Hydrological Component, Sri Lanka

Eng. Ms P. Hettiarchchi
B.Sc. Eng. (Civil)
M.Sc. Hydrology (IHE)
C. Eng. (MIESL)
Director of Irrigation (Hydrology)
River System

- 103 rivers
- 94 coastal basins
• Rivers Vulnerable for Frequent Floods
  • Attanagalu Oya
  • Kelani
  • Kalu
  • Gin
  • Nilwala
  • Mahaweli
Hydrometric Network (Newly Established) of Sri Lanka with 122 observation stations
Criteria for Selection of Stations

- Stations important for forecasting river floods (e.g. Wet Zone Rivers)
- Stations important for Planning and Design of Irrigation works (Dry Zone),
- Stations important for spillway operations of major Reservoirs.
- Stations important for water allocations of cascade systems of hydropower and irrigation works (e.g. Mahaweli)
Types and numbers of Hydro-meteorological Stations

- Rainfall Only: 14
- Rainfall / Water Level: 23
- Rainfall / Water Level / Discharge: 54
- Water Level / Discharge: 13
- Rainfall / Evaporation: 01
- Rainfall / Water Level / Evaporation: 12
- Rainfall / Water Level / Discharge / Evaporation: 05

TOTAL: 122
Instruments Installed

- Wind Sensor
- Radiation and Temperature Sensors
- Solar Panel & Antenna
- SLD
DATA LOGGER

INSTALLATION WORK
River Station with WL (Radar) Sensor

Reservoir Station with WL & Rainfall Recorders
Reservoir Stations

Neelabemma

Padaviya
SLD Sites on Irrigation Canals (Galoya)

SLD – Side Looking Doppler
Mode of Data Transmission

- Satellite Transmission
- GPRS

Software Used

- Aquarius for Data Acquisition and Database Management
- HEC HMS and MIKE 11 for River Modeling and Flood Forecasting
Method of Preparing Forecasts

• Based on Field observations of Rainfalls and stream flows.

Gaps

• Lead time (between the forecast and flood) is not sufficient to evacuate the people and valuables from the vulnerable areas.
Advantage of Flood Forecasting based on Meteorological Forecasts

- Increase the lead time specially in cases of flash floods

Problem of using meteorological forecasts

- Reliability (in quantitative forecasts)
- Spatial and temporal resolution (insufficient)
- Other factors affecting floods (soil moisture, depression storage, reservoir position etc.)
Present Practice

- Identify the river basins vulnerable for floods,
- Monitor the river stages and rainfalls of key stations continuously.
- When the excessive rainfalls occur or river stages rise up to alert levels, flood monitoring committee is gathered.
- If the situation become worse early warning is issued to people & other relevant parties to take necessary actions.
Hydrometric Network of Kelani River Basin
Predefined Flood Levels

Dangerous Flood in 1989 - Kelani Ganga at Nagalagam Street

- Critical Level
- Dangerous Flood Level
- Major Flood Level
- Minor Flood Level

Water Level in Feet (in MSL)

Time in Hours - from 1.00 am on 02.06.1989 to 09.06.1989
Flood Mapping

- Affected areas are surveyed after the major flood events.
- Extent of flooded is identified with GPS.
- Coordinates of boundaries of flooded area are marked on a digital map with Arc GIS.
- Return period of the particular flood is calculated based on the historical records of annual extremes.
Kelani River Flood in 1989

FLOOD INUNDATION AREAS IN KELANI GANGA RIVER BASIN DURING 1989 FLOOD

HYDROLOGIC DIVISION
GOVERNMENT OF SRI LANKA

Scale 1:60,000
Conclusion

- By combination of meteorological forecasts with field observations can
  - Improve the lead time and
  - Increase the Effectiveness of forecasts.
Recommendations

- Improve the reliability,
- spatial & temporal resolution and
- accessibility of real time meteorological forecasts.
Thank You