Hydrological Component, Sri Lanka

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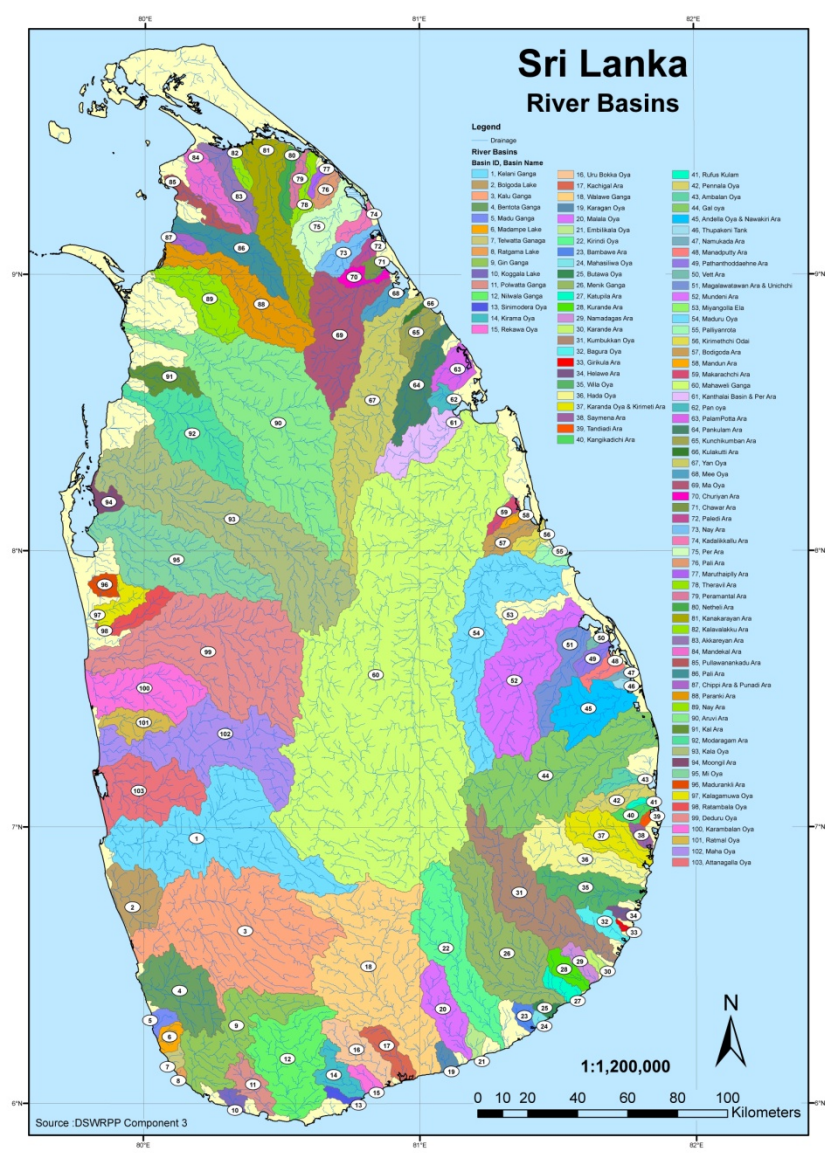
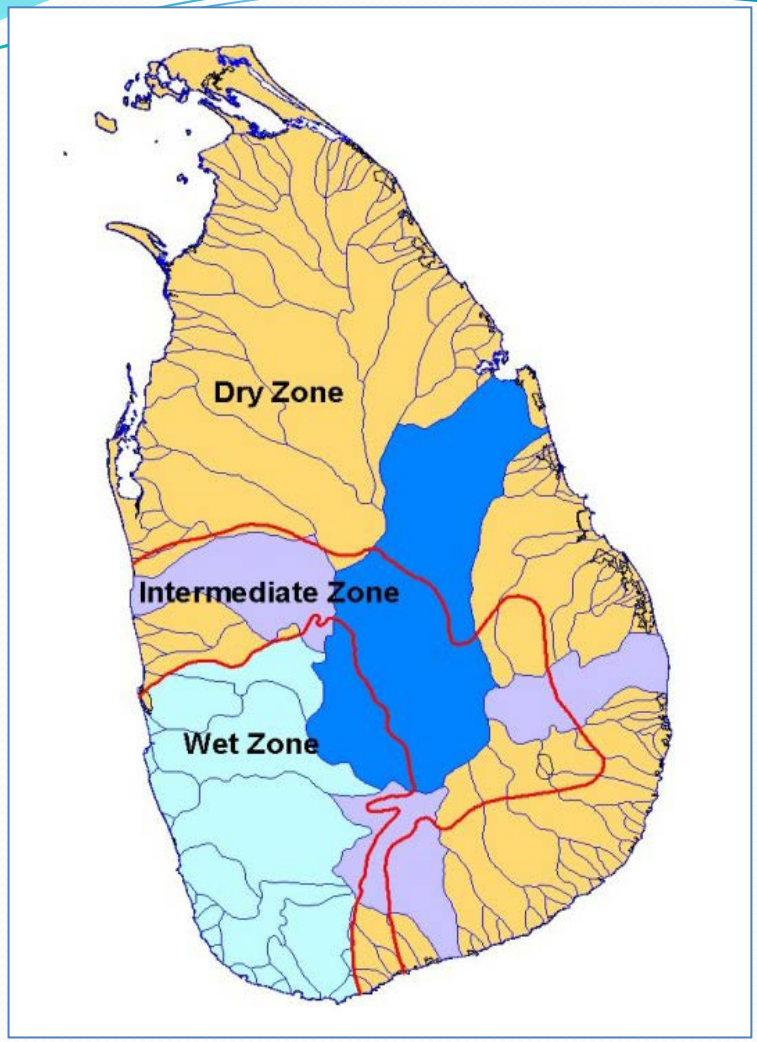


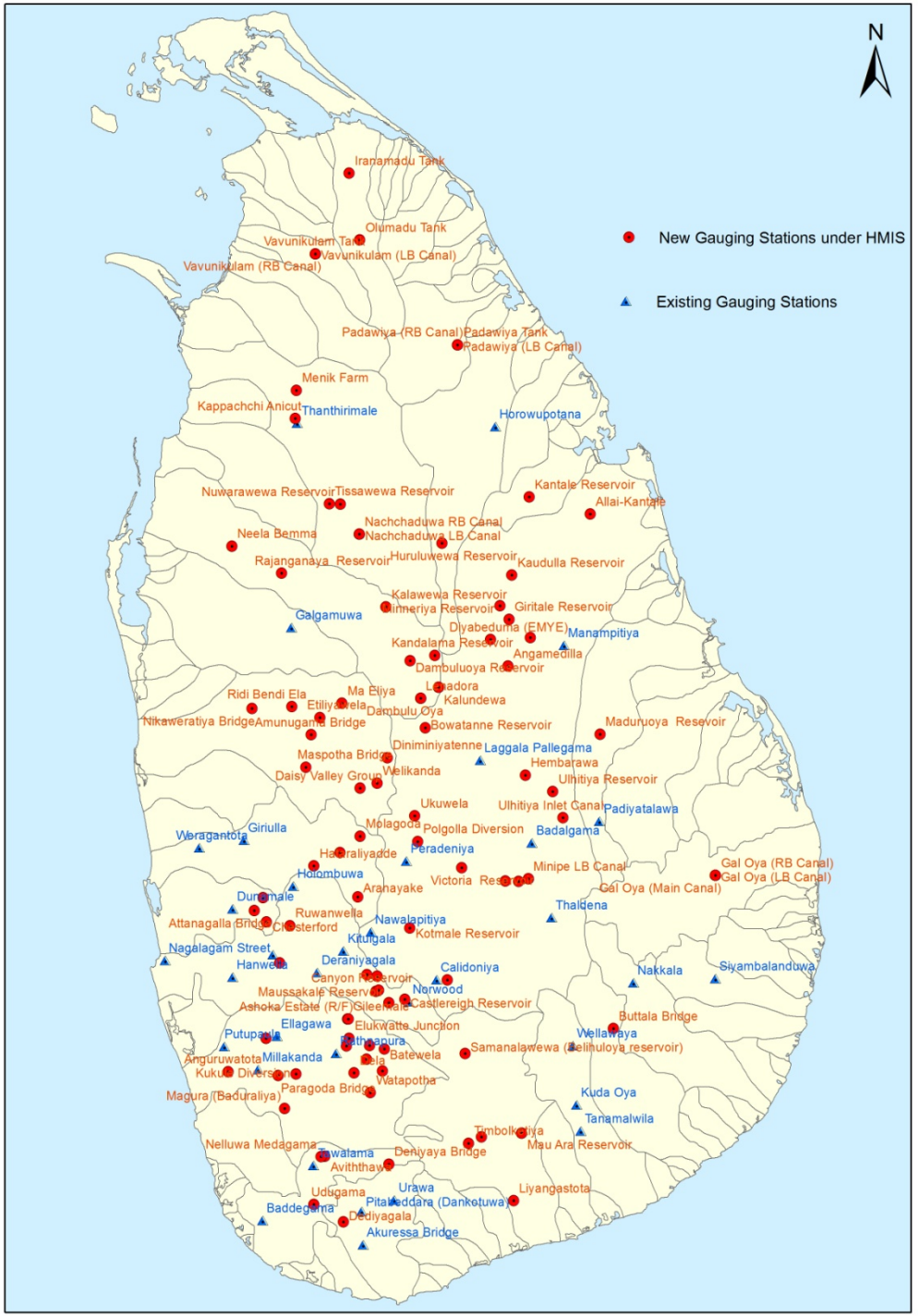
River System

- 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 (eg. 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 (eg. Mahaweli)

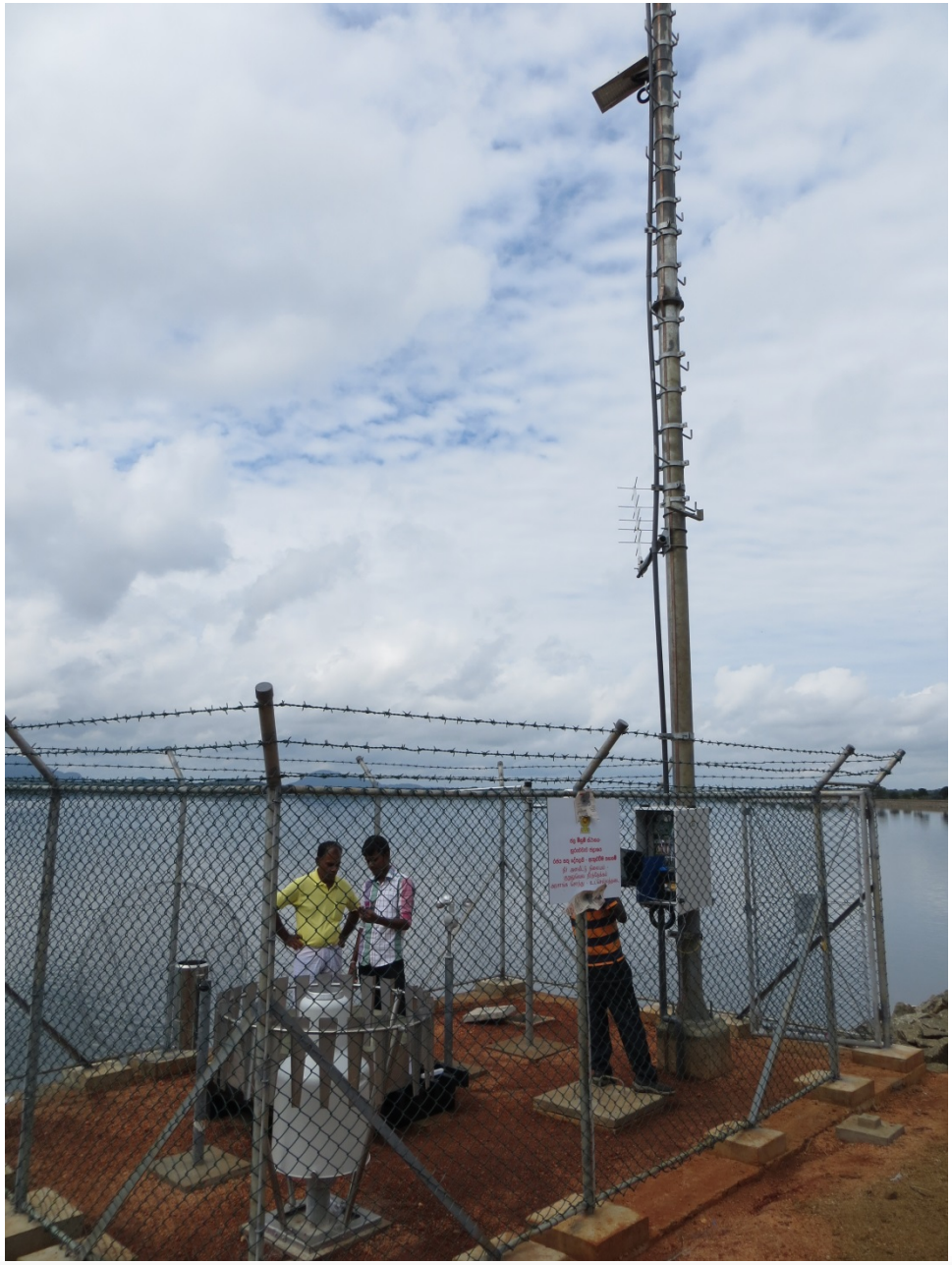
- **Types and numbers of Hydro-meteorological Stations**

• 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

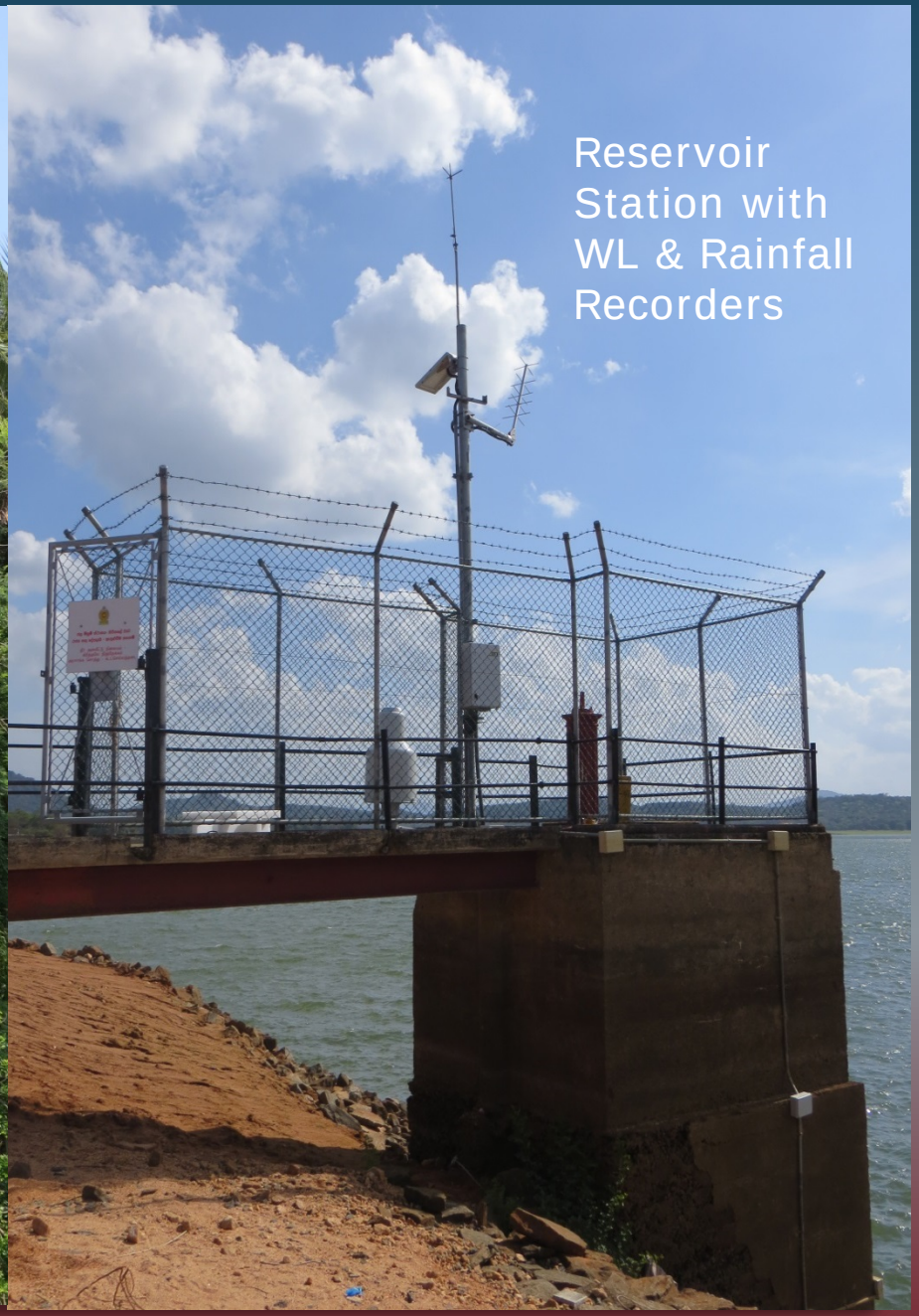
Radiation and Temperature Sensors

DATA LOGGER



INSTALLATION WORK

River Station with WL (Radar) Sensor



Reservoir Stations

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

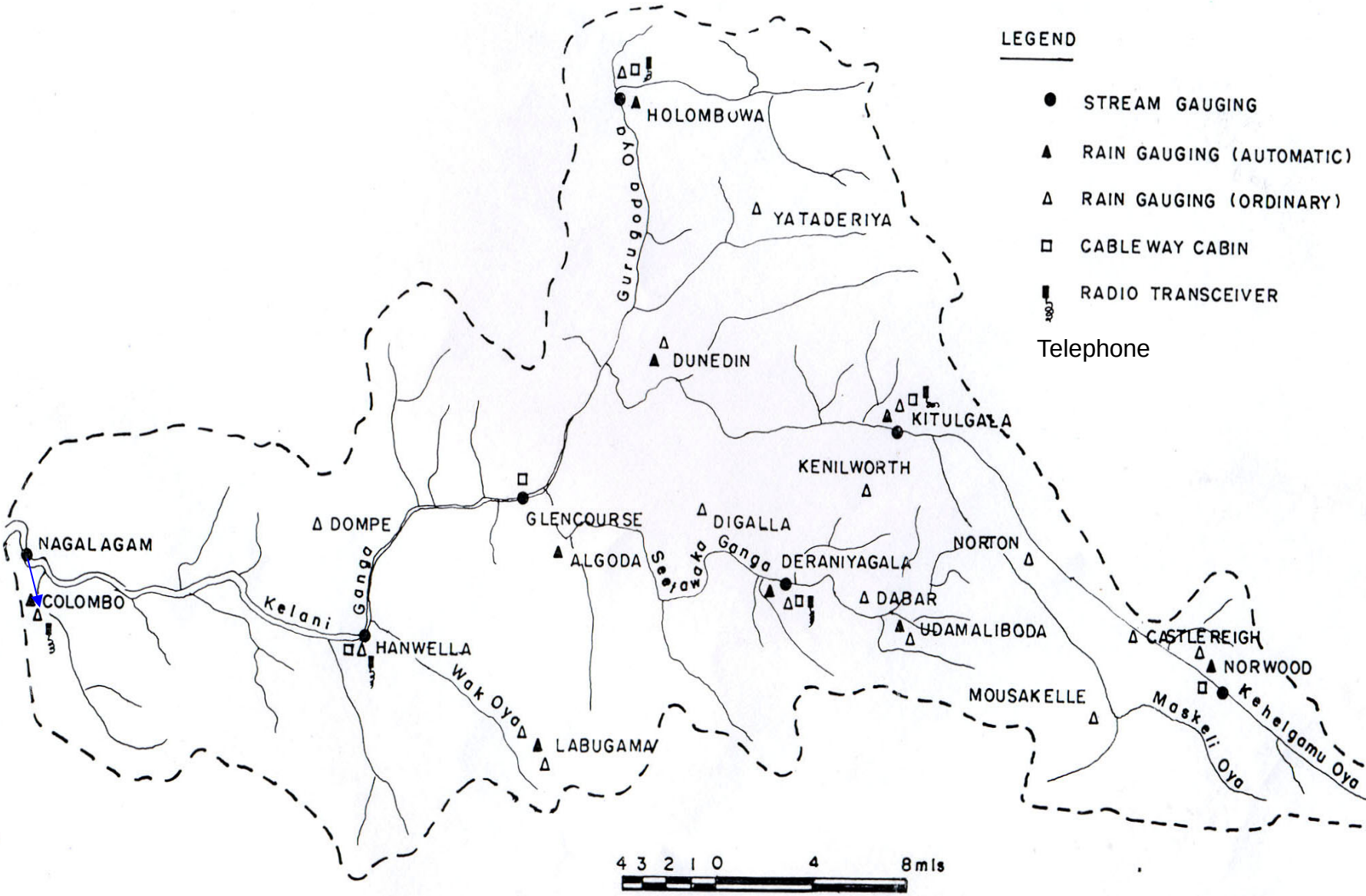
Problem of using meteorological forecasts

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

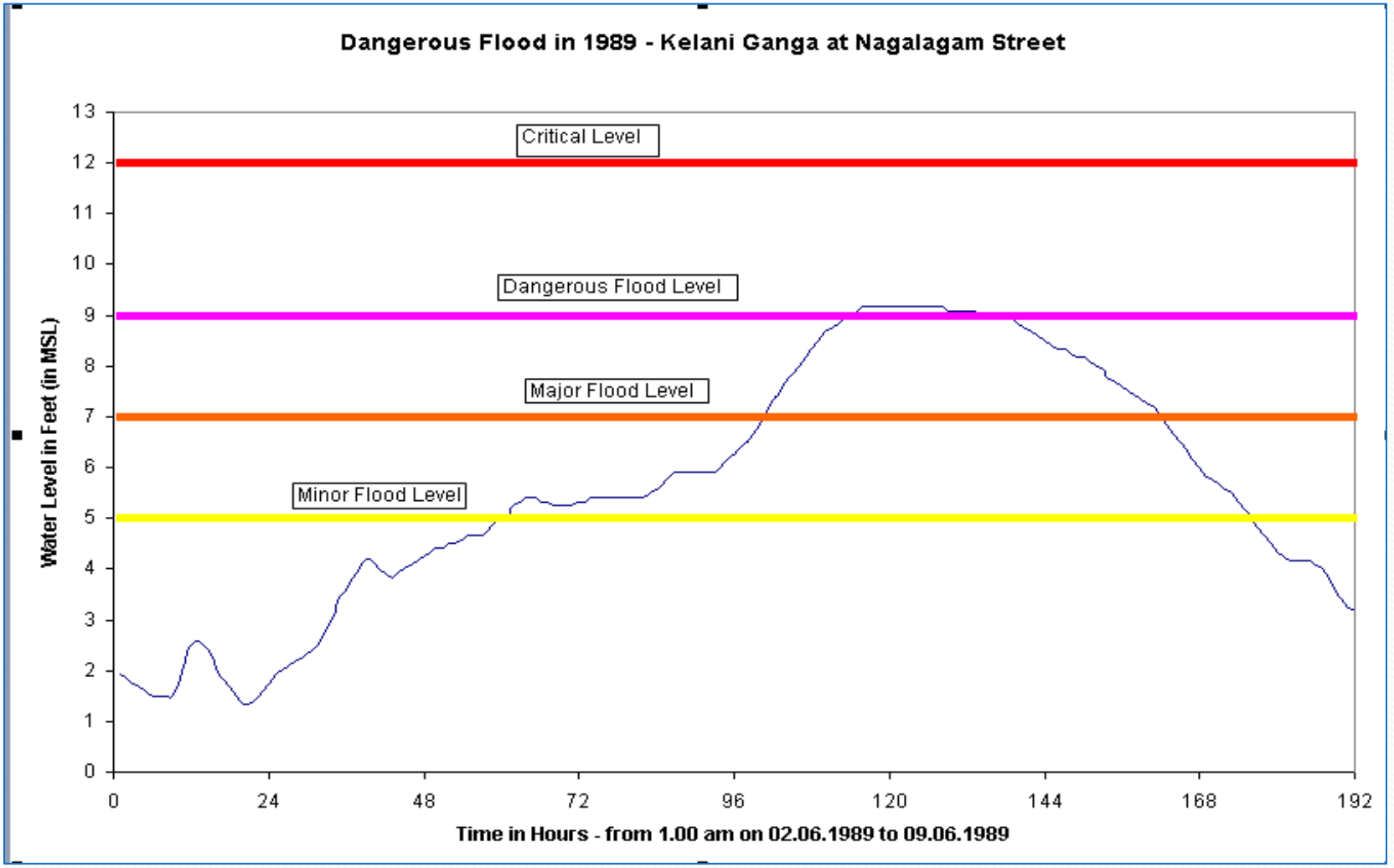
Present Practice

- 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



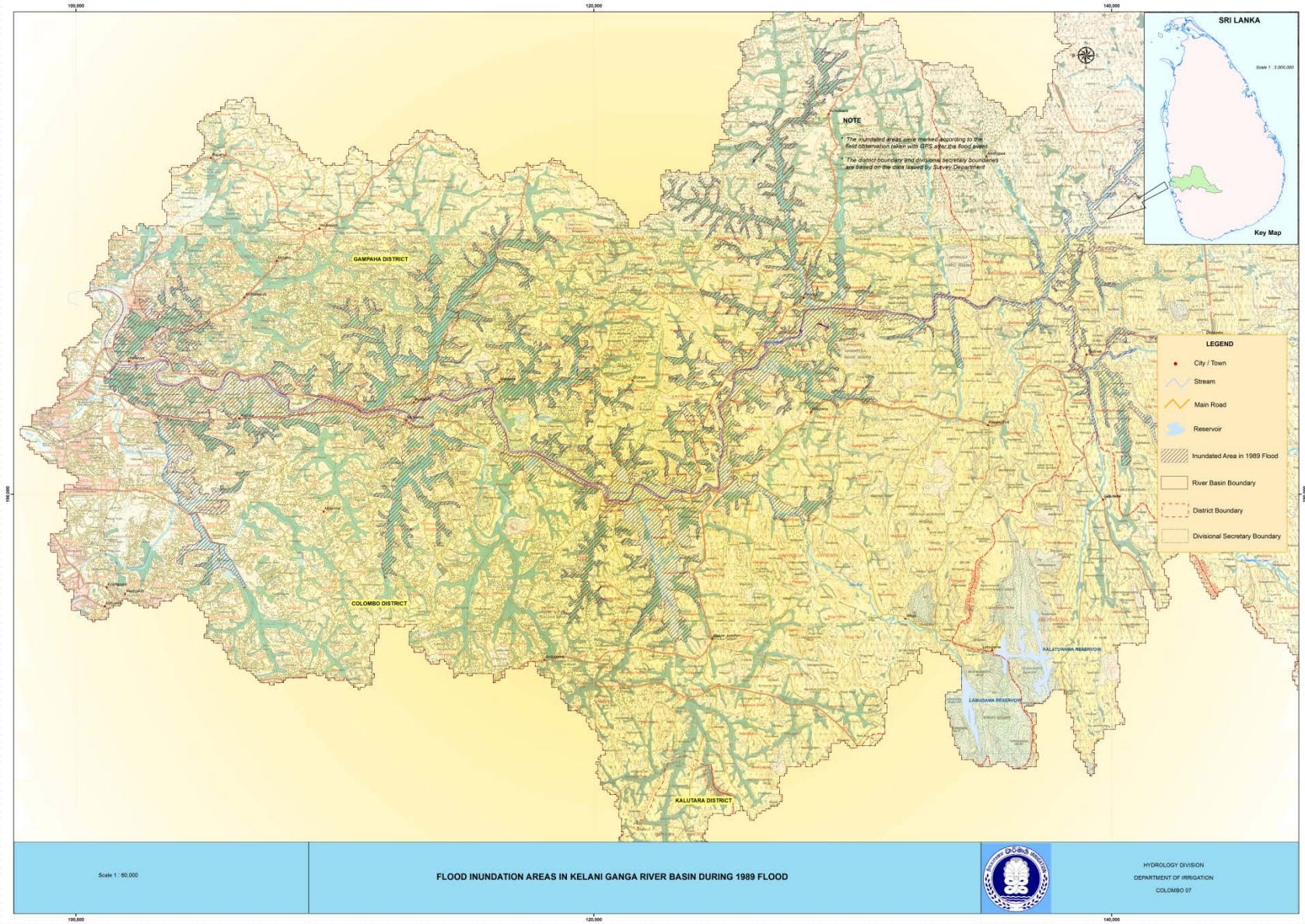
Predefined Flood Levels

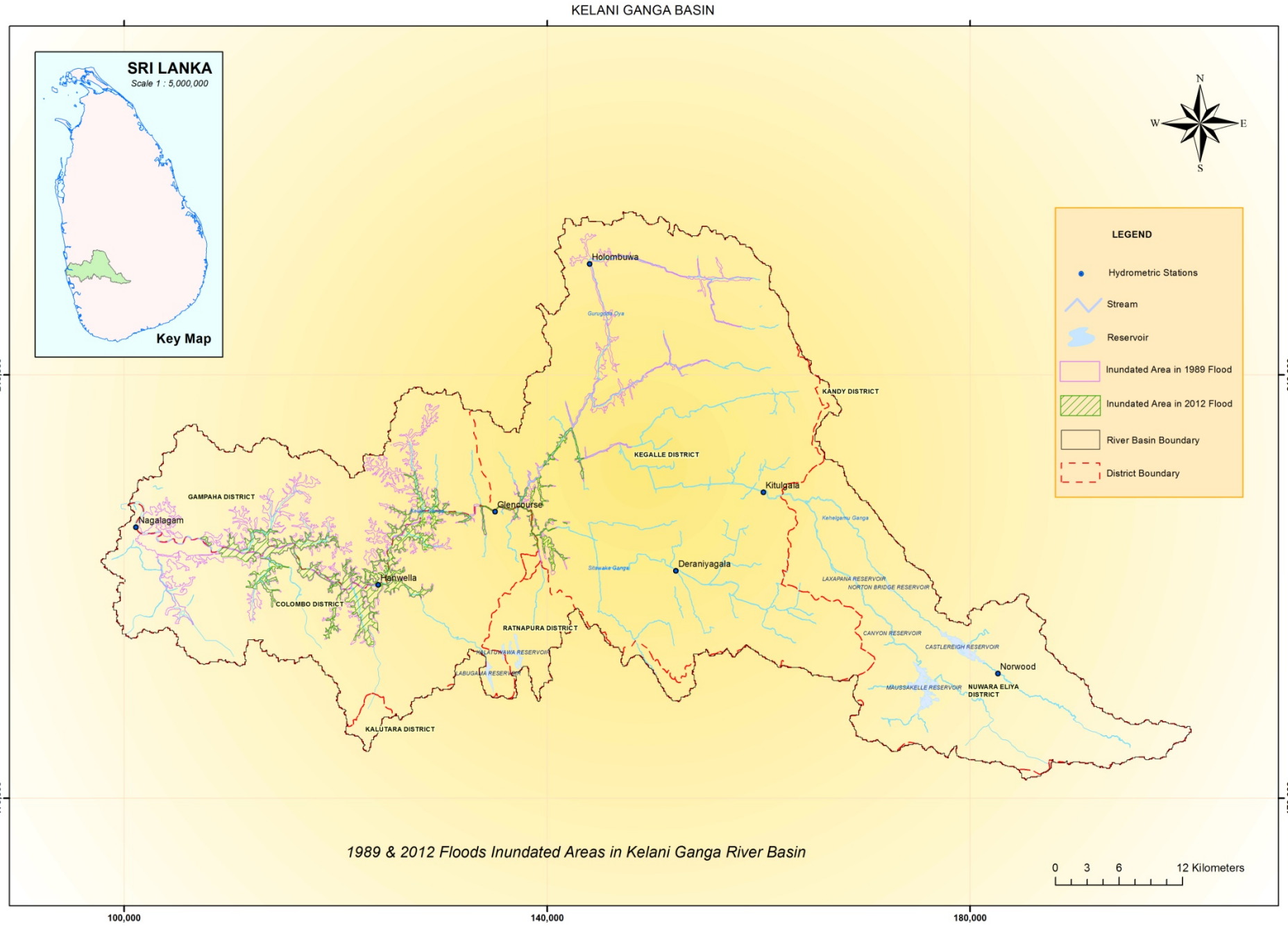


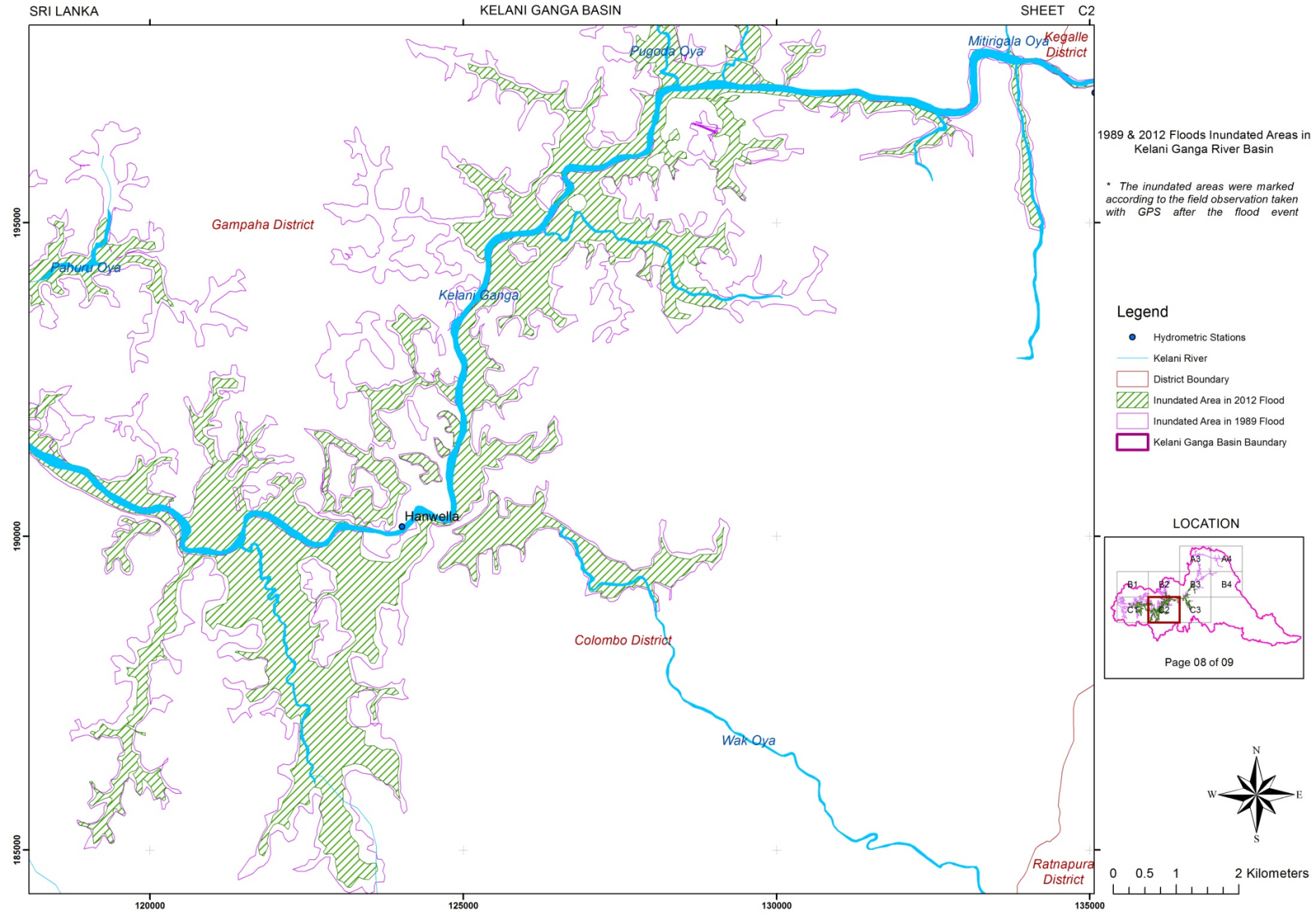
Flood Mapping

- 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 wit Arc GIS.
- Return period of the particular flood is calculated based on the historical records of annual extremes.

Kelani River Flood in 1989




KELANI GANGA BASIN
SRI LANKA
Scale 1 : 5,000,000
Key Map
N
W
E
S
LEGEND
Hydrometric Stations
Stream
Reservoir
Inundated Area in 1989 Flood
Inundated Area in 2012 Flood
River Basin Boundary
District Boundary
Holombuwa
Gurugoda Oya
KANDY DISTRICT
KEGALLE DISTRICT
Kitulgala
Kehelgamu Ganga
GAMPAHA DISTRICT
Glencourse
Nagalagam
Deraniyagala
Sitawaka Ganga
Hanwella
COLOMBO DISTRICT
LAXAPANA RESERVOIR
NORTON BRIDGE RESERVOIR
RATNAPURA DISTRICT
CANYON RESERVOIR
CASTLEREIGH RESERVOIR
Norwood
MAUSSAKELLE RESERVOIR
NUWARA ELIYA DISTRICT
KALUTARA DISTRICT
210,000
170,000
100,000
140,000
180,000
1989 & 2012 Floods Inundated Areas in Kelani Ganga River Basin
0 3 6 12 Kilometers


SRI LANKA
KELANI GANGA BASIN
SHEET C2
Pugoda Oya
Mitirigala Oya
Kegalle District
Gampaha District
Pahuru Oya
Kelani Ganga
Hanwella
Colombo District
Wak Oya
Ratnapura District
195000
190000
185000
120000
125000
130000
135000
1989 & 2012 Floods Inundated Areas in Kelani Ganga River Basin
* The inundated areas were marked according to the field observation taken with GPS after the flood event
Legend
Hydrometric Stations
Kelani River
District Boundary
Inundated Area in 2012 Flood
Inundated Area in 1989 Flood
Kelani Ganga Basin Baundary
LOCATION
A3
A4
B1
B2
B3
B4
C1
C2
C3
Page 08 of 09
N
W
E
S
0
0.5
1
2 Kilometers

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 forcasts.

Thank You