Central Water Commission
Ministry of WR, RD & GR

Operational Flood Forecasting
Flood Forecasting by CWC

- The work of flood forecasting and warning in India is entrusted with the Central Water Commission (CWC).

- **First FF site- 1958 - Delhi**

- **Present network- 176 (148 Level+28 Inflow) FF stations, 878 hydrological observation sites**
Flood Forecasting by CWC

- 9 Major River Basins
  - 71 sub basins
  - 18 states/ Uts

- Period normally from 1st May to 31st October
Flood Forecasting by CWC

- 20 divisions
  - About 6000 forecasts are issued every year with an accuracy of more than 96%
CWC FF Services Set-up

DFCR
FF Formulation

Civil Authorities & others

Ministries/ Deptt

NDM IOC

CWC site
BS, FFS
WL, RF, Q

FMO
RF, WF, QPF

Website /Media
WEATHER FORECASTS

REGIONAL OFFICES OF I.M.D.

F.M.O OF I.M.D

RIVER STAGE & DISCHARGE AT BASE STATION

RIVER STAGE & DISCHARGE AT FORECASTING STATIONS

RAINFALL

REGIONAL OFFICES OF I.M.D.

F.M. O. OF I.M.D

FLOOD FORECASTING CENTRES & CONTROL ROOMS

FORMULATION OF FORECAST

C.E., S.E.

CIVIL AUTHORITIES

MEDIA-Press & Electronic

CIVIL AUTHORITIES

STATE GOVT. CONTROL ROOM

CWC HQ

MINISTRY OF WRRD&GR

POLICE

ENGG. AUTHORITIES

FLOOD COMMITTEE

RAILWAYS

DEFENCE

INDUSTRIES

NDMA, NDM

FF and Warning Present System – schematic Diagram
Forecast Frequency

- **Major rivers (Travel time > 24 hours)**
  - Forecasts are being formulated based on 0800 hrs/ 0900 hrs water level data and forecast issued once in a day at 1000 hrs with advance warning time from 24 hrs to 36 hrs
Medium rivers (Travel time 12-24 hours)

- Forecasts are being formulated based on 0600 hrs and 1800 hrs water level data and forecast issued twice in a day at 0700 hrs and 1900 hrs with advance warning time from 12 hrs to 24 hrs
Forecast Frequency

- Flashy rivers (Travel time < 12 hours)
  - Forecasts are being formulated based on any hr water level data and forecast issued multiple times (more than twice) in a day with advance warning time less than 12 hrs
Data Collection and Forecast Formulation

- **Data Collection**: Manually, Sensors

- **Transmission**: Wireless, Telephone, Mobiles, Satellite
Forecast Formulation:

- Statistical Correlations using gauge to gauge, Gauge - discharge data - Multiple coaxial correlations using gauge, rainfall, Antecedent Precipitation Index (API) data
- Mathematical Models like MIKE-11 - Rainfall Runoff module, Hydrodynamic module, Flood Forecast module
• **Mode of communication**
  - Commonly used mode: Special Messenger, Telephone, Fax, Wireless
  - Nowadays adopted widely: Email, SMS, Website
Forecast Dissemination

- **Mailing List/ Beneficiaries**
  - Commonly - civil/ engineering authorities of concerned States, defense, railways/ highways authorities, industrial and other important establishments located in the flood prone areas through telephone/ fax/ e-mail/ special messenger for taking advance action for flood fighting & evacuating population to safer places.
  - Also Media, Press for the benefit of the likely flood affected population
Website for Forecast and hourly data display
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Stage</th>
<th>Whom to communicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>Low Flood (Water Level between Warning Level and Danger Level)</td>
<td>Yellow</td>
<td>Will not be communicated to PMO/ Cabinet Secretary</td>
</tr>
<tr>
<td>III</td>
<td>Moderate Flood (Water Level below 0.50 m less than HFL and above Danger Level)</td>
<td>Yellow</td>
<td>Will not be communicated to PMO/ Cabinet Secretary</td>
</tr>
<tr>
<td>II</td>
<td>High Flood (water level less than Highest Flood Level but still within 0.50 m of the HFL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Unprecedented Flood (Water Level equal and above Highest Flood Level (HFL))</td>
<td>Red</td>
<td>Communicated to PMO/ Cabinet Secretariat with 3 hourly updates or at more frequent intervals as warranted by the situation.</td>
</tr>
</tbody>
</table>
THANKS