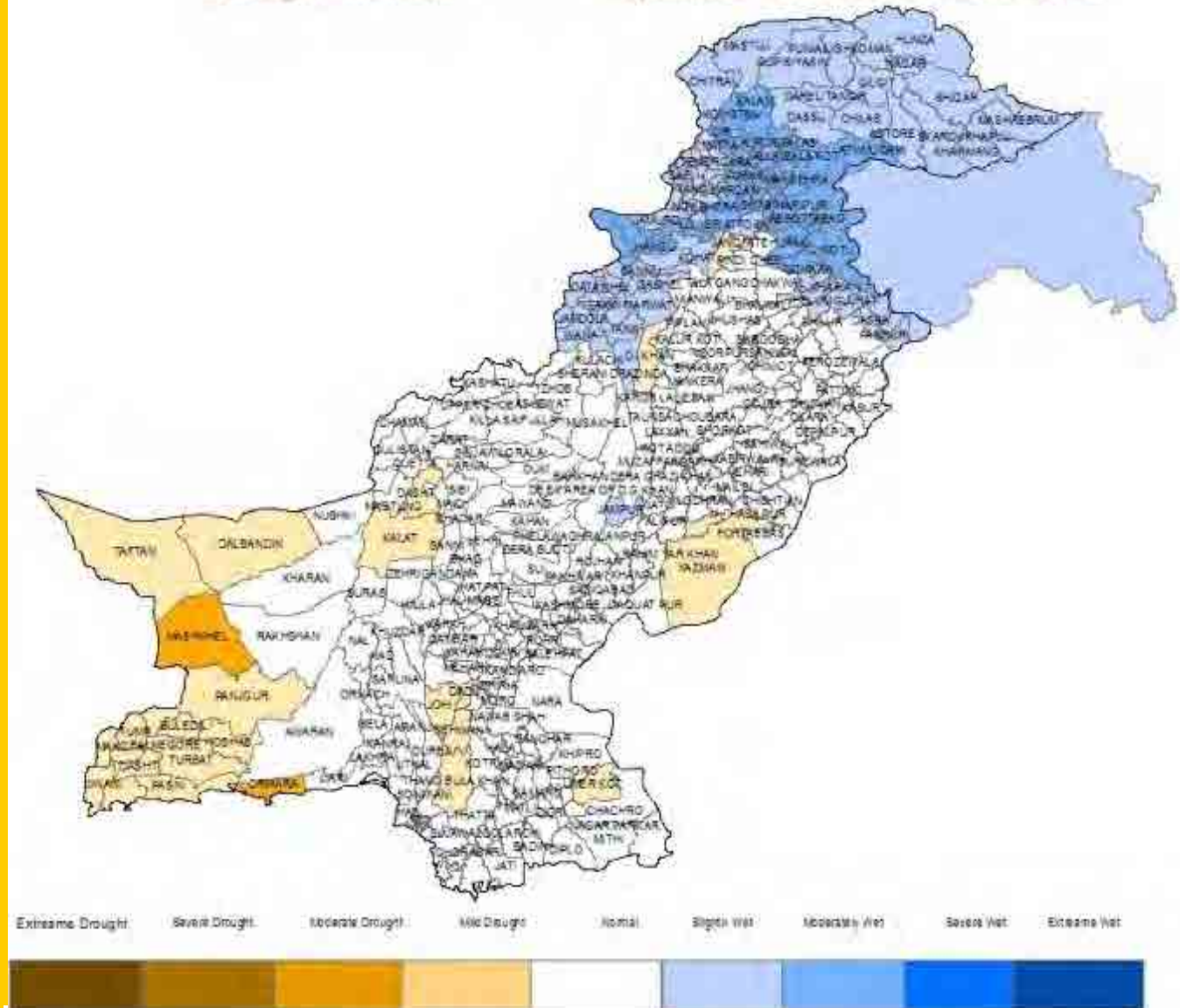
Drought Monitor is prepared fortnightly by applying GIS techniques using;

- SPI calculated from point rainfall data
- Water availability in reservoirs
- Soil Moisture data where available
- ETo data
- River & Stream Flow Data
- Field reports.

Duration 1st Nov to 15th Nov 2016

Drought Monitor

Updated 15th November, 2016



Flood Forecasting and Early warning system in Pakistan

OPERATIONAL HYDROLOGICAL SERVICES OF PMD

Flood Forecasting Division (FFD) Lahore is a specialized unit of PMD for this purpose.

Responsibilities

- i. Flood Forecasting**
- ii. River stream flow forecasting**
- iii. Water availability Forecast for Dams**
- iv. Assisting Water Management at Dams specially during Monsoon**

Pakistan Meteorological Department

Flood Forecasting System of PMD

■ 10-cm Doppler Radars

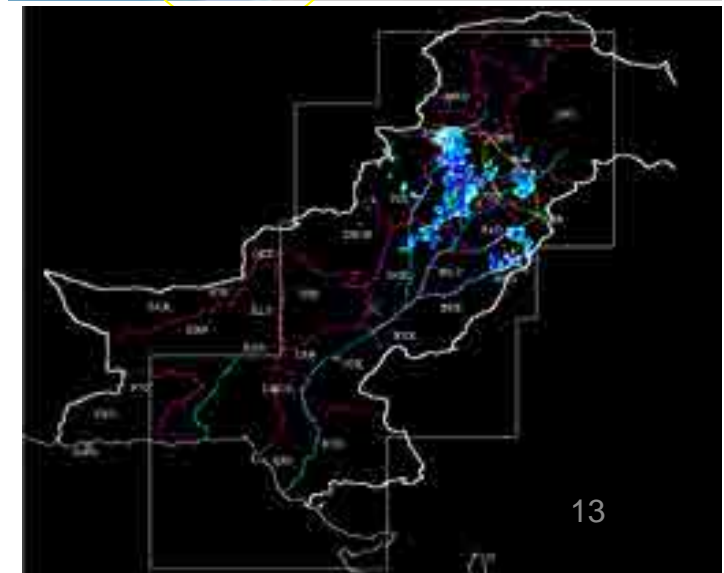
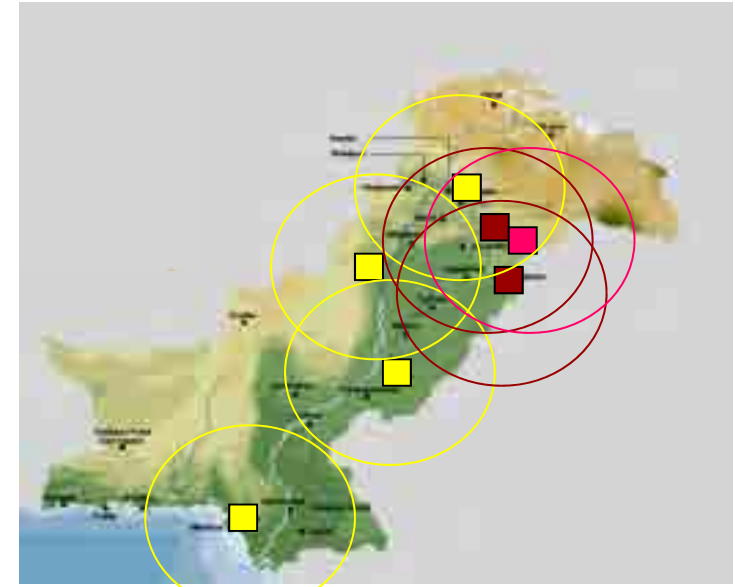
- Lahore
- Mangla

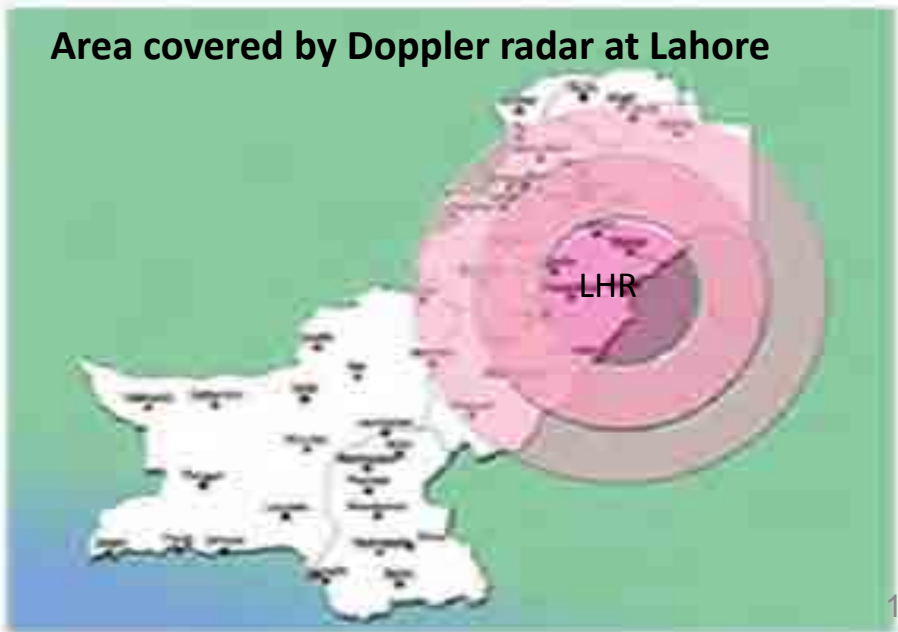
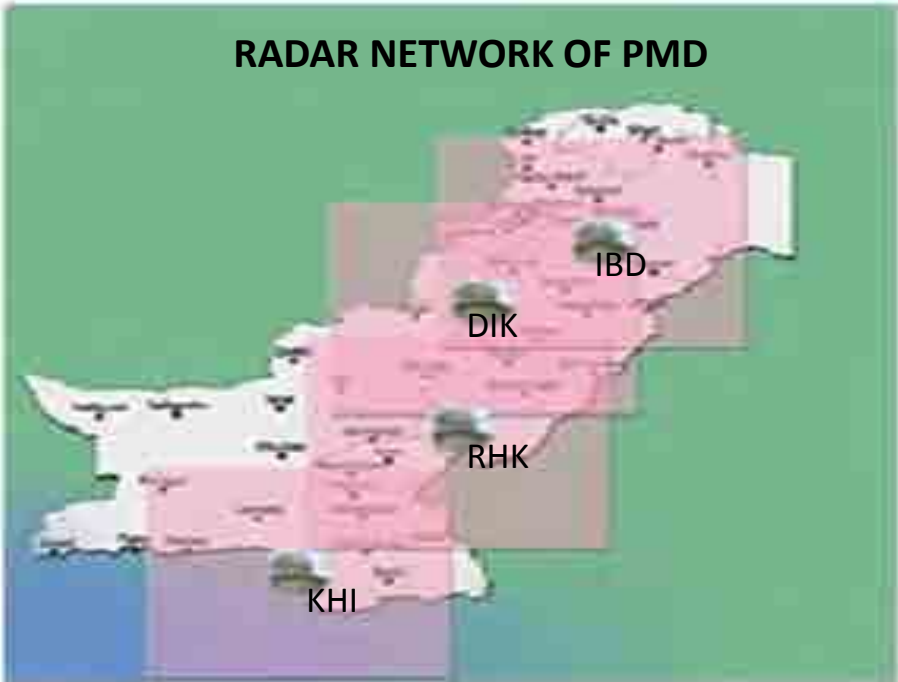
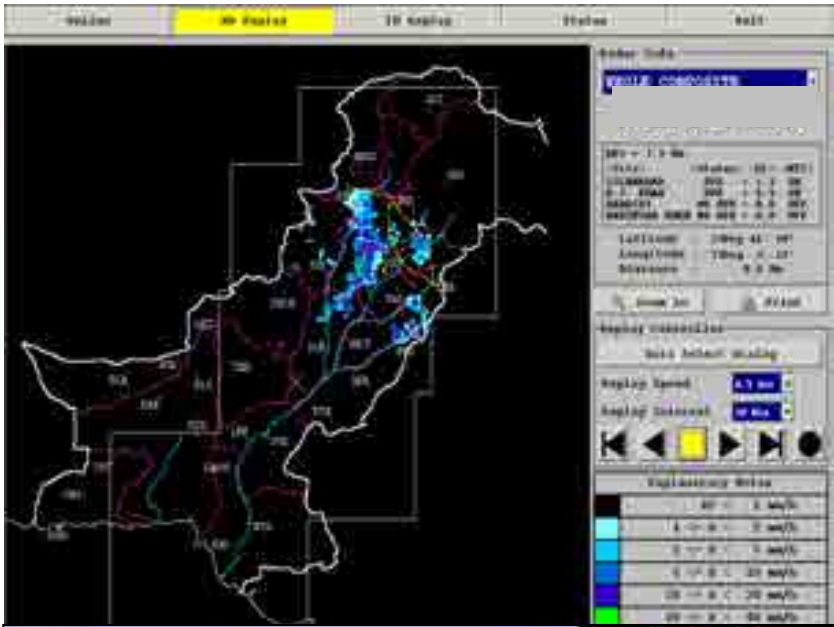
■ QPM Radar

- Sialkot

■ 5-cm Wx. Surveillance Radars

- Islamabad
- D.I.Khan
- Rahim Yar Khan
- Karachi





**GOVERNMENT OF PAKISTAN
PAKISTAN METEOROLOGICAL DEPARTMENT
FLOOD FORECASTING DIVISION
48-JAIL ROAD LAHORE-54000**

BULLETIN No. A-12214

Date: 14th October, 2014
Time: 18:20 hours (PST)

- | | |
|--|--|
| 1. Federal Minister, Water & Power, Islamabad | 13. Administrator & Chief Secretary, Gilgit Baltistan. |
| 2. Governor (All Provinces) | 14. Chairman, Indus River System Authority, Islamabad |
| 3. Chief Minister (All Provinces) | 15. Chairman, Federal Flood Commission, Islamabad |
| 4. Prime Minister House, Islamabad | 16. The Secretary General, Red Crescent, Islamabad |
| 5. Chairman MMA, Islamabad | 17. Secretary, Irrigation Department, (All Provinces) |
| 6. PM Secretariat, Islamabad | 18. D.G. Engineers, Eng. Directorate (DG), Rawalpindi |
| 7. Secretary, Aviation Division, Islamabad | 19. Chief Engineer, Mangla/Tarbela/Chashma |
| 8. Secretary, Ministry of Water & Power, Islamabad | 20. Chief Engineer, (All Searages) |
| 9. Secretary, Ministry of Information, Islamabad | 21. Chief Engineer, C.D.O. (Muzaffargarh) |
| 10. Chairman NHA, Islamabad | 22. Commissioner for Inland Waters, Lahore |
| 11. Chief Secretary (All Provinces & A.R) | 23. All other concerned |
| 12. PMA's (D.O's, All Provinces & A.R) | |

SUBJECT: - QUALITATIVE WEATHER/FLOOD FORECAST FOR NEXT 24-HRS:

I: HYDROLOGICAL SITUATION:

All the major rivers are flowing in their state of Normal flow

II: METEOROLOGICAL FEATURES:

Weak seasonal low lies over Northeast Balochistan.

III: WEATHER FORECAST FOR NEXT 24 HOURS:

Dry weather is expected over most parts of the country

IV: RAINFALL RECORDED IN MM DURING PAST 24 HRS (UP TO 0800 PST):

-NIL-

V: WEATHER OUTLOOK FROM 14th OCTOBER 2014 TO 16th OCTOBER 2014:

No significant change.

Web Site Address: www.pmd.gov.pk (Flood Update)

- <http://fb.pmd.gov.pk> or floodpage.gov.pk
- Duty Office 24 hrs: Phone: 04299205370, 04299205568, 04299205569, 04299205370

(MUTAMMAD AZHAR UL-HAQ)

Director
For Chief Meteorologist
Flood Forecasting Division Lahore
Ph: Office: 042-99205368
Fax: 042-99205369

**GOVERNMENT OF PAKISTAN
PAKISTAN METEOROLOGICAL DEPARTMENT
FLOOD FORECASTING DIVISION
46-JAIL ROAD LAHORE-54000**

BULLETIN No. B-122/16

Dated - 14th October, 2016

I: **WEATHER/RAINFALL FORECAST FOR NEXT 24 HRS:**

Time - 14:20 hours (PST)

RIVERS	Upper Catchments (Above Rim Stations)	Lower Catchments (Below Rim Stations)	DAMS POSITION (0600 PST)
INDUS	Dry weather	Dry weather (Kawalpindi Division)	FARBELA Level - 1507.02 Feet Max. Capacity Level - 1550.00 Feet
JHELUM	-0-	-0- (Sargodha Division)	MANGLA Level - 1198.80 Feet Max. Capacity Level - 1242.00 Feet
CHENAB	-0-	-0- (Capewala Division)	
RAVI	-0-	-0- (Lahore Division)	
SUTLEJ	-0-	-0- (Bikaner/India Division)	

II: **QUANTITATIVE FLOOD FORECAST OF GAUGING STATIONS (IN THOUSANDS OF CUSECS)**

RIVERS	Stations	Design Capacity	Actual Observations at 0600 PST		Quantitative Forecast for Next 24 hrs. (Inflow)	Forecasted Flood Level (Inflow)	Danger Level (Very High Flood)
			Inflow	Outflow			
INDUS	Turbala	1500	42.0	54.4	38.41	Below Low	650
	Kawalpindi	850	74.3	68.3	No significant change	-0-	650
	Chashma	850	66.8	62.0	-0-	-0-	650
	Tarnak	1100	65.6	60.8	-0-	-0-	650
	Gudke	1200	61.2	49.0	-0-	-0-	700
	Salhar	1500	41.2	8.8	-0-	-0-	780
	Kail	875	8.9	0.0	-0-	-0-	650
MADH	Rawana	-	10.5	10.5	-0-	-0-	280
JHELUM	Mangla	1600	10.0	23.9	9.12	-0-	-0-
	Harid	850	24.6	8.8	No significant change	-0-	725
CHENAB	Marala	1100	12.8	8.0	10.13	-0-	400
	Chuhra	800	6.2	6.2	No significant change	-0-	480
	Capewala	807	21.0	0.0	-0-	-0-	480
	Tarna	645	24.0	8.7	-0-	-0-	450
	Punjab	700	11.5	8.0	-0-	-0-	450
RAVI	Ambar	275	1.1	1.1	-0-	-0-	150
	Dhambra	250	1.4	1.4	-0-	-0-	135
	Bahar	225	21.8	0.0	-0-	-0-	135
	Salhar	150	14.2	0.0	-0-	-0-	80
SUTLEJ	G.S.Wala	-	6.0 (Gauge in Feet)	-	-0-	-0-	25.3 (Feet)
	Submari	325	11.0	0.0	-0-	-0-	175
	Isam	300	0.0	0.0	-0-	-0-	175

Inclined - 10 to 20% of area. Scattered - 20 to 30% of area

Widespread - 50 to 100% of area

R - Rising & F - Falling

* - Indicates data not received

Web Site Address: www.pmd.gov.pk (Flood Update)

* <http://fdk.pmd.gov.pk/cp/floodpage.htm>

* Day Office 24 hrs: Phone: 04299265139

04299265347, 04299265348

04299265349, 04299265379

(MURAHMAD AJMAL SHAH)

Director

For Chief Meteorologist

Flood Forecasting Division Lahore

Ph: 042-342 873432

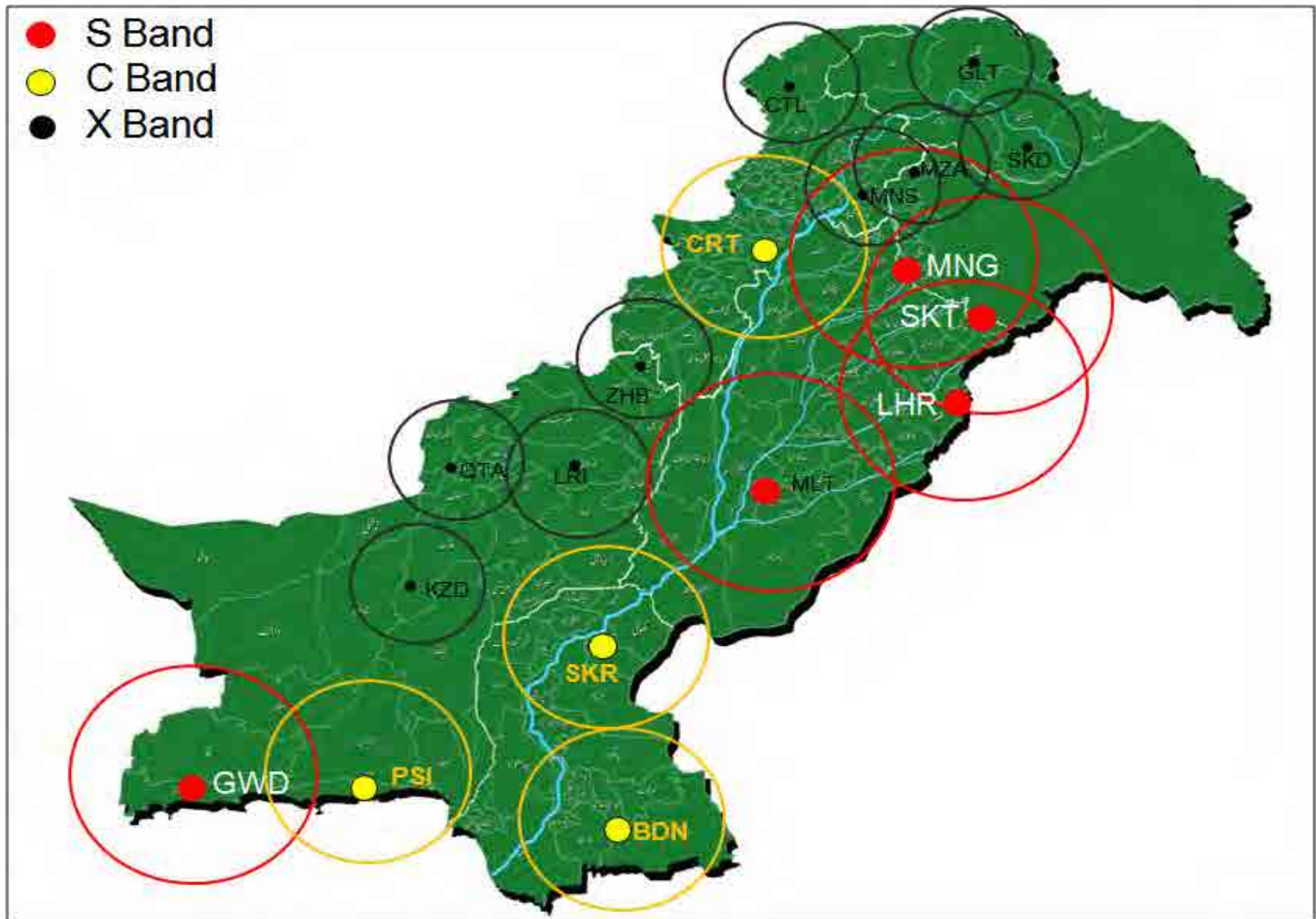
Fax - 342 873438

PMD existing RADAR network covers about 60-70% of the country. More RADARs are required especially covering Northern Areas and Balochistan.

At present, following initiatives have been taken for improvement of existing radar-network and forecasting capabilities:

- Installation of a new WSR, Islamabad with the height upto 73 meters. The project is being schedule to be completed in Dec, 2018.
- Installation of a new WSR, with the height upto 73 meters, Karachi, Dec, 2019.
- Establishment of Flood Forecasting & Warning System for Kalpani Nullah Basin, Mardan- Khyber Pakhtunkhwa. **Septmeber, 2017.**

Sites Proposed for installation of Radar Network



Earthquake Monitoring and Tsunami Early Warning System

- i. Earthquakes Monitoring**
- ii. Monitoring of Nuclear Explosion in the Region**
- iii. Building Sector**

Seismic Monitoring & Tsunami Warning System

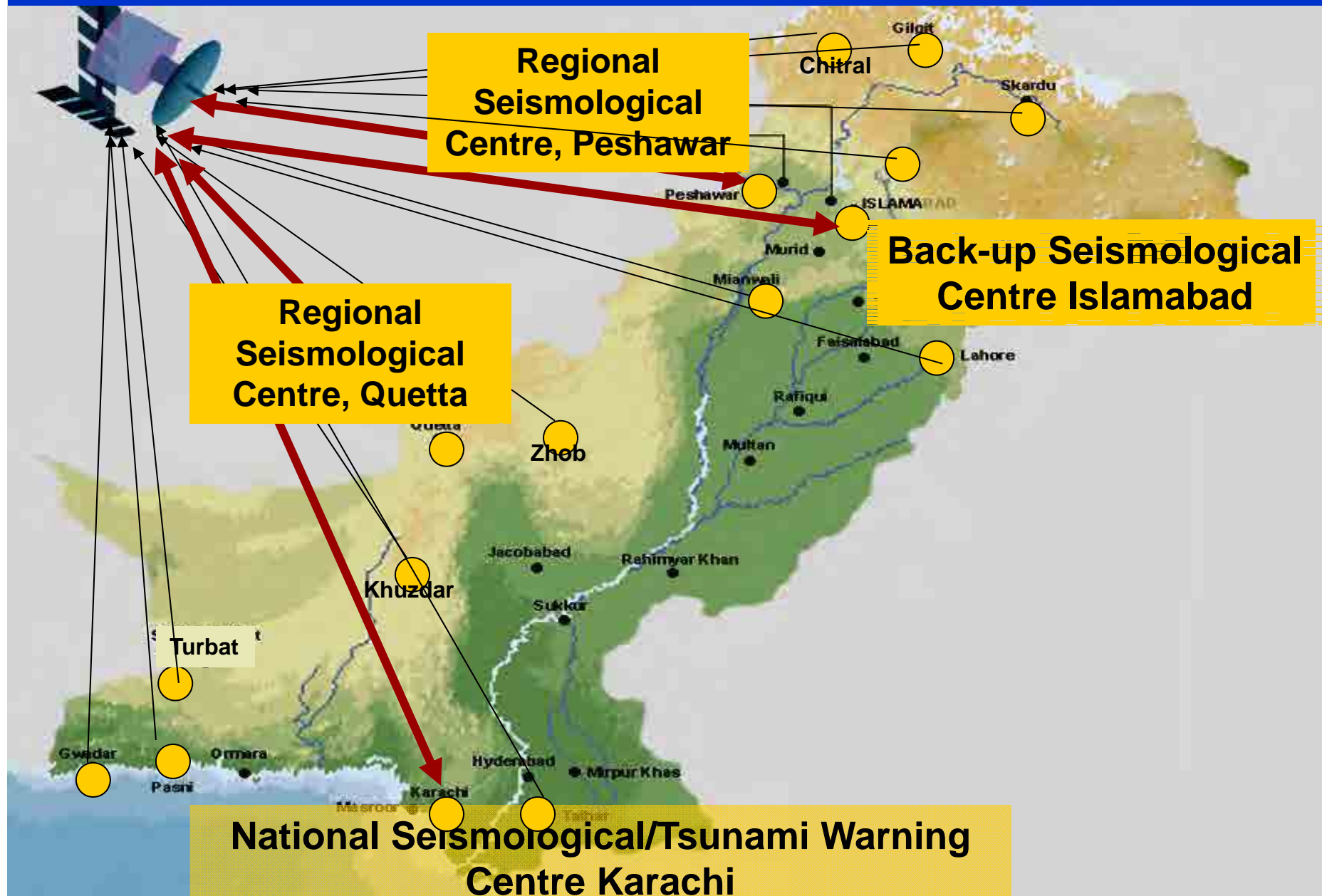
- **PMD is focal agency for Tsunami Warning System in Pakistan**
- **20 Digital broadband seismic monitoring stations**
- **20 Short period seismometers**
- **20 Accelerographs for major cities**
- **Speedy data communication System**



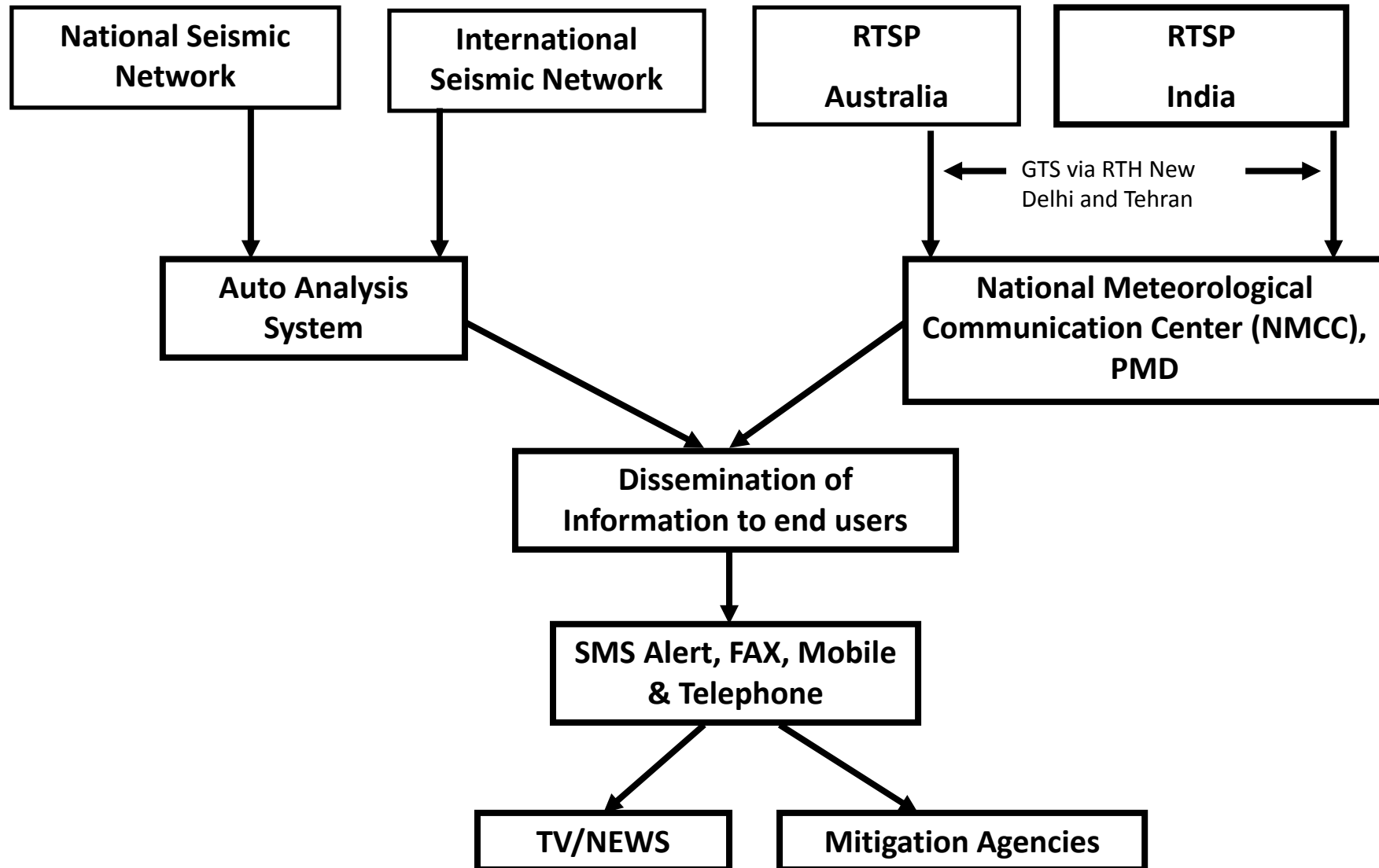
**Central Data Collection Hub
National Seismic Control Room**



Up-gradation & Strengthening of National Seismological Network for Pakistan



PMD TSUNAMI EARLY WARNING SYSTEM



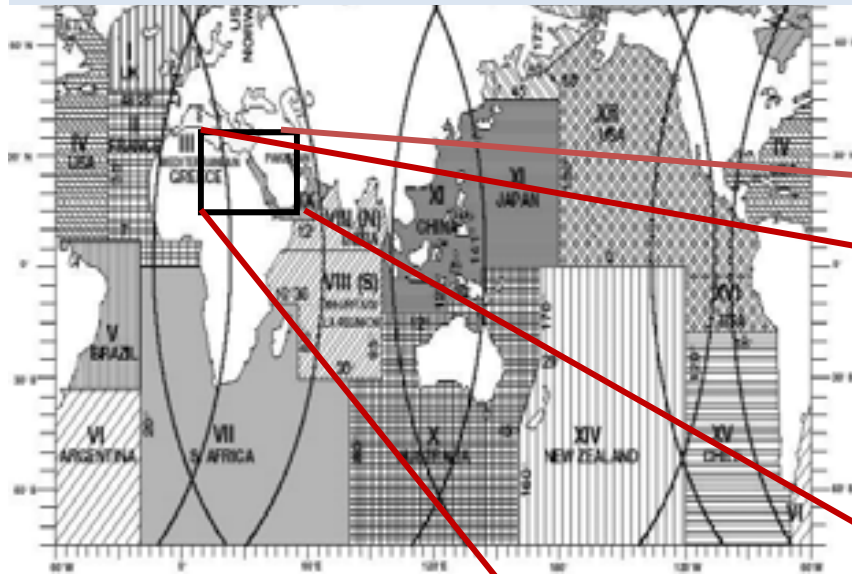
Marine Meteorological Service

PMD-Area of responsibilities under GMDSS

(Global Maritime Distress & Safety System)

- **Forecast is issued twice daily through INMARSAT Coastal Station Perth, Australia for the ships already in sea.**
- **Warnings when the port is threatened.**
- **Sea Bulletins for fisheries broadcast by Radio**

Pakistan -Area of responsibilities under GMDSS (Global Maritime Distress & Safety System)



AREA-IX

Pakistan is a Coordinator of AREA-IX since 1976

- Issues coastal warnings to all ships and concerned National Authorities



AREA-IX

consists of these 16 countries

- Bahrain
- Saudi Arabia
- Djibouti
- Somalia
- Egypt
- Sudan
- Ethiopia
- UAE
- Iran
- Yemen
- Iraq
- Kuwait
- Jordan
- Oman
- Pakistan
- Qatar

National Weather Forecasting Center

Weather Forecast issued by PMD

Short Range Weather Forecasts

24 Hours >90%

Medium Range Weather Forecasts

5-7 days > 80%

Long Range Weather Forecasts

1-3 Months ----70%

WATER AVAILABLE FORECAST FOR DAMS



Pakistan Meteorological Department

Government of Pakistan

ISO 9001:2008 Certified Provider of Aviation Meteorological Services View Certificate



National Weather

[Weather Ticker](#) 

[Daily Weather Report](#)

[Weekly Weather Forecast](#)

[Numerical Weather Products](#)

[Daily Weather Charts](#)

[Forecasting Terminology](#)

[Satellite Images](#)

Provincial & Districts' Weather

[Balochistan](#)

[Gilgit Baltistan](#)

[Khyber Pakhtoonkhwa & FATA](#)

[Punjab & Kashmir](#)

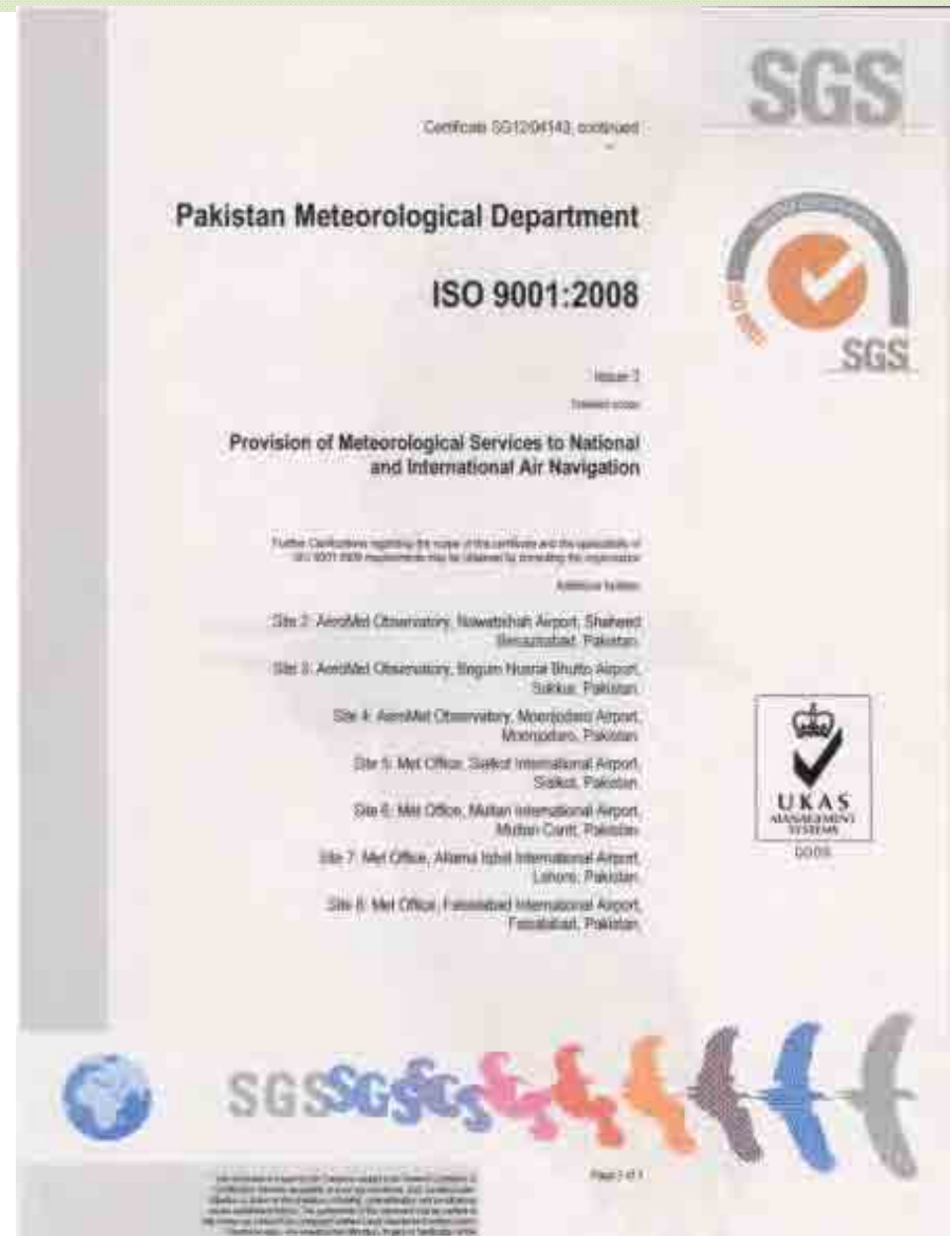
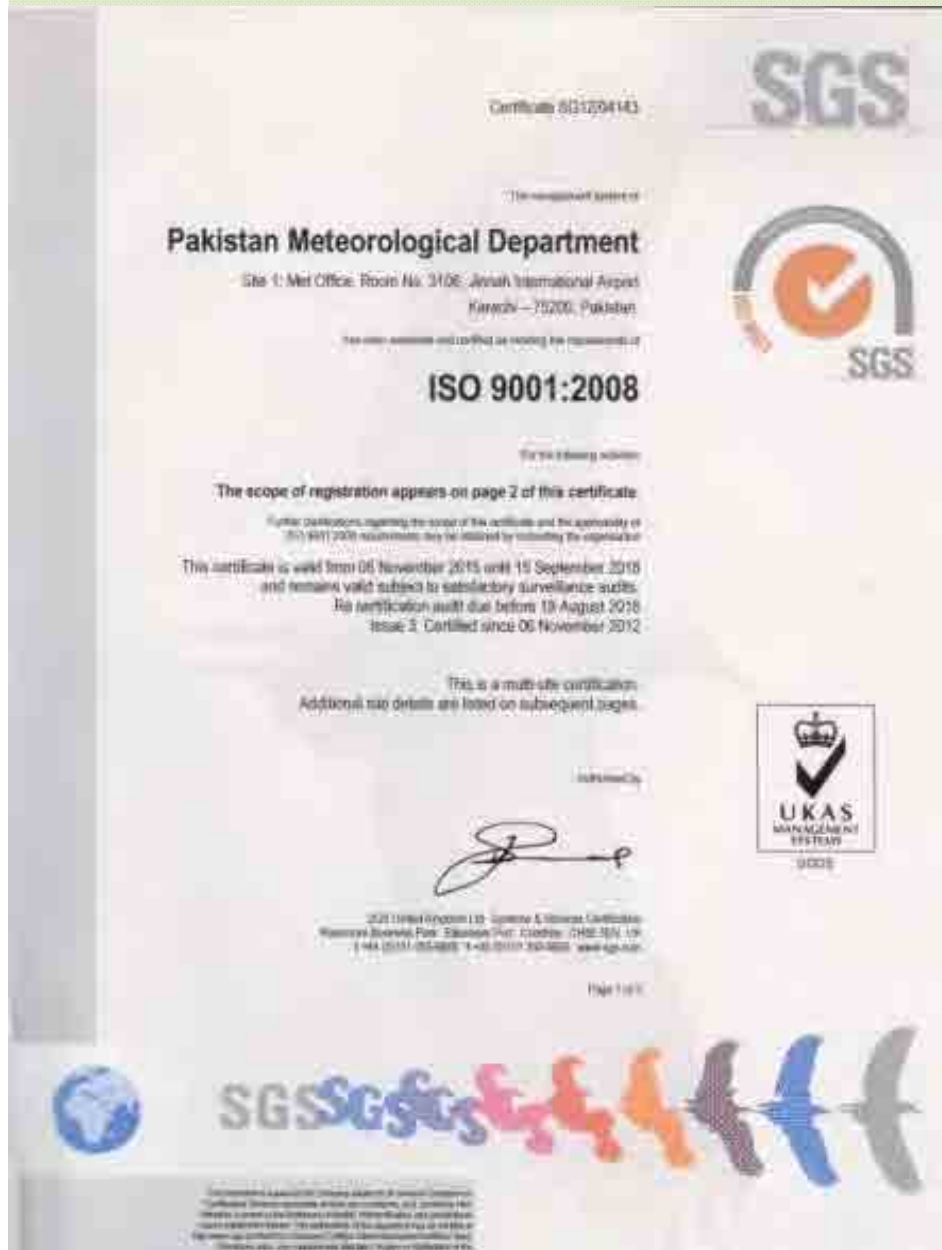
[Sindh](#)

[Daily Rainfall](#)

[Radar Images](#)

Aviation Meteorological Services of PMD

(ISO 9001-2008 Certified Provider of Aviation Meteorological Services)



Pakistan Meteorological Department

ISO 9001:2008



Issue 3

Further Certificates regarding the scope of the certificate and the applicability of ISO 9001:2008 requirements may be obtained by contacting the organization

Additional facilities

- Site 9: AeroMet Observatory, Bahawalpur Airport, Bahawalpur, Pakistan
- Site 10: AeroMet Observatory, Sheikh Zayed International Airport, Rahim Yar Khan, Pakistan
- Site 11: AeroMet Observatory, DG Khan Airport, DG Khan, Pakistan
- Site 12: DMO, Hyderabad Airport, Hyderabad, Pakistan
- Site 13: AeroMet Observatory, D.I. Khan Airport, D.I. Khan (PK), Pakistan
- Site 14: Met Office, Gagg Airport, Gagg (Gagg-Balistan), Pakistan
- Site 15: Met Office, Skardu Airport, Skardu (Gagg-Balistan), Pakistan
- Site 16: AeroMet Observatory, Chitral Airport, Chitral (PK), Pakistan
- Site 17: AeroMet Observatory, Sothi Sharif Airport, Sothi (PK), Pakistan



CLIMATOLOGICAL SERVICES

- i. **Study of Climatic Indicators & Global Warming**
- ii. **El-Nino & La-Nina effects on Pakistan's Weather & Climate**
- iii. **Environmental Pollution and Ozone Monitoring**
- iv. **Climatological information for National Development Projects**

Examples:

- **Location of the Federal Capital**
- **Location of Pakistan Steel Mill**
- **Tunnel in Northern Area**
- **Water Level in Lakes & Rivers**
- **Design for Dams, Motorways, Roads**
- **Feasibility of industrial Projects**

National Agro- Meteorological Center



Agromet Bulletins



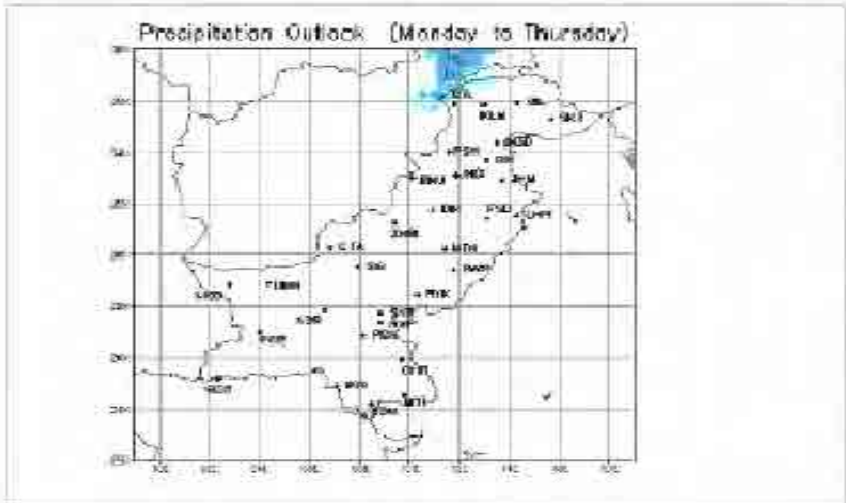
Crop Reports



Farmer Advisories



Technical Reports



موسمی پیش گوئی تاریخ اجراء: 11 نومبر 2016ء وقت: 11:00

ملک کے بالائی علاقوں میں جزوی طور پر مطلع اور آلودہ ریگندہ تاج آج (شام/رات) کویت، نیوں ڈویژن، کٹاک، گلگت بلتستان اور کشمیر میں کہیں کہیں جھکے مالاکنڈ، بزارہ، پشاور، مردان، راولپنڈی، گوجرانوالہ، لاہور اور سرگودھا ڈویژن میں چند مقامات پر تیز بواؤں کے ساتھ یلخی بارش اور پھاڑوں پر برقیاری کا امکان ہے۔ ملک کے دیگر علاقوں میں موسم خشکہ ریگندہ قیصل آباد، گوجرانوالہ، لاہور، ملتان، بہاولپور ڈویژن میں صبح کے وقت میں دھند پڑنے کا امکان ہے۔

زرعی مشورے

- (1) کپاس کے کاشتکار چٹائی کے بعد پھٹی کو ایک یا دو دن دھوب کر ضروری لگاوانی کیونکہ زیادہ نمی کی صورت میں پھٹی کا معیار متاثر ہو سکتا ہے۔
- (2) چاول کے کاٹ کا فصل پر کسی بیماری کی صورت میں مٹھکھہ وراثت کے مشورے سے بچوں کا استعمال جاری رکھیں، اور فصل کی چٹائی اور پھٹائی کا عمل روزانہ کی بنیاد پر مکمل کریں۔
- (3) گندہ کے متعلقہ علاقوں کے کاٹ کا فصل کی کاٹ جلد مکمل کر لیں اور مٹھکھہ عوسحیات کی پیش گوئی اور فصل کی ضرورت کے مطابق آبیاری جاری رکھیں۔
- (4) گندہ کی کاشت والے علاقوں کے کسان زمین کی تیاری شروع کر دیں۔ اور اس کے علاوہ بیج اور کھاد کا اچھا صحیح منصوبہ کریں۔ دھاری علاقوں میں دستیاب وتر کو استفادہ بنانے کے لیے گہرا بل چلائیں۔

رابطہ کے لیے

موسم کی پیش گوئی کے سلسلے میں 051-9250363 اور 638-638 پر فون کر کے مشورہ طلب کے آئندہ موسم کی معلومات حاصل کی جاسکتی ہیں، زرعی موسمیاتی مرکز، مٹھکھہ موسمیاتی اسلام آباد

Research & Development Division



Research Groups in R&D Division

- Numerical Modeling Unit
- Climate Research Unit
- Cryosphere Monitoring and Research Unit
- Seasonal Forecasting Unit
- Agromet & Bio-met Research Unit

High performance computing (HPC) facility



PowerEdge M1000e Chassis Nos :3

PowerEdge M600 blade servers Nos : 32



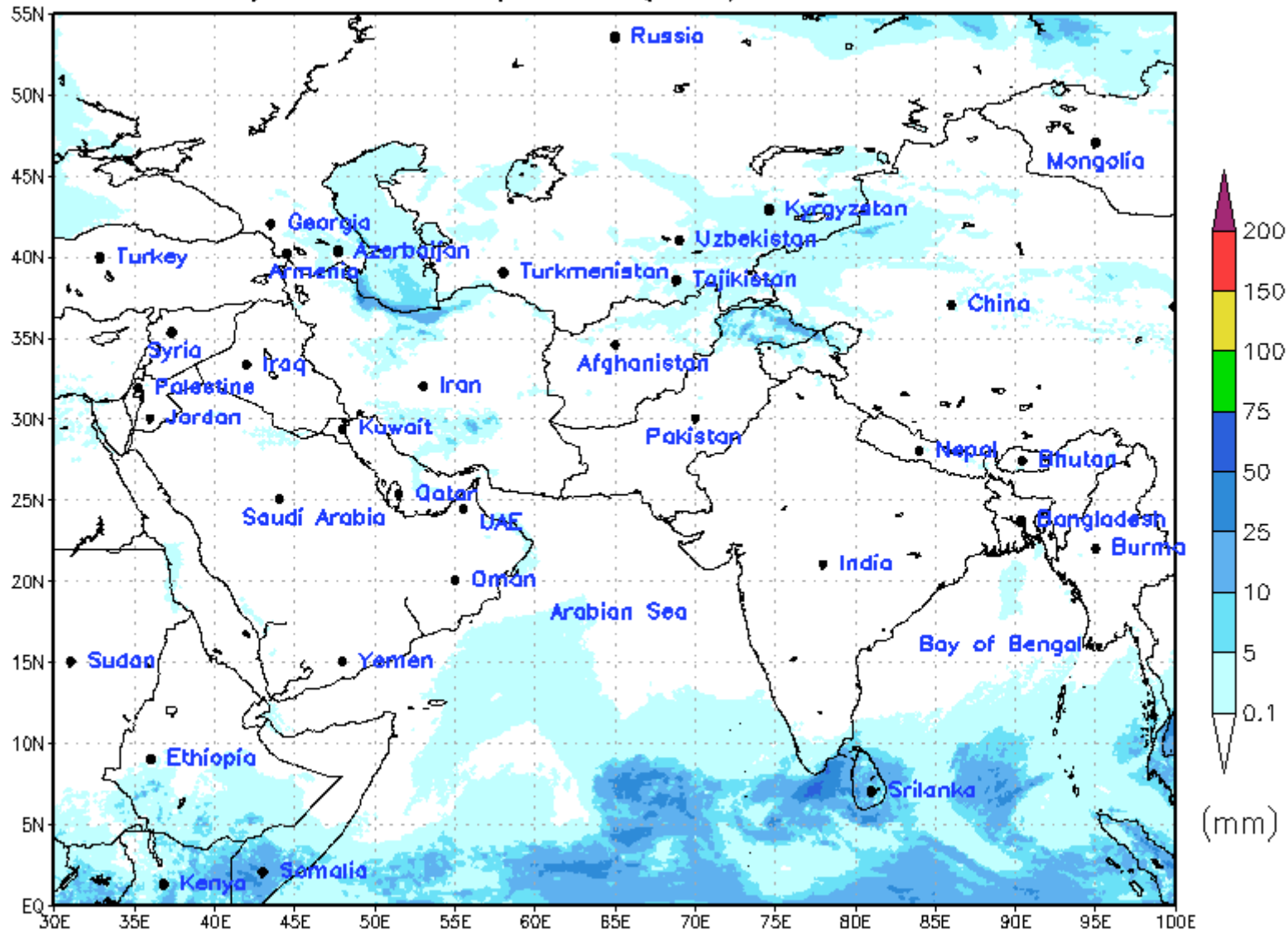


High performance Cluster technical Specifications

- Computing Nodes: 32 Nos. Dell PowerEdge M600 Blade Servers
- Each having 3.33GHz 2 Quad Core Processors
- **Total No. of Cores : 256 Nos.**
- **Total Memory : 256 GB**
- Connectivity
 - Gigabit Ethernet
 - Infiniband 20 Gbps DDR
 - FC 8 Gbps
- **Total Data Storage Capacity 50TB**

ICON Model Output (13 km)

Daily Total Precipitation(mm) 23-NOV-2016



Installation of Glacier Monitoring Stations in Northern Pakistan



Askoli, Shigar Valley 2015 m a.s.l



Malungutti Glacier Shimshal 4750 m a.s.l



Temp and Precipitation Logger Yazdgil Glacier Shimshal 3300 m a.s.l

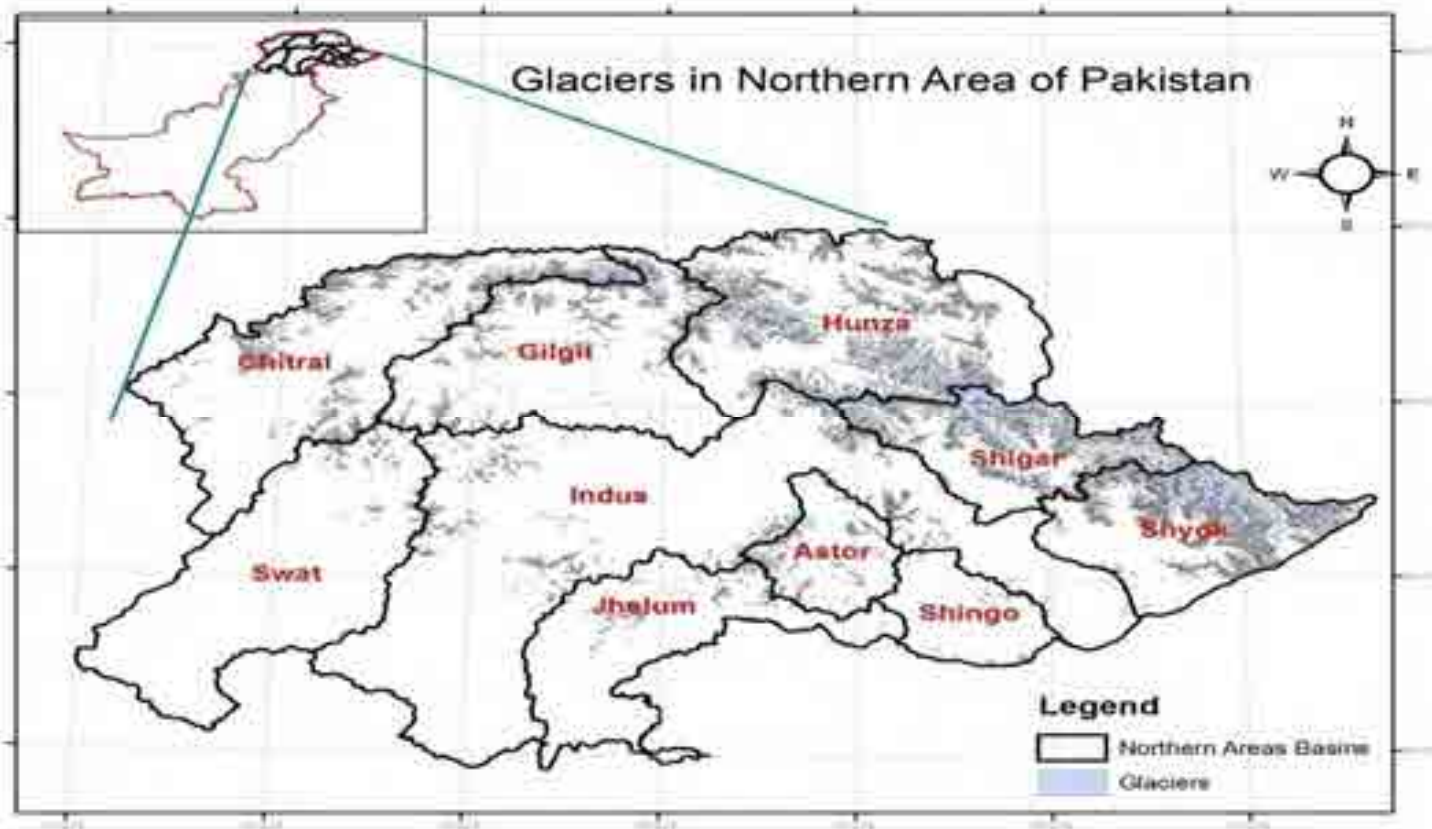


Patundas, Passu Glacier 4500 m a.s.l,

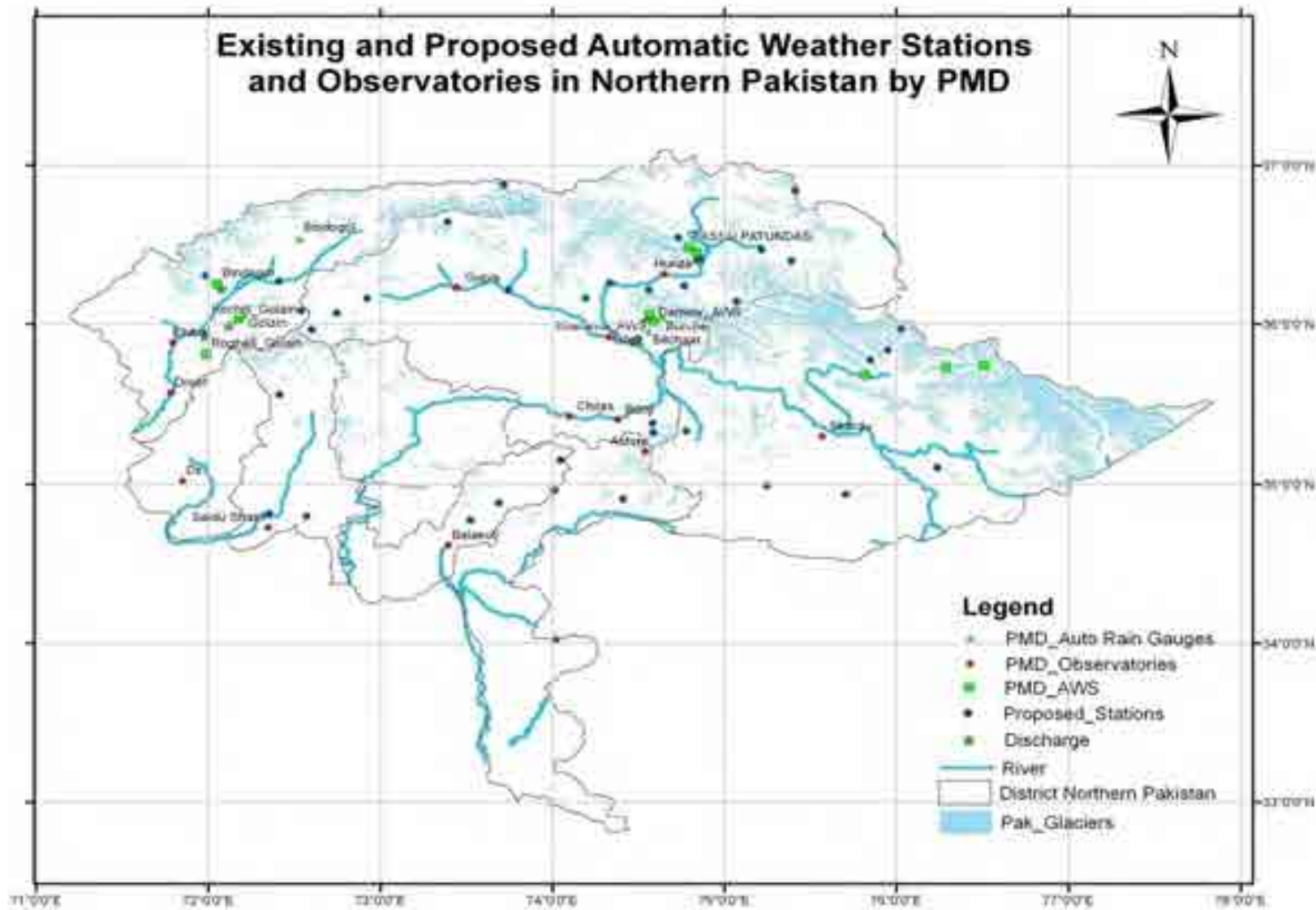
Pakistan's Cryospheric Assets



Number of Glaciers	Area of Glaciers (km ²)	Volume of Ice (km ³)	Ranges
7259	11780	2066	Himalaya Karakoram Hindukush



Cryosphere Monitoring Network of Pakistan



Installation of Glacier Monitoring Stations in Northern Pakistan



AWS at Dammay, Bagrot Valley, 4100 m a.s.l



Rain Gauge at Bilchar Bagrot Valley 3350 m a.s.l

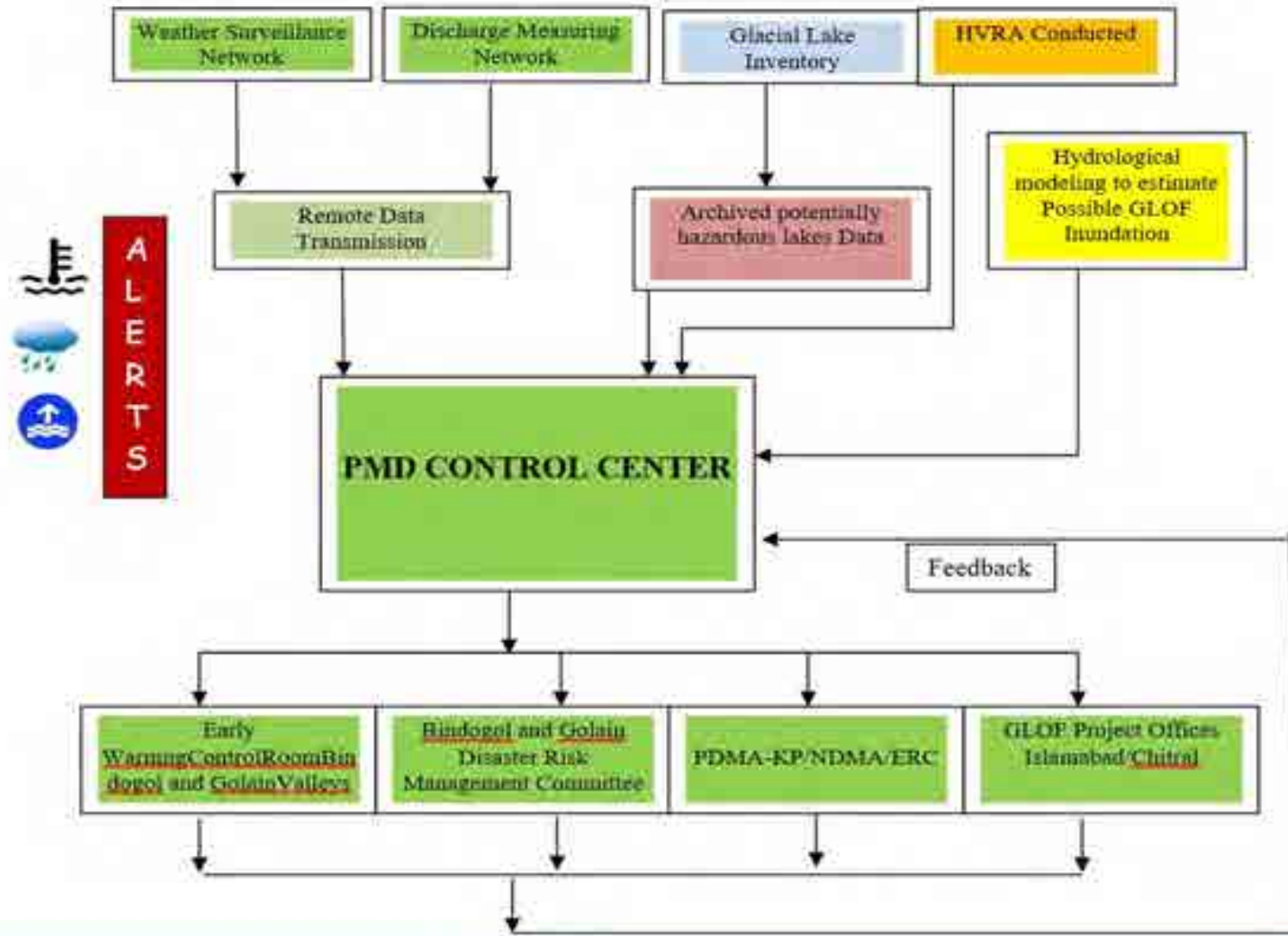


AWS at Shahchukoh Glacier, Golain Valley 3965 m a.s.l



Discharge Measuring Station at Golain Valley

GLOF EWS for GB and Chitral



Climate Outlook for Nov-Dec 2016

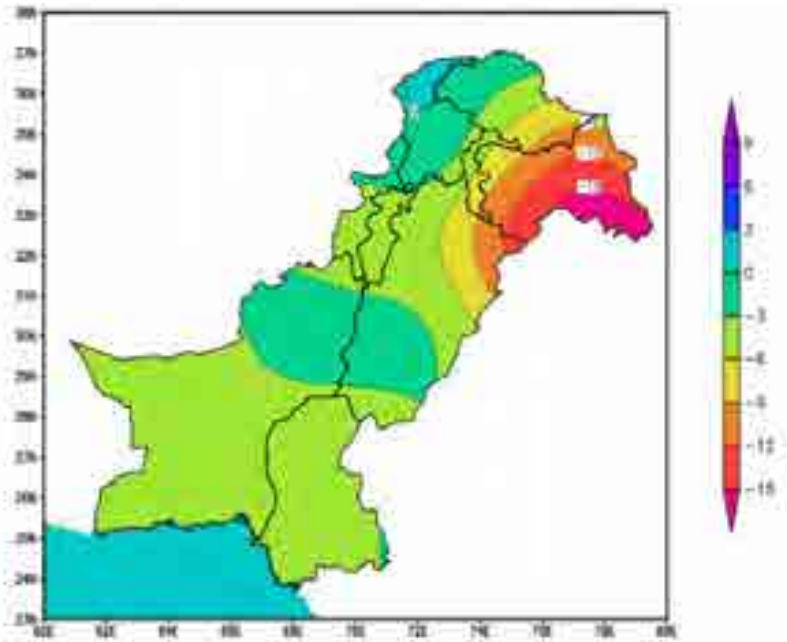


Figure : Predicted Anomaly for Precipitation (mm/day)

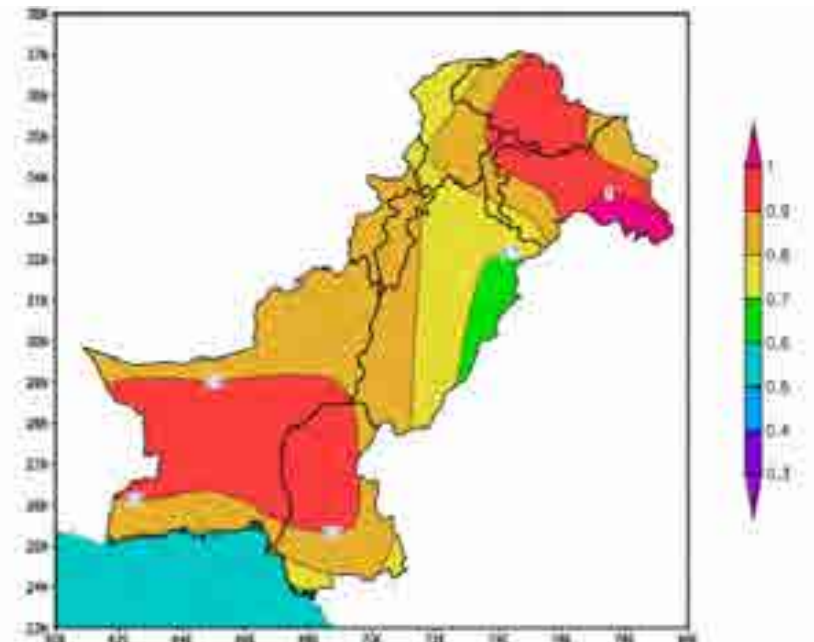


Figure 2: Predicted Anomaly for Mean Temperature (C)



Pakistan Meteorological Department

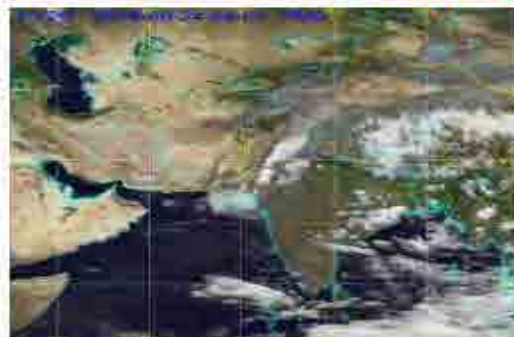
Government of Pakistan

ISO 9001:2008 Certified Provider of Aviation Meteorological Services View Certificate

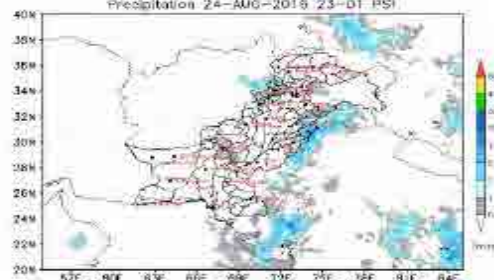


Mainly hot and humid weather is expected in most parts of the country. However rain-thunderstorm is exp

- About PMD
- Leaders
- Services
- Address Book
- Met Observatories
- PMD Projects
- Climate & Astronomical Data
- Historical Events
- Numerical Weather Products
- Seasonal Forecast
- Academic Strength
- Events Pictures/Videos
- Training and Courses
- Publication/Reports
- Quarterly News Bulletin
- AWS Data
- Conferences and Seminars
- Official Forms
- Circulars
- Pension Cell
- Jobs
- Tender
- Official Email
- Contact Us
- Youth Corner (Met.Edu)
- Webmaster



Three Days Rainfall Forecast
Precipitation 24-Aug-2016 23-01-PSI



Pakistan Weather	Satellite/Radar Images
National Forecast, Cities Forecast, Weekly, Seasonal Outlook	Pakistan, Asia, Global Satellite Images, Radar Network
Aviation Products	Flood Update
Aviation Weather Charts, NMCC Charts, Metars, Telfors	Flood Forecasts, Damo Flows, Lai Nullah, GIS Maps, Rainfall/Temperature
Drought Monitoring	Farmer's Weather
Current Drought Situation/Monitoring, Soil Moisture Analysis/Advisory	Farmers Forecasts, Agromet Bulletins, Crop Vegetation Index, Crops Report
Tropical Cyclone/Marine Weather	Earthquake Information
Tides, Wave Height, Wind speed, Coastal Areas Forecast, SST	Recent Earthquakes, Seismic Reports, Seismic Monitoring Network
Research Activities	Synoptic Data
R&D, NWP Products, Publications, Climate Data, Pollen Count, Pak Jrm. of Meteorology	Daily Synoptic Data, Browsing Surfaces/Upper Air Met Data

sterday's Highest Maximum Temperatures: Turbat 44 °C, Sibbi 43°C, Islamabad 36°C, Lahore 36°C, Kara

Current Weather at 03 PM (PST) Dated: Wednesday, August 24, 2016 	Daily Weather Report	Monsoon Progress				
	Weather Advisory/ Press Release	Seasonal Forecast				
	Weather Alert / Glof Alert-3-Update	Farmers Advisory (زرعی ہوشیار)				
Maximum Temp. Dated: Tuesday, August 23, 2016	Real-Time Flood Report (Lai Nullah)					
<table border="1"> <tr> <td>Chilas</td> <td>38.5 °C</td> </tr> <tr> <td>Chitral</td> <td>34.0 °C</td> </tr> </table>	Chilas	38.5 °C	Chitral	34.0 °C		
Chilas	38.5 °C					
Chitral	34.0 °C					



Rs. Million

SN	Description	Total Cost	Remarks
Radars	<ul style="list-style-type: none">•12 New•5 Replacement	8000.00	Provinces
Met Data (Observation Network)	<ul style="list-style-type: none">• 40 New, 430 AWS•10 Agro-met•8 Wind Profilers (Aviation)	1391.00	Federal Govt
Flood Warning Centers Regional Centers GLOF Flash Flood WC	<ul style="list-style-type: none">• 5 Centers (Provincial)• 20 Stations in GB & Chitral• 8 Vulnerable Sites (Hill Torrents)	2820.00	Federal Govt
Seismic Data	10 Stations (Tsunami & Micro-seismicity)	500.00	Federal Govt
Awareness	TV/FM Radio/Cell	600.00	Federal Govt
Technology	HPCC (High Power Computer Clustered)	100.00	Federal Govt
Capacity Development	Scientists skill according to new & advanced technology	1000.00	Federal Govt
Total Cost		6411.00	Federal Govt



Pakistan Meteorological Department
Government of Pakistan



Thank you!

