

NMHSs Role in facilitating Climate Change adaptation at National Levels

(A Case Study of Pakistan)

Dr. Qamar-uz-Zaman Chaudhry
Director General
Pakistan Meteorological Department
REP. OF WMO

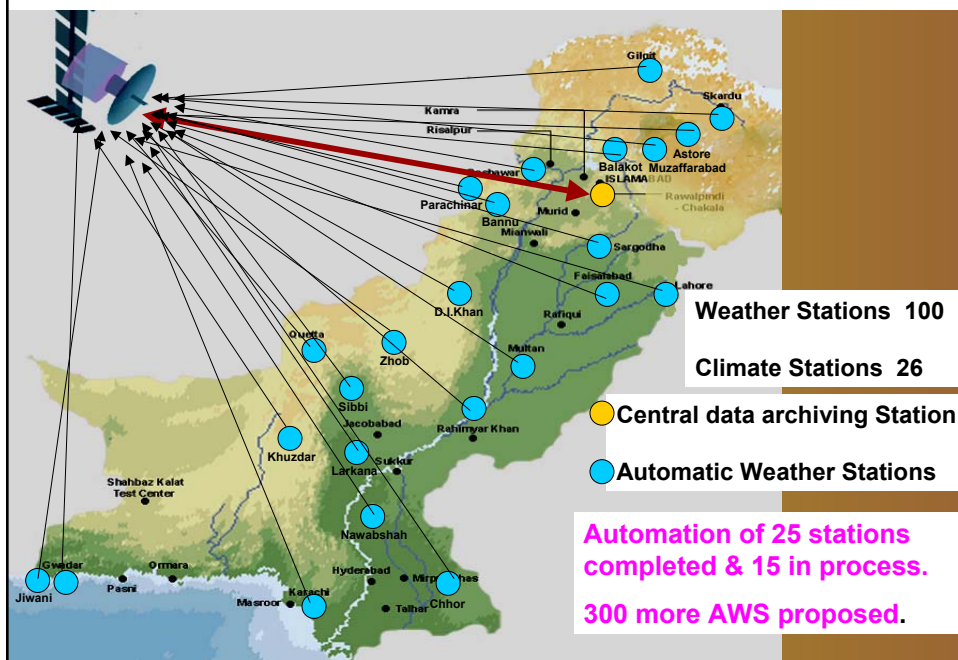


Prime Minister's Committee on Climate Change

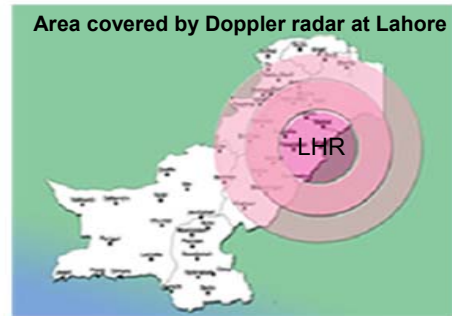
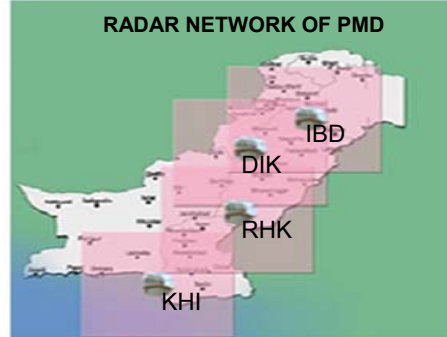
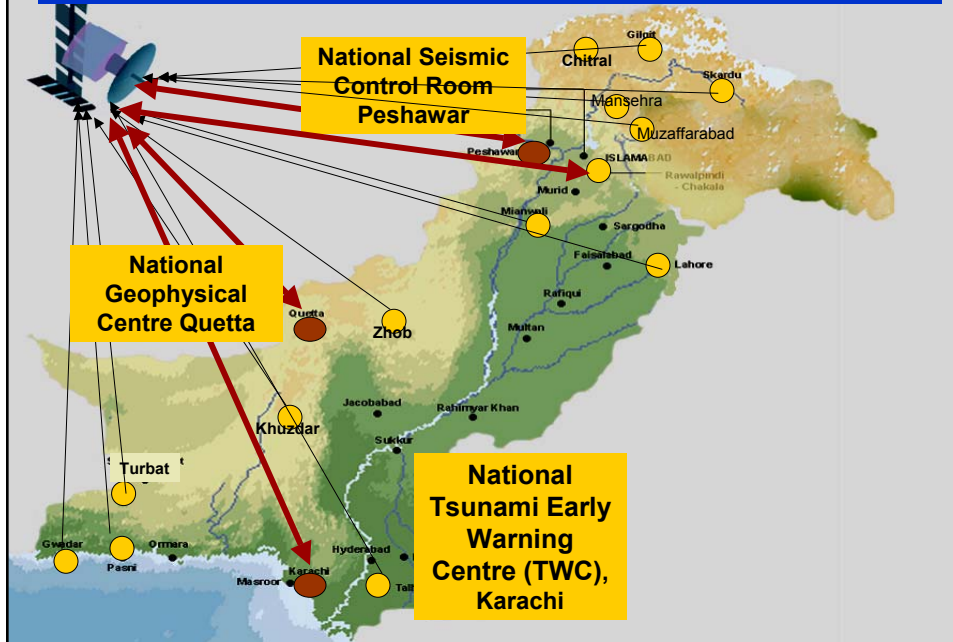
Establishment of Global Change Impact Studies Centre (GCISC)

Establishment of NDMA

Automation of Meteorological Observing Network

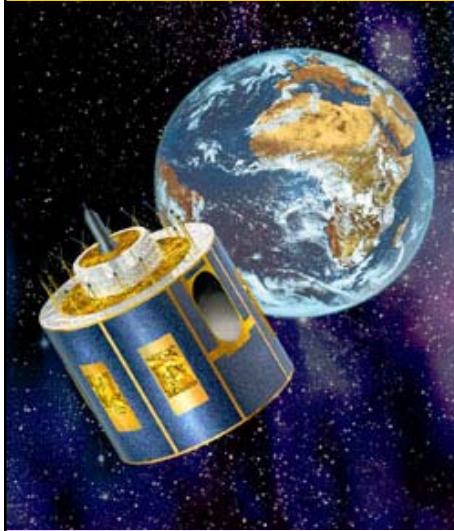


Up-gradation of National Seismic Network for Pakistan (Approved June, 2005)



SATELLITES FOR DATA ACQUISITION

Meteo-SAT-7
NOAA Series
Chines Satellite



Drought/Environment Monitoring & Early Warning Centre

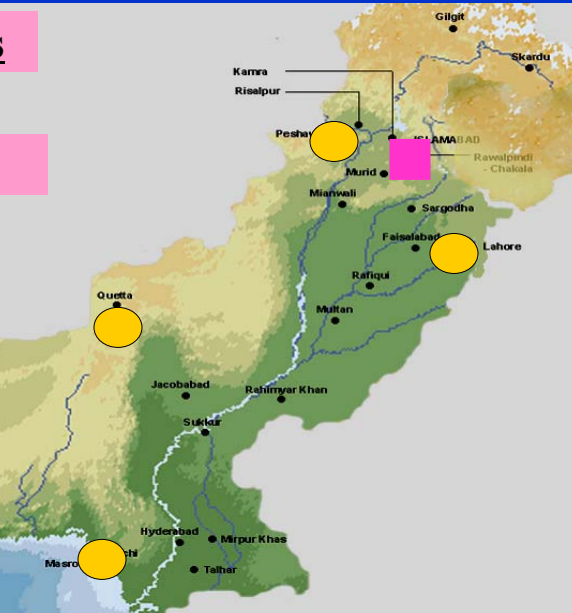
Project Components

 National Centre for Drought/ Environment Monitoring

 Regional Drought Centre

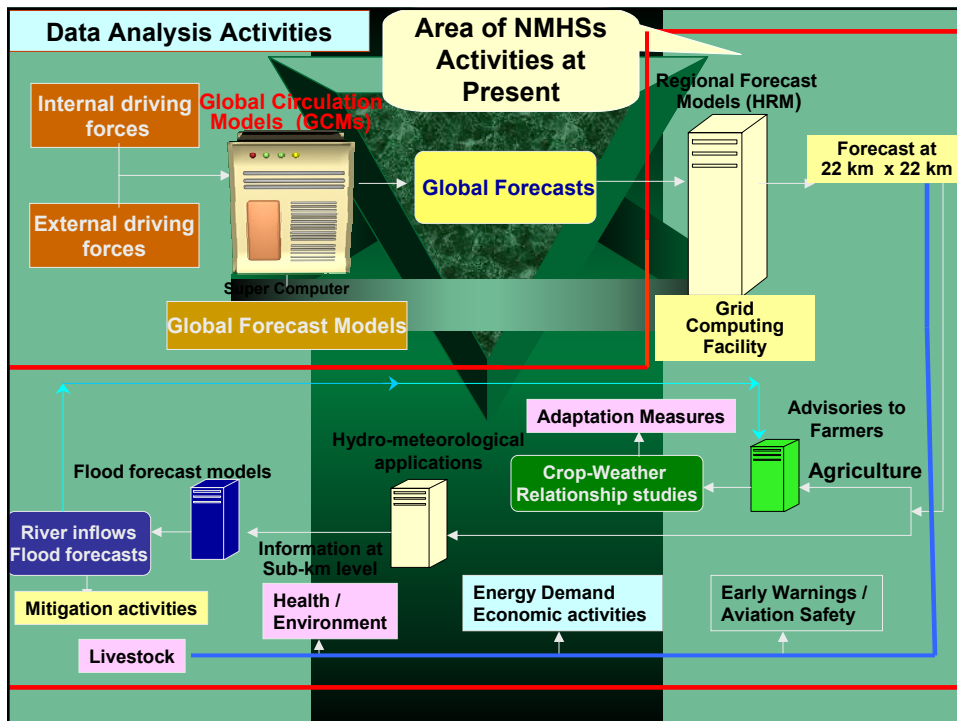
Additional data generation Resources in this project

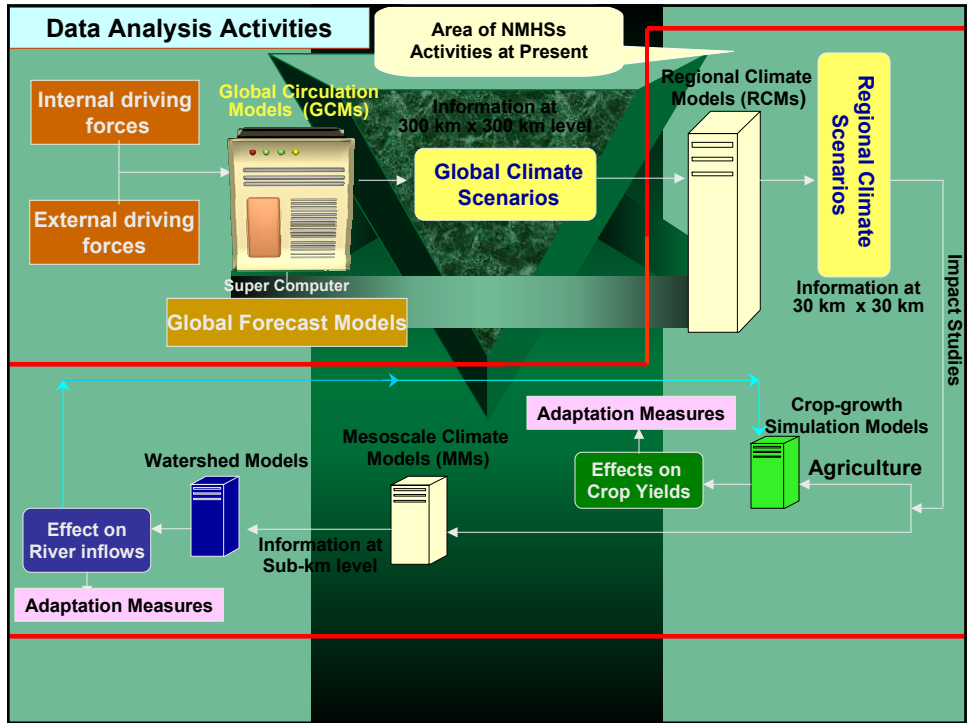
- AWS 50
- Rain-guage stations 500
- Soil Moisture & Under Ground Water situation Monitoring



SOURCES OF CLIMATE DATA & ANALYSIS

i. Climate Data Centre	PMD
ii. Weather & Climate Modeling	PMD & GCISC
iii. Agro-Climate Relationships Modeling Studies	PMD, GCISC & Agri University F-Abad





Simulation Models Currently in Use at GCISC

Regional Climate Models

- RegCM3 (AS-ICTP, Italy)
- PRECIS (Hadley Centre, UK)
- WRF (NCAR, USA)

Watershed Models :

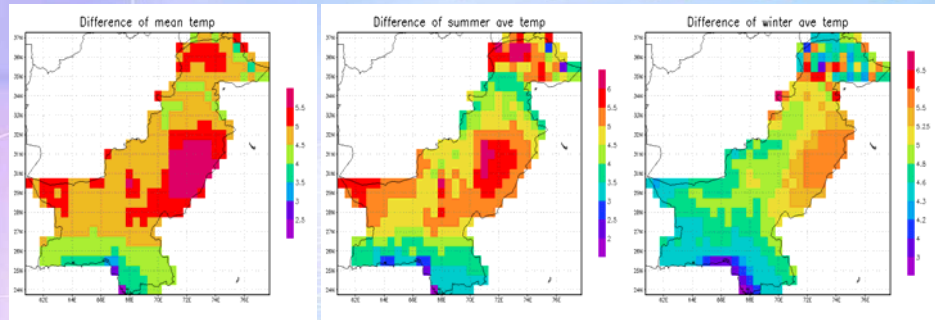
- DHSVM (Univ. of Washington, USA)
- UBC (Univ. of British Columbia, Canada)
- HEC-HMS (US Army Corps of Engineers)

Crop Simulation Models :

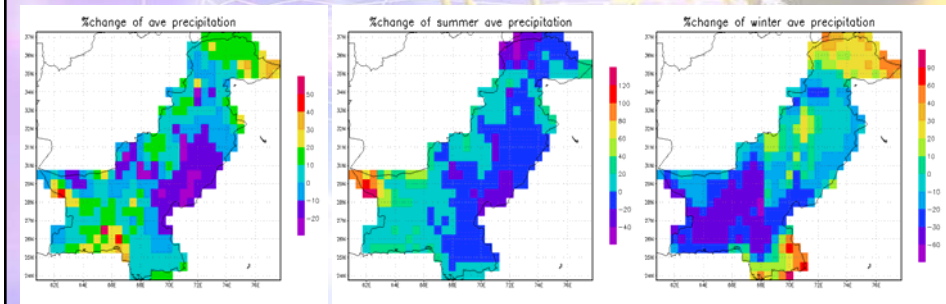
DSSAT: Decision Support System for Agro-technology Transfer (Univ. of Georgia, Griffin, USA) comprising several families of models:

- CERES (for cereals)
- CROPGRO (for grain legumes)
- CROPSIM (for root crops)
- Other Crops (for Tomato, Sunflower, Sugarcane, Pasture)

Projected Temperature Change (° C) for 2080s by PRECIS (A2 Scenario)



Projected Precipitation Change (%) for 2080s by PRECIS (A2 Scenario)



Products to end Users

- i. Next 24 hour Weather Forecast
- ii. Next 2-3 days Weather Forecast for Farmers
- iii. Weekly Weather Forecast
- iv. Seasonal Weather Prediction

Adaptation to Economic Sector

NMHSs are effectively contributing in minimizing Economic Losses across the globe.

Agriculture, power sector, water management , construction firms, kilns etc all are directly benefited from precise early warnings.

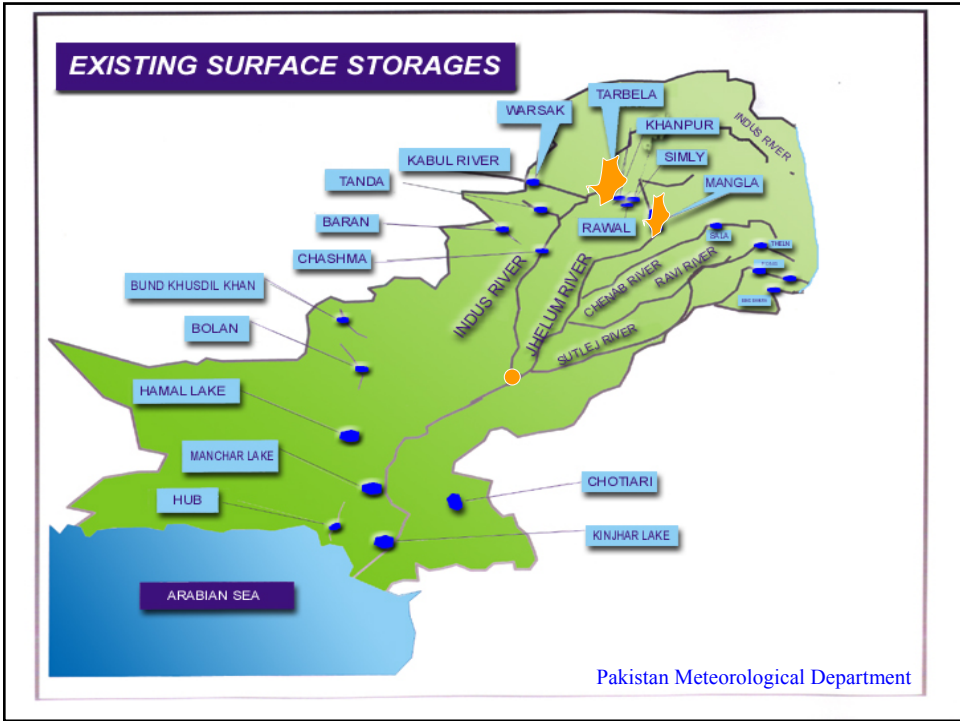
Few case studies are presented here.

Case Study 1:

FLOOD WARNINGS IN 1997

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 Management at Dams specially during Monsoon



D.O. No. F.1-3-97/FAM
Ministry of Water & Water
Federal Flood Commission,

Riaz Ahmad
Chairman

Islamabad the 15.10.1997

Dear Doctor Sahib

I feel honoured to acknowledge the accuracy of Meteorological Department's recent flood forecast during August, 1997 record rainfall. Early warnings and consequent pre-releases from Mangla Dam saved the country from flood damages of the tune of approximately 5 billion rupees.

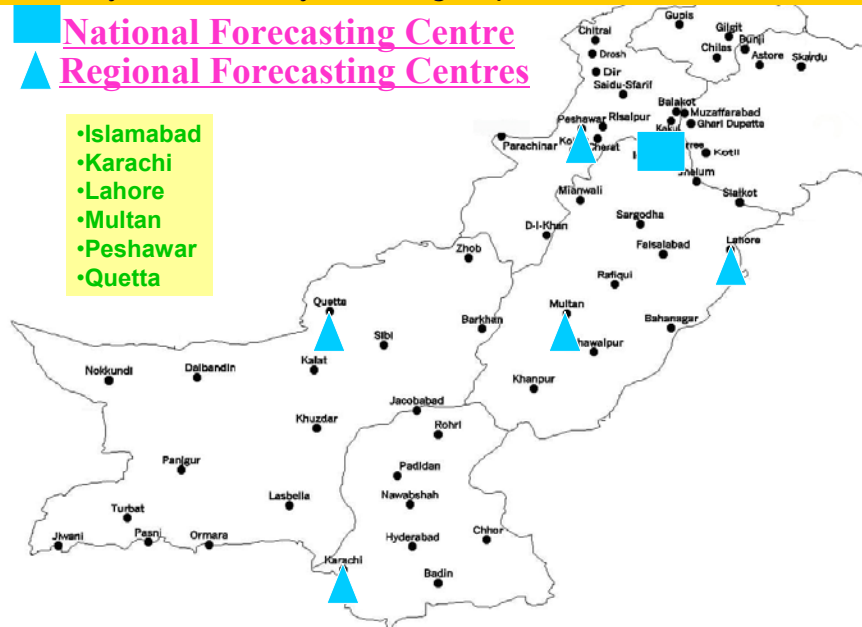
With best regards,

sd/
(RIAZ AHMAD)

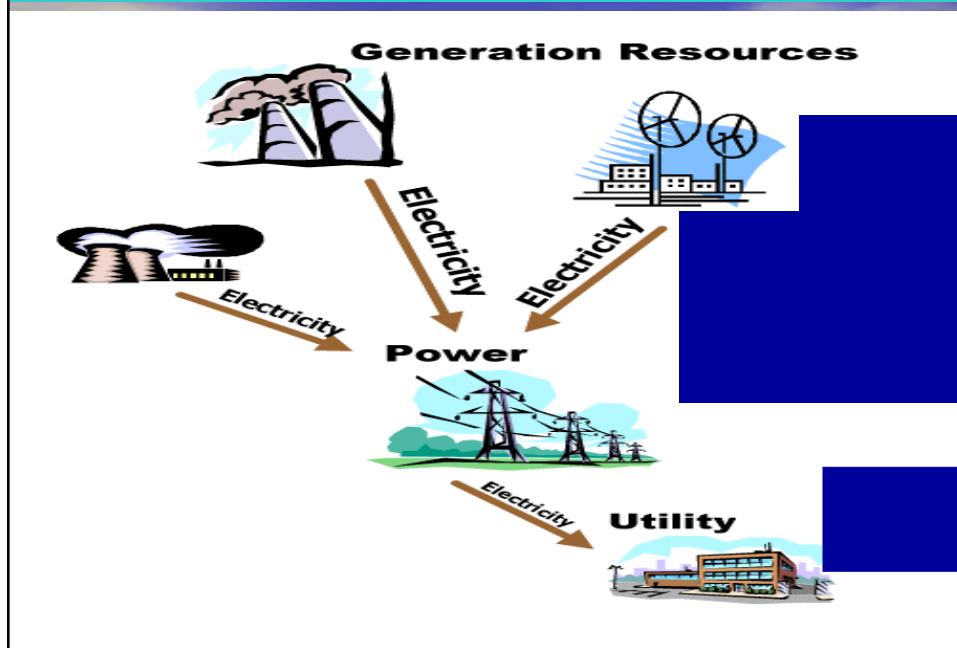
Case Study 2: Early Warning Impact on Power Sector

■ National Forecasting Centre
▲ Regional Forecasting Centres

- Islamabad
- Karachi
- Lahore
- Multan
- Peshawar
- Quetta



WPADA CONNECTED TO IPPS



Water & Power Development Authority

National Power Control Centre

No.CENPCC/2080

Islamabad the 27.02.1999

Director General,
Meteorological Department
H-8/2, Islamabad

Subject: IMPORTANCE OF WEATHER REPORTS FOR LOAD FORECAST.

Thanking you for the proposal attention to our requests. It will be appreciate to explain that daily weather reports help this centre in accurate Load Forecasts for the day. Based on Load Forecasts demand is placed on IPP's thermal units.

On 2-7-1998 WAPDA saved Rs.12.3 million for not demanding HUBCO unit, as your report had a forecast of Rain at Lahore, which proved correct.

Concerned with weather of each city related to Load in turn, the undersigned shall be grateful if you supply us every minute weather details.

(HABIB ULLAH)

Chief Engineer NPCC

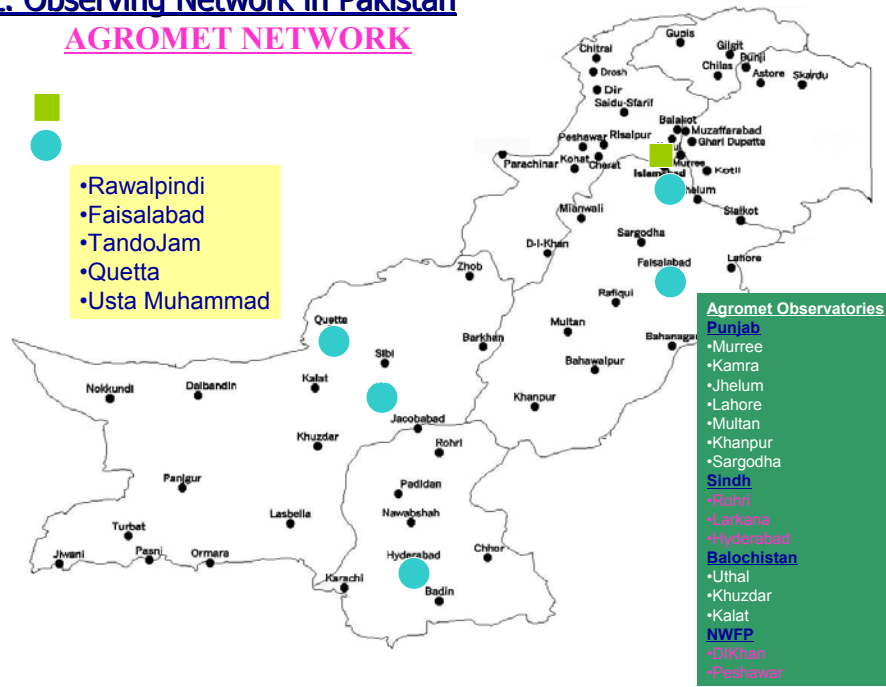
Case Study 3:

Impact on Agriculture

- i. Rain Predictions
- ii. Frost Predictions
- iii. Soil Moisture Information
- iv. Time of Crop Sowing/Harvesting
- v. Spraying of Pesticides on Crops
- vi. Water Requirement of Crops
- vii. Heat Wave and Cold Wave Forecast
- viii. Special Weather Advisories for Farmers
- ix. Monthly Agromet Bulletin of Pakistan
- ix. Research on Regional Basis in Collaboration with Agriculture Research Institutions.

Met. Observing Network in Pakistan

AGROMET NETWORK



Weather Services For MOUNTAINEERING

Weather For Mountaineers

One Day to One Week Outlook

**Snow Storm
Blowing Snow
Wind Speed at Different Levels
Wind Storm
Visibility
Sky/Cloud Condition
Avalanches**

Weather Services For MOUNTAINEERING

Main Peaks in Pakistan

**K2 - 8611m
Nanga Parbat - 8125m
Broad Peak - 8051m
Gasherbrum I - 8080m
Gasherbrum II - 8034m
Rakaposhi - 7788m
Batura II - 7762m
Chogolisa - 7665m
Noshaq Peak - 7492m
Skilbrum - 7360m**

Weather Services For MOUNTAINEERING

EverestNews.com Xplorersweb [everest] [k2] [oceans] [poles] [space] [tech] [veat]

K2 climb.net

Home Today's News Everest 05 Everest 04 Everest 03 History Mountains

SHOP HERE FOR BOOKS Everest Speakers Bureau BRUNTON EverestGear

2005 Pakistan Meteorological Dept Warning for all K2 / Broad Peak / Nanga Parbat / G1 /G2 2005 Expeditions

WARNING: June 10, 2005

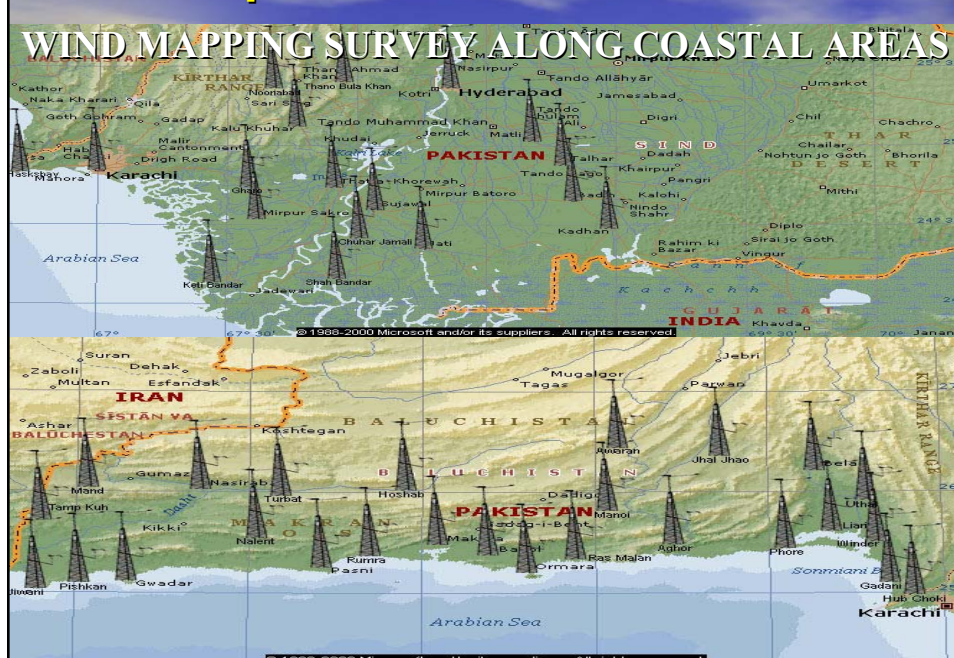
Due to unprecedented/heavy snowfall in this winter especially over & around K2 / Broad Peak / Hanga Parbat / G1 /G2 ,the tracks/steepness have changed; and the **risk of avalanches (due to loaded-snow) will be high** as compared to previous 5 years. Shortly, the coming expedition season may be very hard.

Note: The publishing of the Pakistan weather reports yielded excellent results in the past. These forecasts have been used in the past with excellent results, however one should always be reminded these are forecasts and forecasts can be wrong. Climbing mountains is a very high risk activity where people die, many times due to the weather, SO be careful.

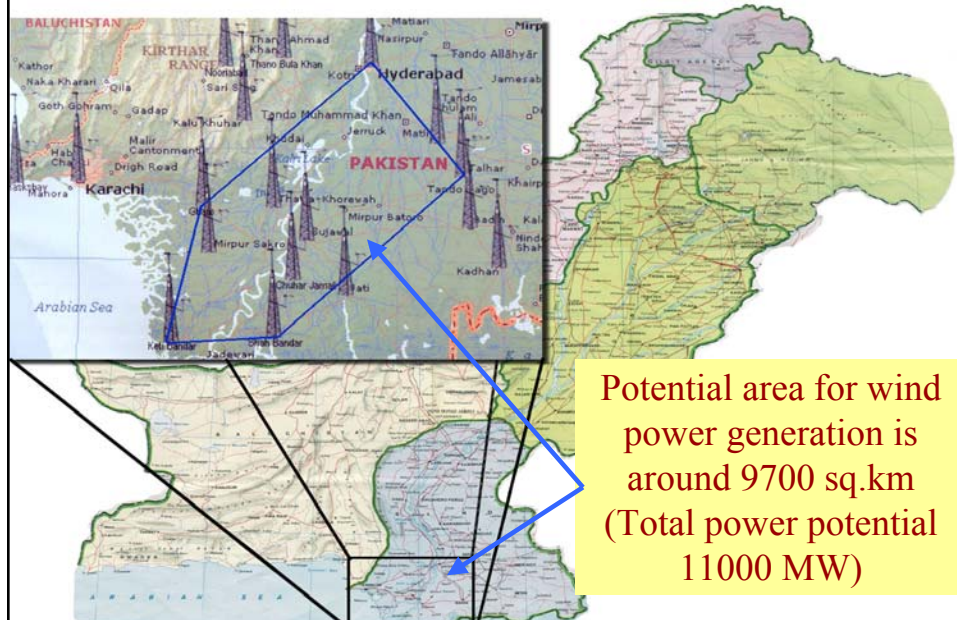
The Best Source for Online Gear

- Altitude pre-acclimatization
- Ascenders
- Atlas snowshoes
- Black Diamond
- Botas
- Brunton
- Carabiners
- CaVa Climbing Shoes
- Clearance
- Clif Bar
- CMI
- Cramppons
- Edelweiss ropes
- Eureka Tents
- Featured
- Fox River
- Garmin
- Granite Gear
- Harnesses

Response to National Issues



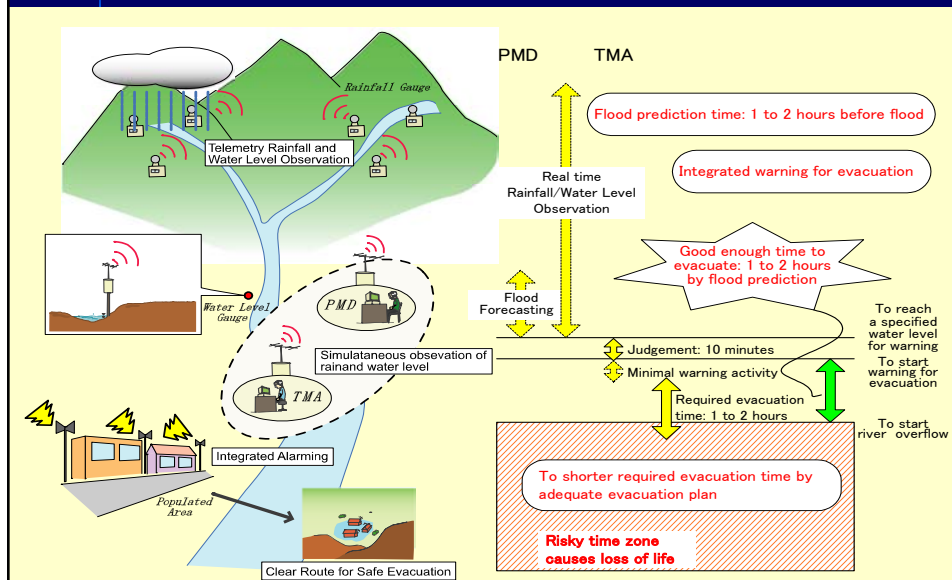
Response to National Issues



Extreme Events

- i. Heavy Rainfall in Islamabad in 2001
- ii. Tropical Cyclone in southwest of Pakistan in 2007
- iii. Extended cold wave in Feb. 2008
- iv. Extended drought in 2000 – 2002 in southwest Pakistan

Response to National Issues Flash Floods Warning & Dissemination System



Shortfalls

- Capacity Building
- Acquisition to new tools & Technologies for speedy utilization of data
- Outreach to end users
- Effective dissemination System
- Maintaining Data Quality

Weakness of Pakistan in Confronting Climate Change Challenge

- **Low technological and scientific base;**
- **Limited access to knowledge;**
- **Weak institutional mechanism;**
- **Low financial resources.**

Regional Centres

SAARC Regional Meteorological Research
Centre

Regional Climate Centre China

Regional Drought Centre Iran

World Data Centre for Green houses gases
Japan

RA II regional Perspective

RA II (Asia) represent 35 Nations.

- Regional Climate Centers in China, Korea, Japan providing seasonal to inter-annual prediction for the region.
- Pakistan, India & some other countries issue seasonal forecasts (Winter & Monsoon Seasons) for planning and mitigation activities.

Strategic Plan (2012-2015) for RA-II

The Next WMO Strategic Plan shall:

- (a) Invest in precise prediction and dissemination systems for high Impact events.
- (b) Help NMHSs developing geo-spatial based data distribution & Information system
- (c) Help access to new tools & technologies for effective use of collected data.
- (d) Standardize Key Performance Indicators so that the cumulative impact of the Organization's performance can be measured.

How to Seek Strategic Plan Aims

The Strategic Plan be achieved through, among other things, assisting the NMSs:

- (a) To develop and be provided access to appropriate databases, resources and expertise to produce appropriate advice and products for application sectors (such as agriculture, aviation, maritime and tourism) and for national development planning and for decision makers;
- (b) To develop scientific methodology to provide climate information and climate predictions;

How to Seek Strategic Plan Aims

c) To strengthen services related to disaster mitigation, prevention and preparedness; environmental pollution monitoring; hydrology and water resources assessment and management

(d) To develop a scientifically sound programme on weather modification; and

(e) To upgrade and modernize their Services including their infrastructure (buildings, equipment and facilities) and technology, and to have adequate qualified and trained staff.

Thank You

