Andhra Pradesh flood modelling

- 24 rivers to be modelled, including Godavari, Krishna, and Pennar
- Flood forecasting in coastal districts
- Network of real-time river and rainfall gauges
- Rain gauges – 50 Nos
- Rain & River gauges – 16 Nos
- River gauges – 28 Nos
- Meteorological Stations – 5 Nos
RAINFALL AT GULLALAMODHA

[Graph showing rainfall data over time]

[Graph showing water level data]

[Graph showing water level data]

[Graph showing water level data]

[Graph showing water level data]
**Flood forecasting system**

- **Flood Watch**
- Real time data management and display
- **UP Model**
- Hydrological modelling
- **Mike11 FF**
- Hydrodynamic modelling with real-time updating
- **Mike11 GIS**
- Flood mapping and topographic data management
Rivers Models

1. Krishna
2. Godavari
3. Pennar
4. Vamsadhara
5. Nagavali
6. Goshani
7. Meghadrigadde
8. Sarada
9. Varaha
10. Thandava
11. Tammileru
12. Gunderu
13. Gundlakama
14. Swarnamukhi
15. Kandaleru
16. Pampa
17. Elleru
18. Vogaru vagu
19. Rammileru
20. Errakalva
21. Paleru
22. Manneru
23. Nallamada
24. Romperu

Extent of Proposed River Modelling

UP Model

- Upscaled Physically-based model designed:
  - to simulate water exchanges between the land surface and the atmosphere
  - to simulate lateral transfer of water, solutes and sediment
  - to be applicable from catchment-scale to continental-scale

UP Element

- Precipitation
- Evapotranspiration
- Soil water storage
- Surface runoff

Flow Routing

- Channel transfer function approach
  - Analytic solution to St. Venant equations
  - Linear superposition
MIKE11 Model

- MIKE11 is a one-dimensional mathematical model of river flow
- Solves the 1-D form of the St.Venant equations providing a fully dynamic representation of river flow
- Linkage to GIS, Flood Forecasting, and Flood Warning packages
MIKE 11 GIS

- Flood Mapping: MIKE 11-GIS
- Fully integrated GIS based flood modelling
- Centred on ArcView GIS
- Leverages full power of GIS for modelling
- Pre-processing: Floodplain schematization
- Post-processing: Inundation maps
  - Comparison maps
  - Duration maps
- Analysis with other GIS data

Basic data requirements for modelling

- River cross-sections
- Maps of floodplains
- Historical river flow data
- Tidal variations
- Data on structures along river that affect flow

River Pennar Model

- Model extends from Somasila to Bay of Bengal
- The total modelled length of the River Penneru is around 117 km
- Major structure is Somasila dam
- One existing CWC station at Nellore is present within model reach

Input Data

- Daily and hourly flow data from CWC
- Somasila Dam outflow discharges from Irrigation Dept.
- River Channel Survey Data
- Topographic data from Survey of India

Comparison of observed and measured discharge at Nellore gauge for 1988 event (Somasila Dam discharges decreased by 20%)
FLOOD WATCH
A Management System for Real-Time Flood Forecasting and Warning

MIKE Flood Watch is a decision support system for real-time flood forecasting combining an advanced time series database with the MIKE 11 hydrodynamic modeling and real-time forecasting system, MIKE11 FF together with the Geographical Information System (GIS), Arc View GIS.

The Strengths of MIKE Flood Watch

A fast and reliable system for real-time operation
Direct-access time series database
Integration with external databases, e.g. Oracle
Automatic import of telemetric data
Data quality control and data processing facilities
GIS presentation facilities
Automatic forecasting and storage of results
Dissemination of flood maps, flood warnings, bulletins and graphics on the World
Front page of District Level flood inundation report

Fax / email output

Nellore District Flood Inundation Map

DSS Outputs – District Level

DSS Outputs - Bulletin
<table>
<thead>
<tr>
<th>Bulletin No.</th>
<th>CONTENT</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Routine Daily State-wide Report based on both Districts and Catchments Areas</td>
</tr>
<tr>
<td>2</td>
<td>Specific District Report with Mandals/Forecast Information</td>
</tr>
<tr>
<td>3</td>
<td>District Mandals</td>
</tr>
<tr>
<td>4</td>
<td>District Mandals, Assets at Risk Assessment</td>
</tr>
<tr>
<td>5</td>
<td>Flood Forecasting Station Report</td>
</tr>
</tbody>
</table>

### Kandaleru Extreme Flood Event - Nellore District