



Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Government of India

Extreme Flood Events - Analysis of Krishna, Cauvery, Godavari and adjoining East and West Flowing Rivers



Central Water Commission

30th January 2026

New Delhi

Role of DoWR, RD & GR

- Nodal for providing expeditious information on incidents “Flood like situation due to Dam Failures/ natural calamities, etc. & matters related to flood forecasting”.

CWC – Nodal agency for flood forecasting

Flood Forecasting - Infrastructure

CWC FF network - 200 LF and
150 IF

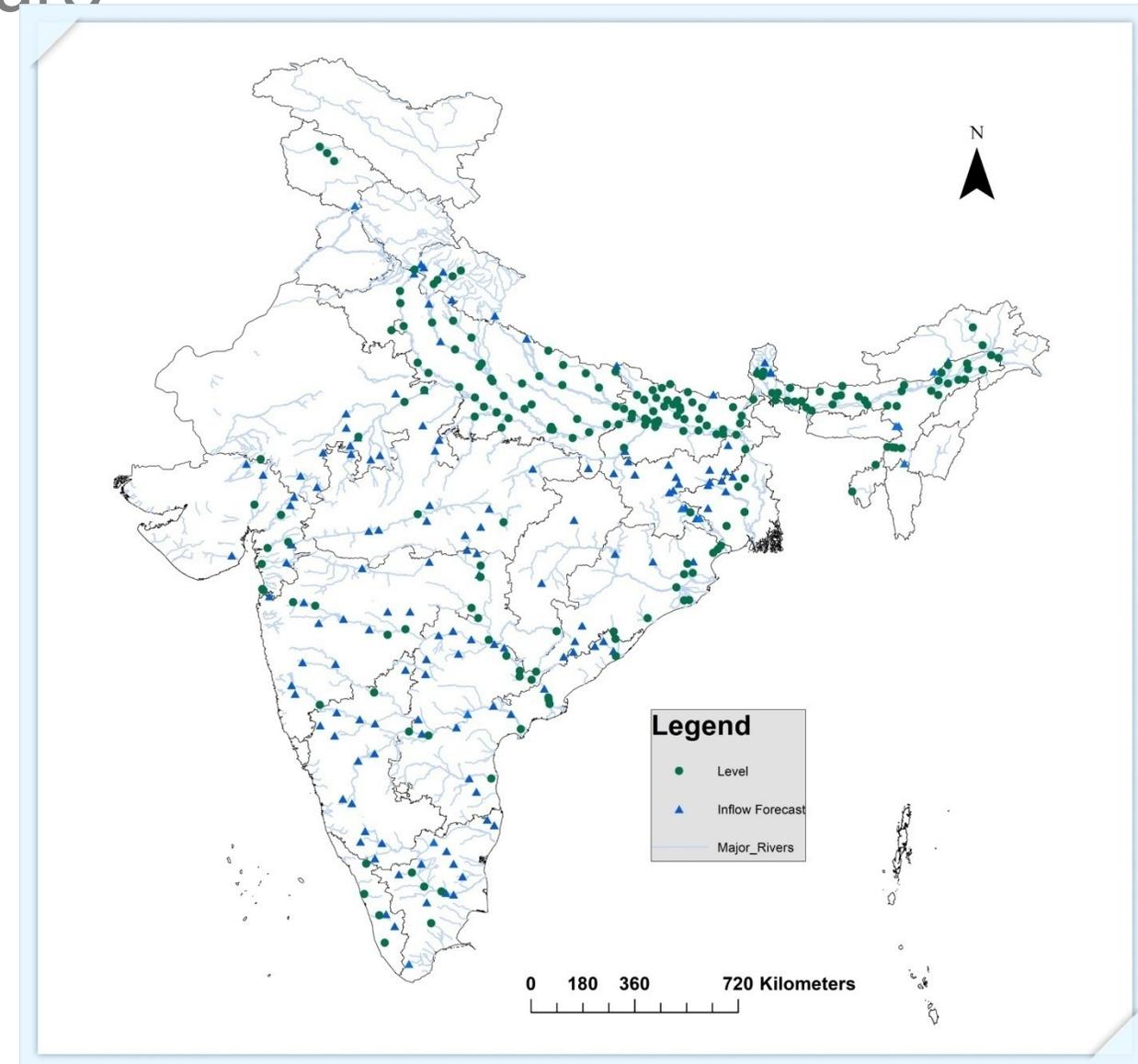
HO network – 1543

Met. Stations – 185

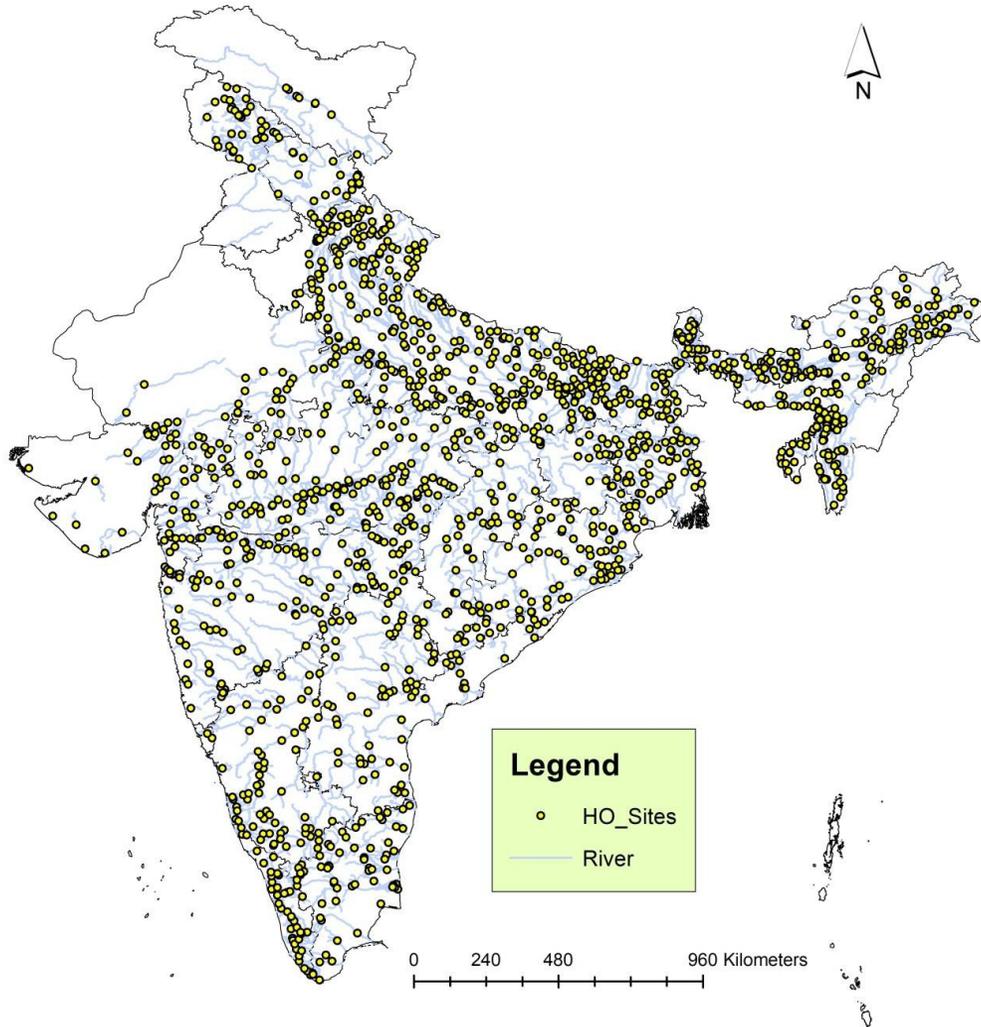
Telemetry Stations – 1121

CFCR - 1 at New Delhi

DFCR – 36 (across India)



Hydrological Observation sites of CWC



Hydrological Observation (HO) Network of CWC

HO Coverage

- HO network – 1543
- Over 27 states and 5 UT's

HO Framework

- **Water level** – Collected hourly during monsoon and Multiple hourly during non-monsoon
- **Rainfall** - 3 hourly during monsoon and daily/Twice daily during non-monsoon
- **Discharge** – Daily throughout the year
- **Met.Parameters** - Daily throughout the year

HO Mechanism

- Gauge/Water Level, rainfall data primary validation is done on near real time basis
- All data are validated using primary and secondary checks, and Water Year Books are published after each hydrological year.
- Validated data of non-classified rivers are open and free of cost.

Designated Flood Period

1st May to
31st October

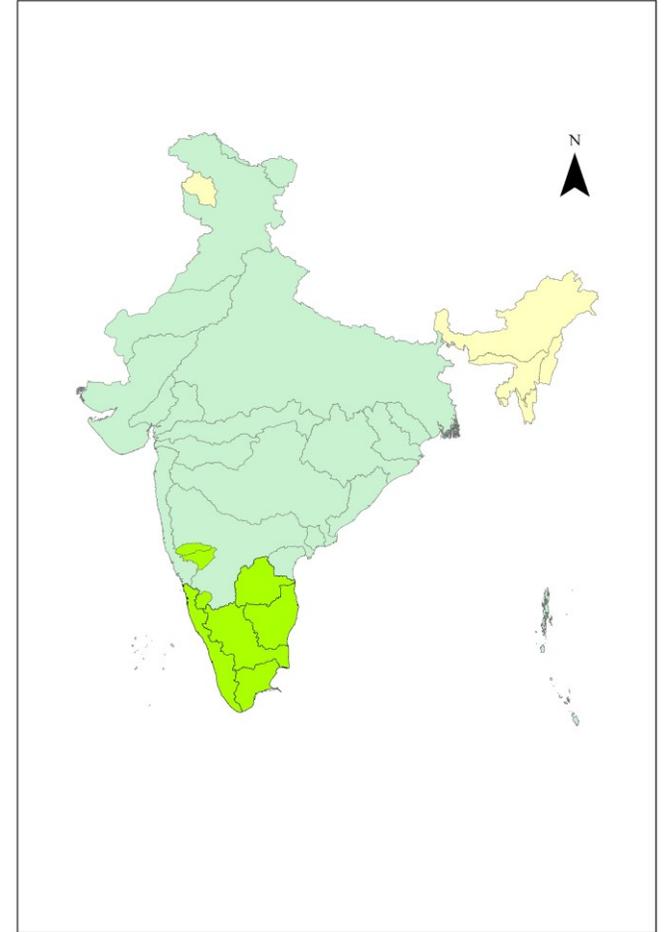
Brahmaputra & Barak (including Teesta, Rivers flowing in States of Tripura, Manipur, Mizoram, Nagaland, Meghalaya, North Bengal, Sikkim) and Jhelum Sub Basin of Indus

1st June to
31st October

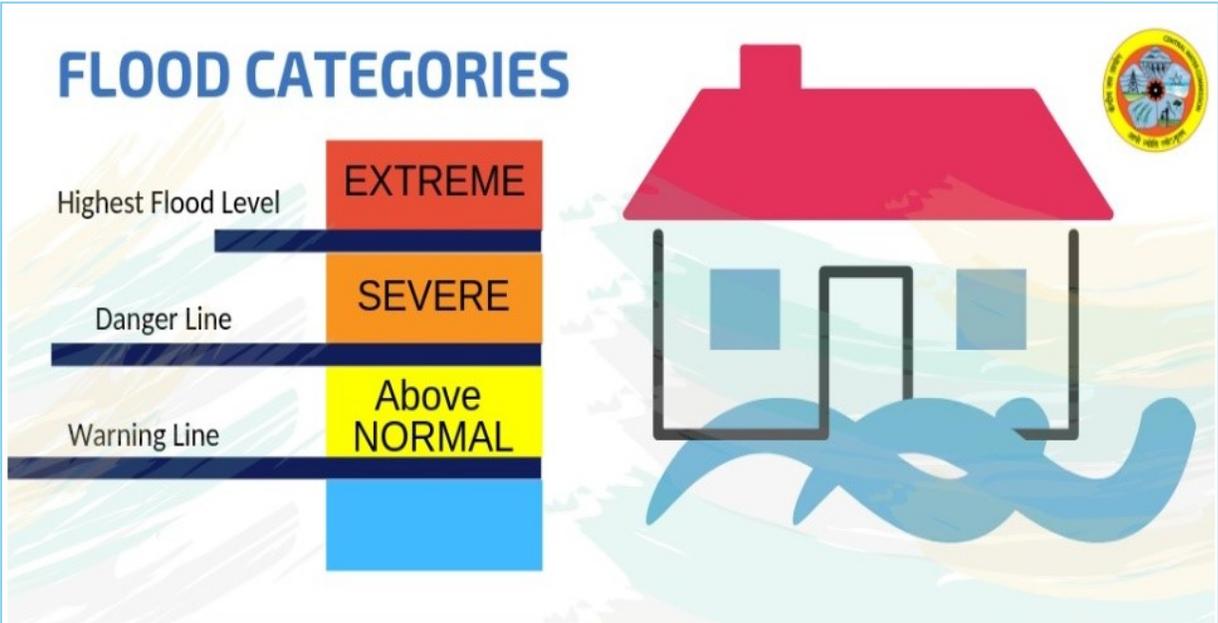
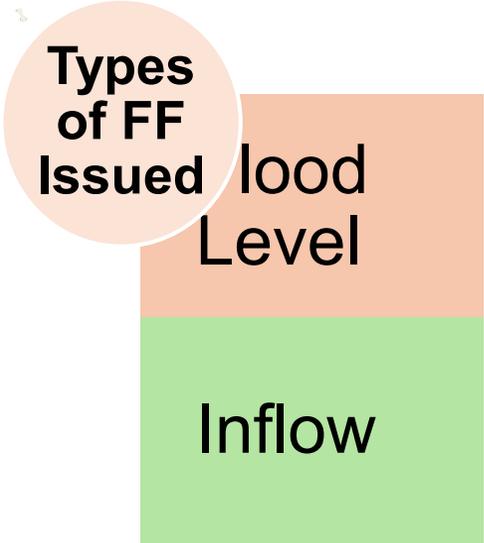
All other Basins up to Krishna Basin excluding the subbasins of Krishna such as Ghataprabha, Malaprabha, and sub basins of Tungabhadra such as Tunga and Bhadra

1st June to
31st
December

All Basins South of Krishna Basin and the subbasins of Krishna such Ghataprabha, Malaprabha, and sub basins of Tungabhadra such as Tunga and Bhadra



Flood Categorization



Dam Inflow Threshold

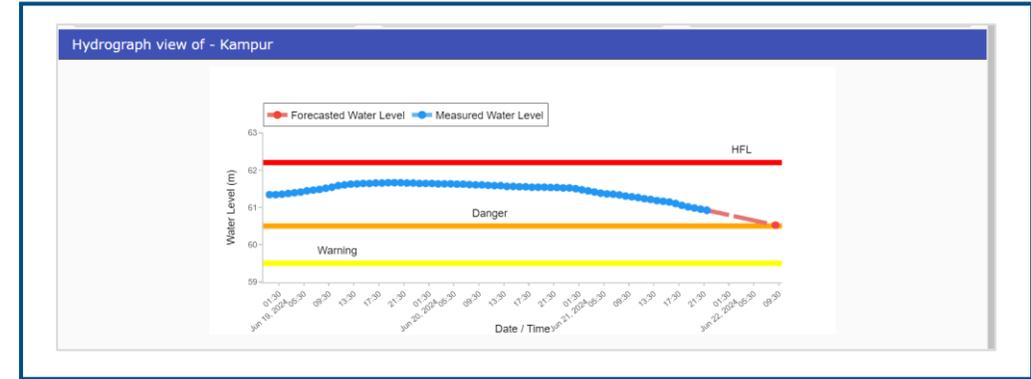
A light blue horizontal bar representing the 'Dam Inflow Threshold'.

Types of Forecasts - CWC

Short Range Forecast

Warning Time \leq 24 hrs

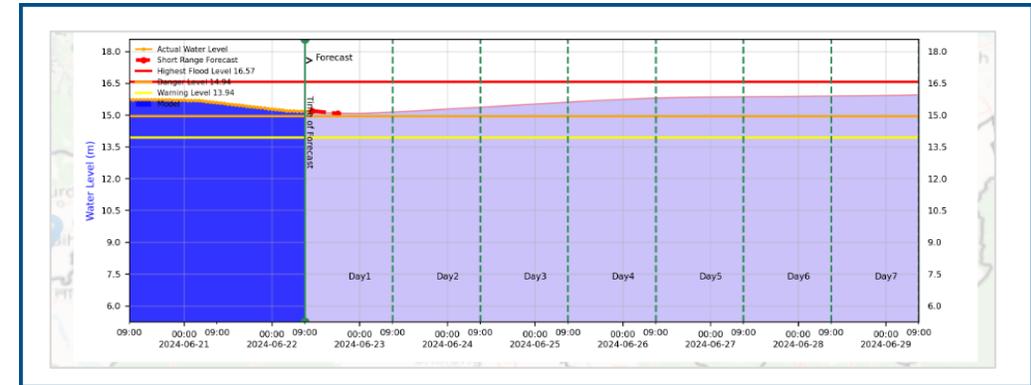
<https://ffs.india-water.gov.in/#/>



7 Day Flood Advisories

Warning Time - 7 days

<https://aff.india-water.gov.in/>



Inundation Flood Forecast

Warning Time - 3 days

<https://aff.india-water.gov.in/inundation.php>

1. ANKINGHAT

Area(s) at Risk

Tehsil Adjoining Village Important Place

Day	Water Level (m)	% Inundation	Flood Condition
Current (13-01-2026 13:00)	119.72	0.0	Normal
Today +1 (15-01-2026 16:00)	124.42	47.3	Severe
Today +2 (16-01-2026)	119.71	0.0	Normal

Short Range Forecasts of CWC

Types

Level Flood Forecast (LF)

Inflow Forecast (IF)

Locations

Bridges, Sites, Weirs/Barrages.

Reservoirs, Weirs, Barrages

Basis

CWC initiates Flood Forecast as per the Request of State/Central agencies/VIP References

Utility (LF)

Support for decision-making – Flood Management (State & Central agencies)

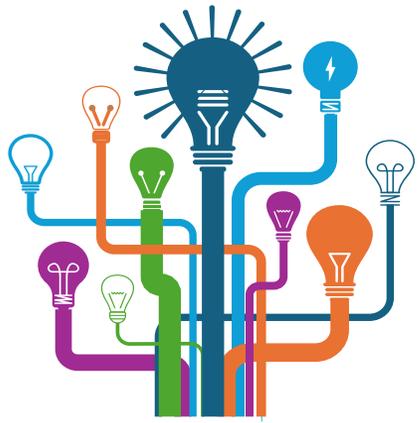
Public awareness and preparedness

To initiate evacuation measures

Utility (IF)

- Reservoir Operation & Regulation
- Flood Management
- Decision Making





Initiatives undertaken to expand the forecasting network and introduce new techniques

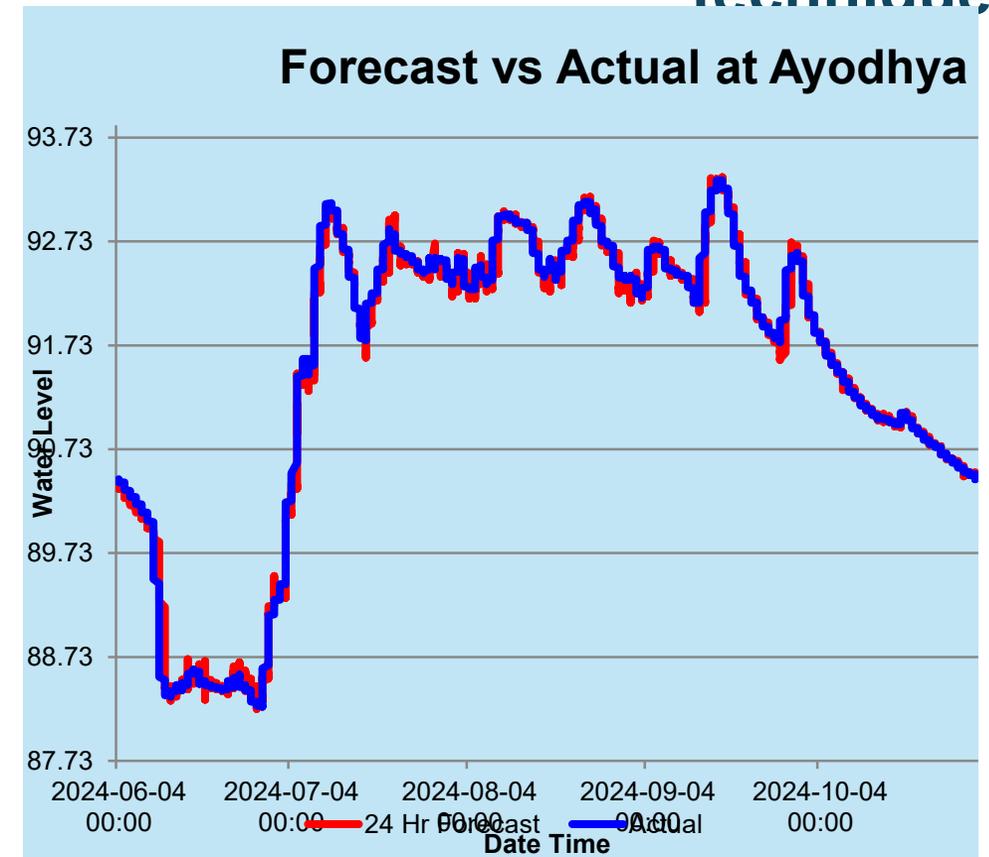
Uses available AIML models with codes and customization

LSTM model for time-series forecasting (water level, rainfall, inflow)

Models will run every 3 hour on the server, and results will be updated on the webpage.

Forecasts from WIMS will then be visible on the CWC website (<https://ffs.india-water.gov.in/>) and “FloodWatch India” Mobile App.

Flood Forecast using Machine learning techniques



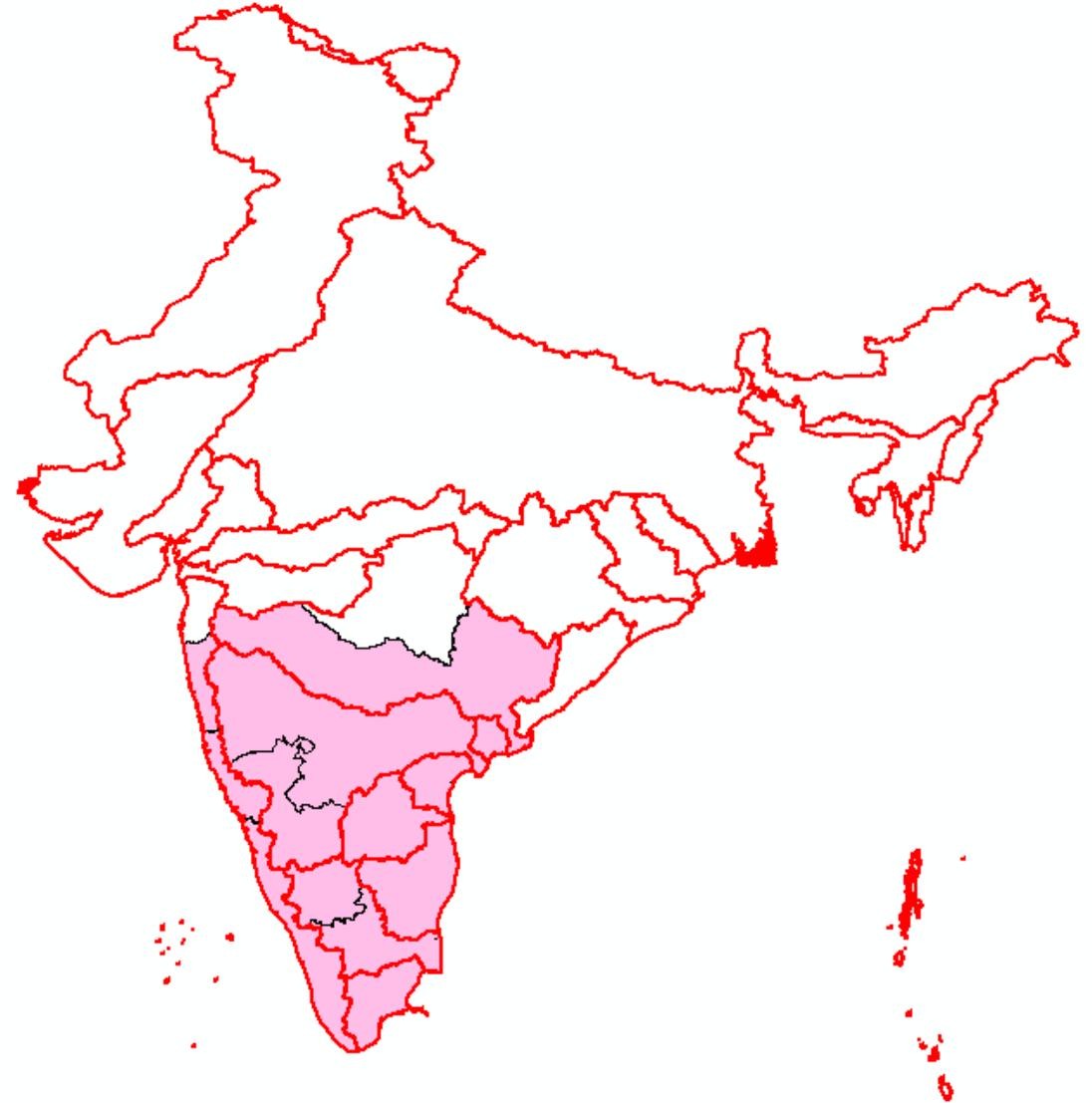
Analysis

- Extreme Flood Events – Krishna, Godavari, Cauvery, Few West and East Flowing rivers
- Highest Flood Level – Highest water level observed at the river gauge station.
- Extreme Flood - When river crosses the Highest Flood level at a hydrological observation station.
- Year wise Mapping of Extreme Flood Location based on CWC Hydrological Observation Sites
- Decade wise analysis of HFLs and recurrence of HFL (Within 5 years period) at same location in the area of interest.

Study Area

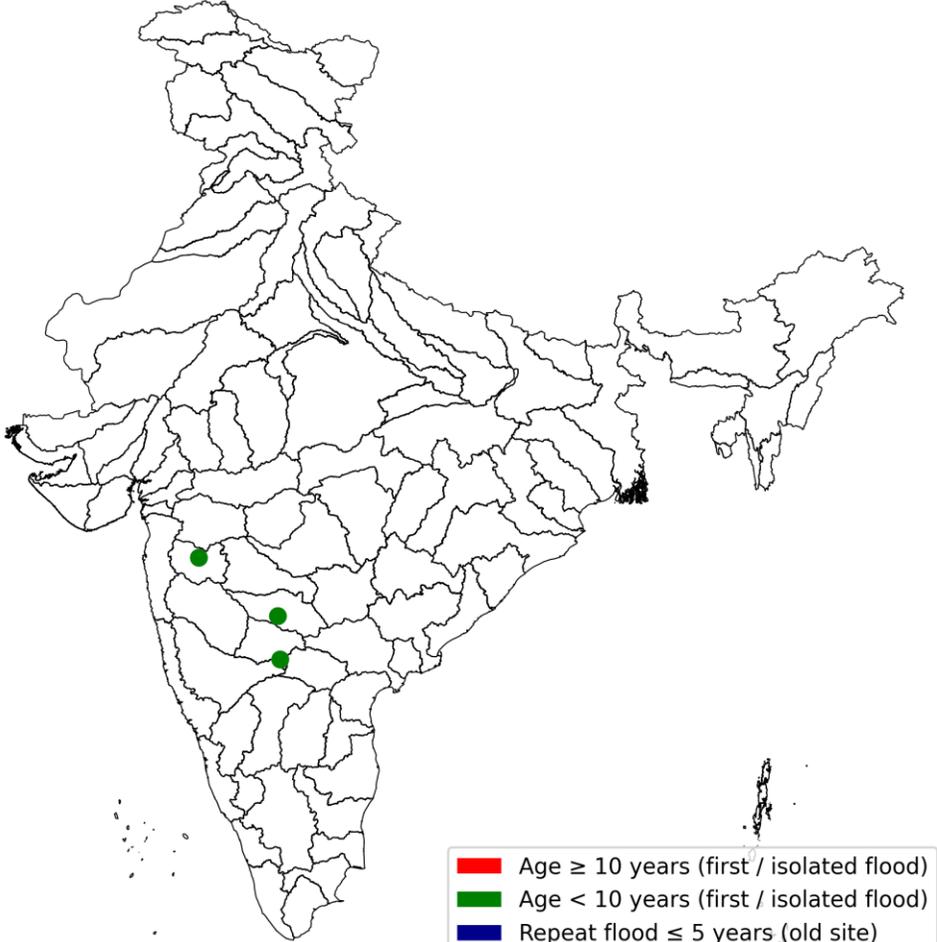
Cauvery, Krishna, Godavari
(excluding Wainganga), Few East
and West Flowing Rivers

- Red – Sites with more than 10 years data during observation of HFL
- Green – Sites with less than 10 year data during the observation of HFL
- Blue - HFL recurred within 5 years of previous occurrence (with more than 10 year data during that time)
- Cyan - HFL recurred within 5 years of previous occurrence



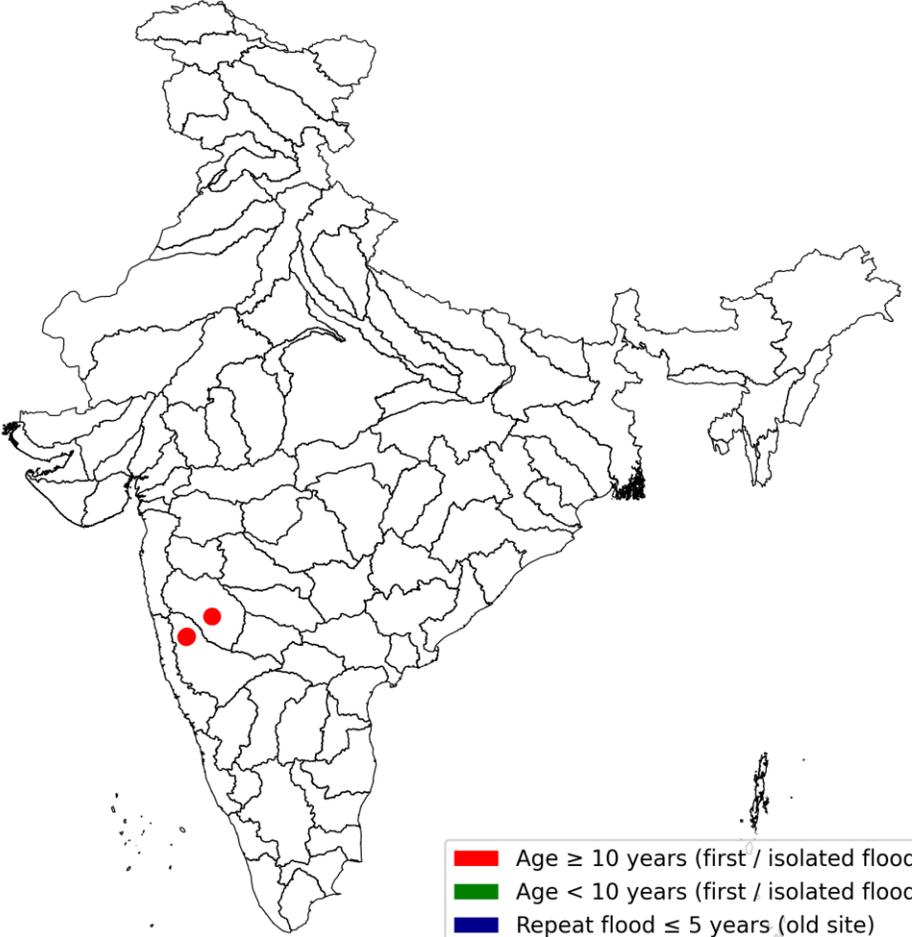
10 yearly Maps of HFL

Extreme Flood Locations - 1969



1966 -75

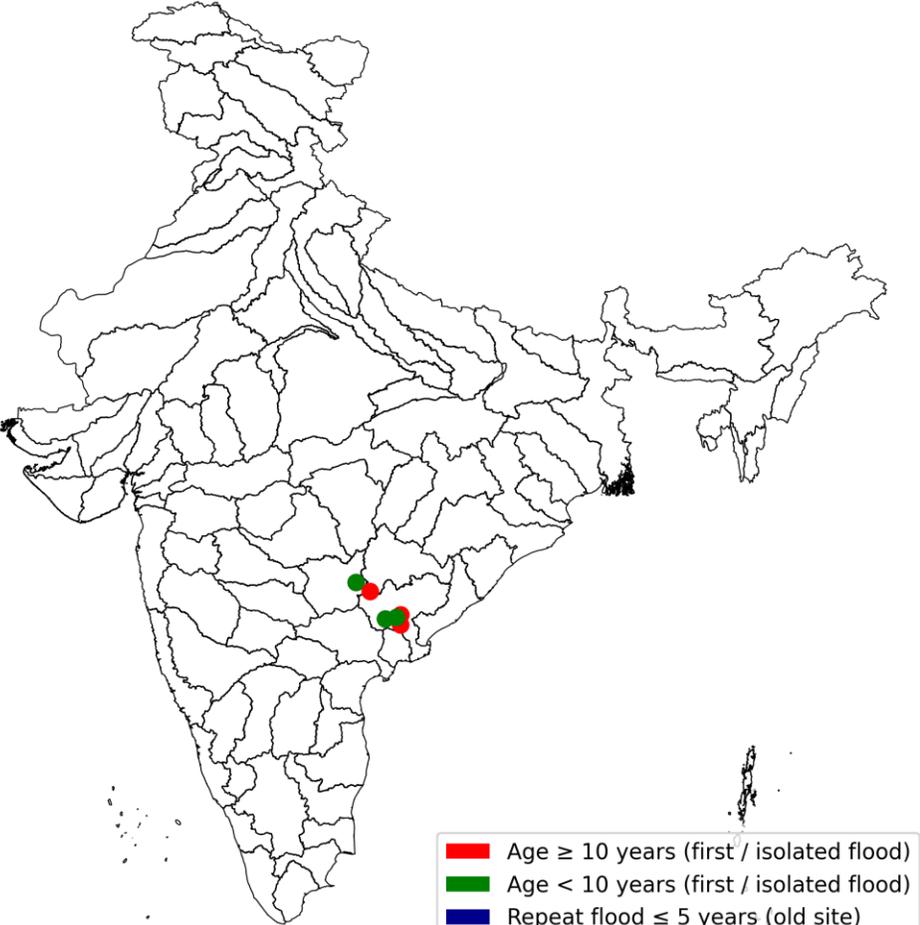
Extreme Flood Locations - 1976



1976 -85

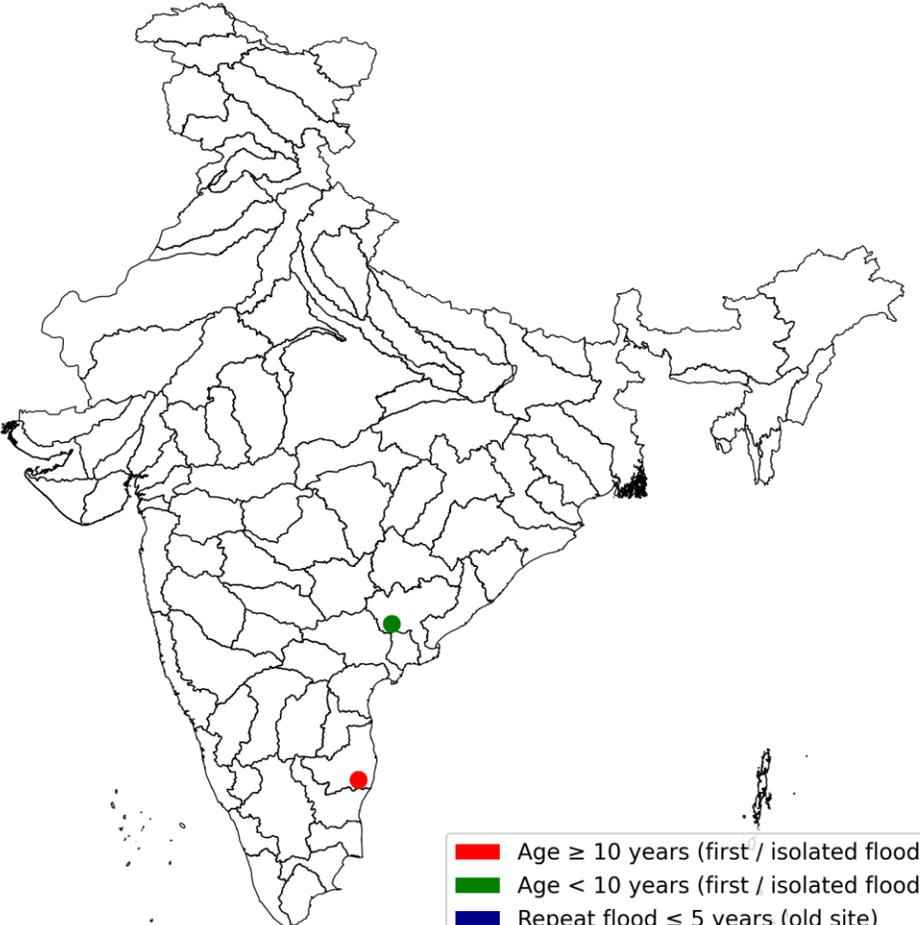
10 yearly Maps of HFL

Extreme Flood Locations - 1986



1986 -95

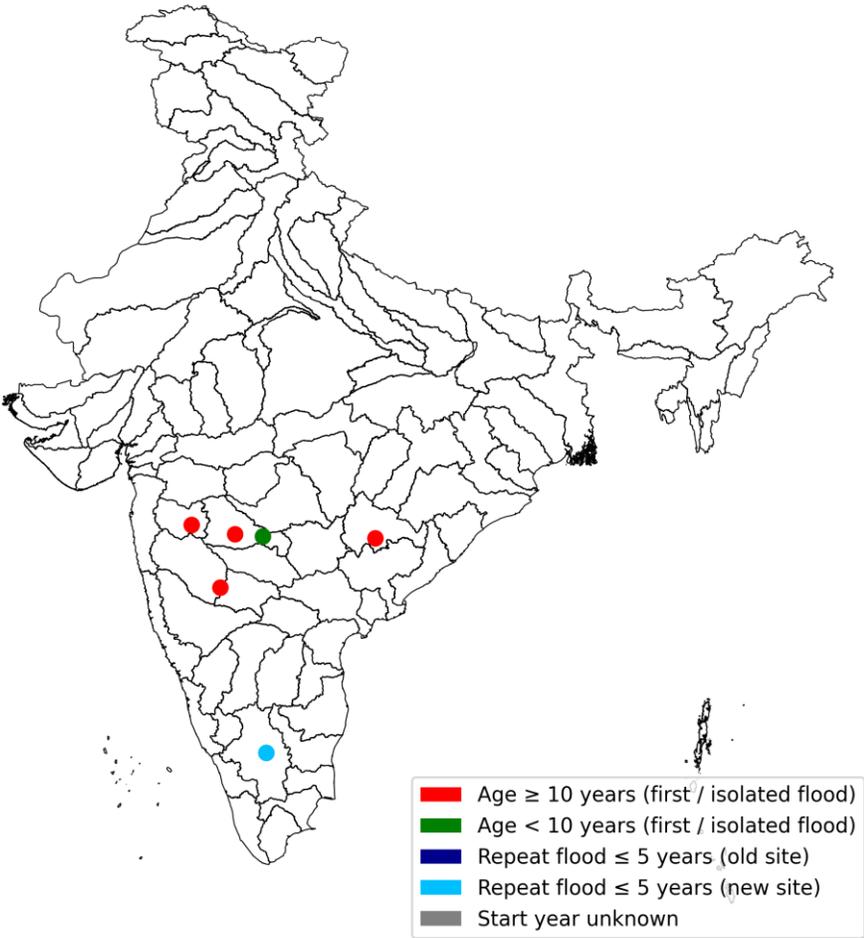
Extreme Flood Locations - 1996



1996 -2005

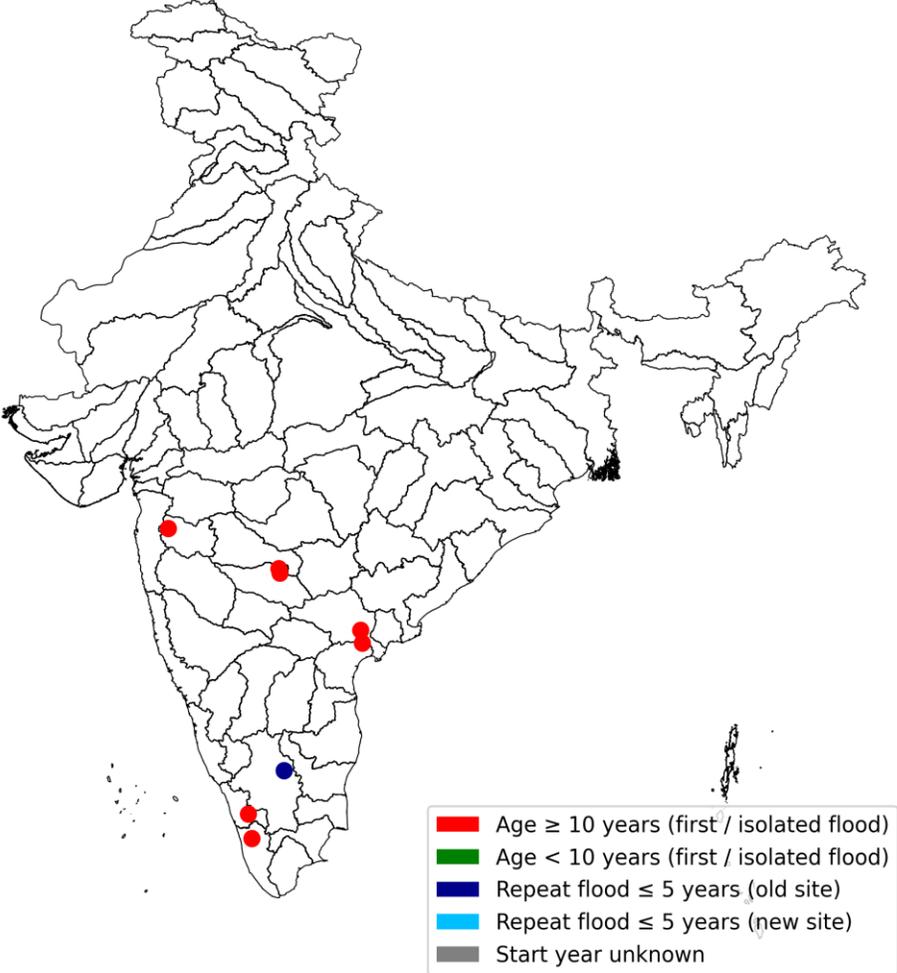
10 yearly Maps of HFL

Extreme Flood Locations - 2006



2006 -2015

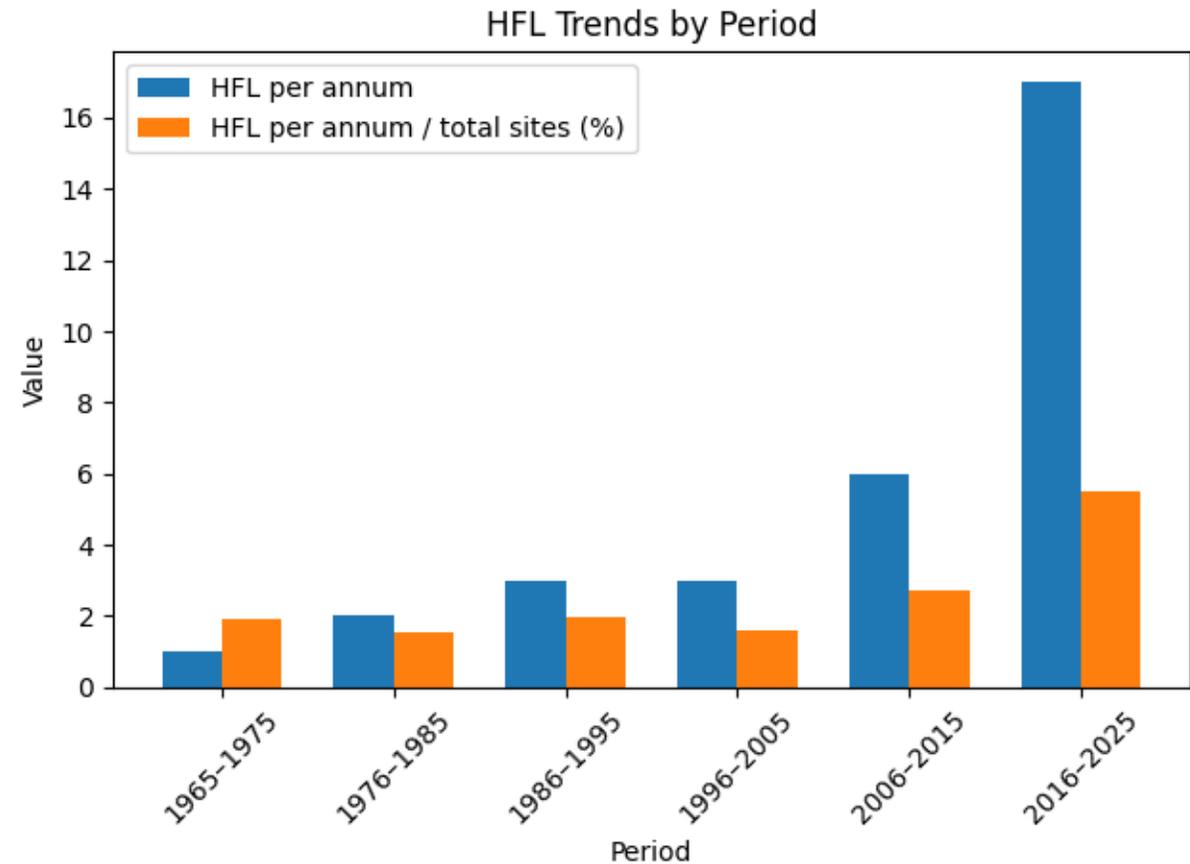
Extreme Flood Locations - 2016



2016 -2025

Increase in number of stations and HFL during the decade

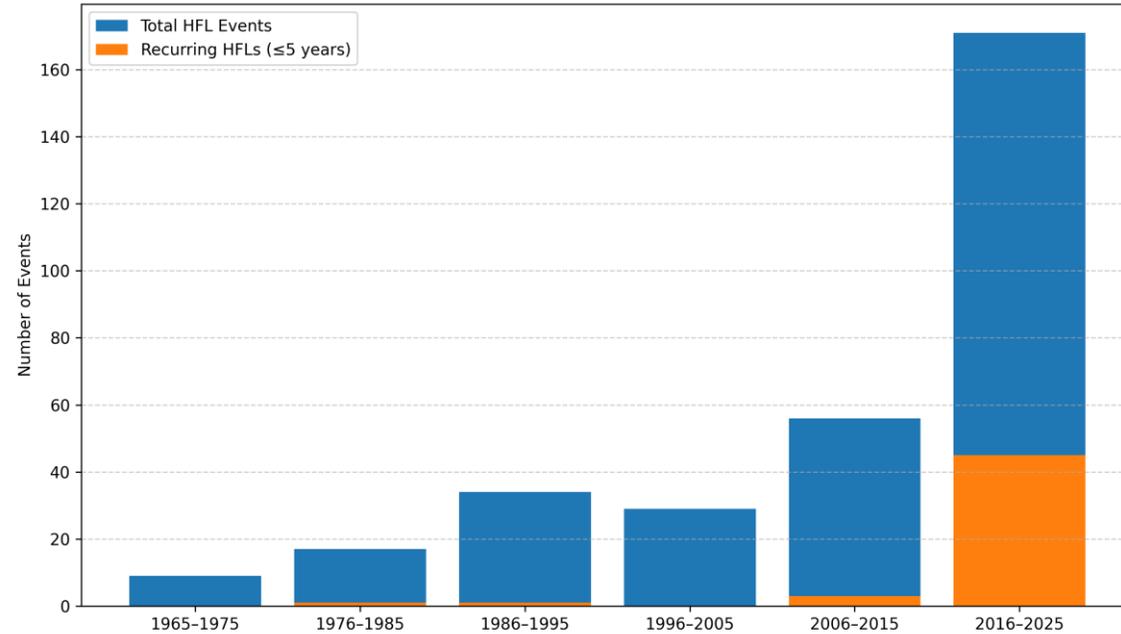
Period	Total Sites Available	Cum. HFL Events during the decade	HFL per year	HFL per annum/total sites (%)
1965–1975	52	9	1	1.92
1976–1985	127	17	2	1.57
1986–1995	153	34	3	1.96
1996–2005	189	29	3	1.59
2006–2015	221	56	6	2.71
2016–2025	309	171	17	5.50



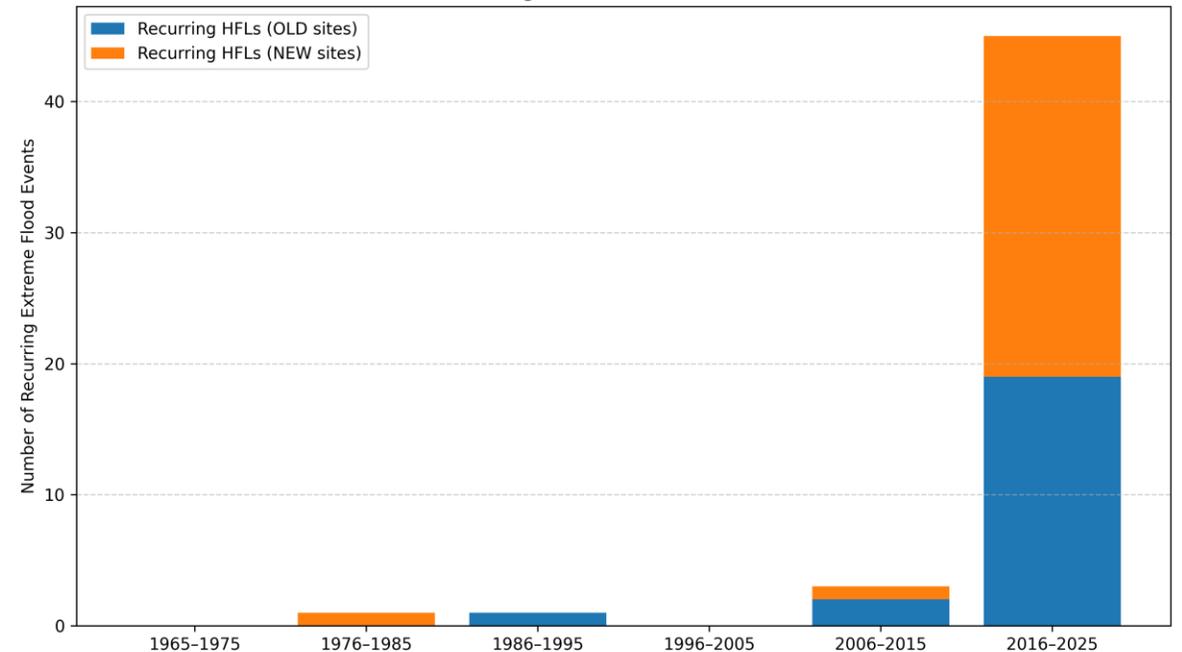
Decadal information on recurrence of HFLs (Old and New Sites)

Period	Total Sites Available	Recurring HFLs (≤ 5 years)	Old sites	New Sites
1965–1975	52	0	0	0
1976–1985	127	1	0	1
1986–1995	153	1	1	0
1996–2005	189	0	0	0
2006–2015	221	3	2	1
2016–2025	309	45	19	26

Decadal Extreme Flood Events and Recurrence



Decadal Recurring Extreme Floods (OLD vs NEW Sites)



Observations

- Total number of HFLs have seen a rise in last two decades
- Last decade has show sharp rise in HFLs and recurrence of HFLs (within 5 years)
- Though number of Flood monitoring sites have increased, percentage of HFL with w.r.t total station have also increased in last decade,
- Increase of Recurrence of HFLs have been observed even in Old HO sites
- Indicating increasing Extreme weathers occurrence and recurrence in last decade.
- This warrants improved policy level actions like Flood Plain Zoning and efficient reservoir operation based on long term forecasting and optimization of reservoir releases through Integrated Reservoir Operation

As this region has major storage projects as well as system of projects

Reasons:

- Extreme Weather Events
- Channel Capacity reduction due to encroachments
- Lack of adequate waterways along Line structures
- Synchronization of releases from dams with downstream flooding
- Change of land use & land cover pattern

Way Forward

- Flood Plain Zonation & Regulation to control/recover encroachments
- Improvement & maintenance of flood carrying capacity of drains especially through structures
- Review of waterways through line structures and implementation of mitigation measures with minimum obstruction to flood plain.
- Integrated Reservoir Operation through optimization/Decision support system using long term inflow forecast with sufficient lead time **in place of fixed seasonal rule curves**
- Frequent Updating of Design Flood and Emergency action plans.

Thank You