

# Flood Hazard Atlas- Bihar State

*A geospatial approach*

***Prepared by***

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***In Association with***

National Disaster Management Authority  
Ministry of Home Affairs, Govt. of India



Disaster Management Department  
Govt. of Bihar, Patna

**&**

Bihar State Disaster Management Authority  
Govt. of Bihar, Patna

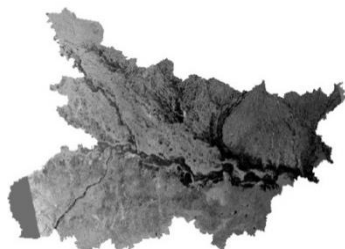
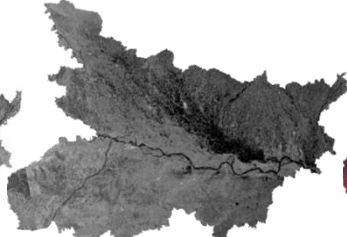
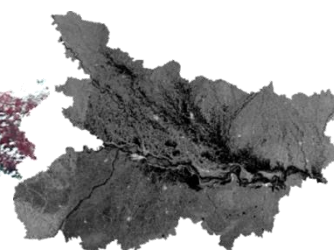
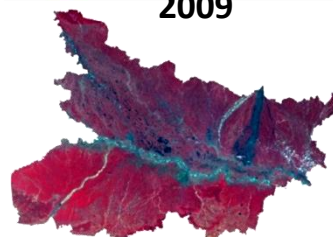
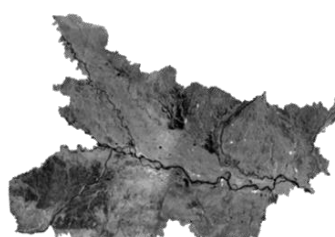
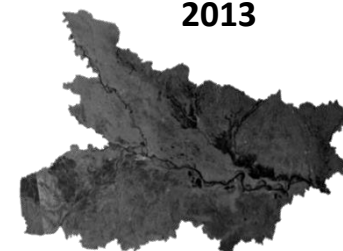
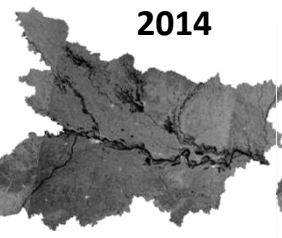
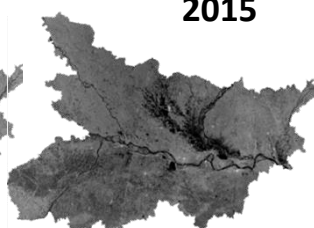
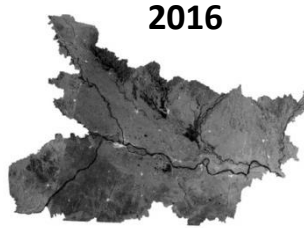
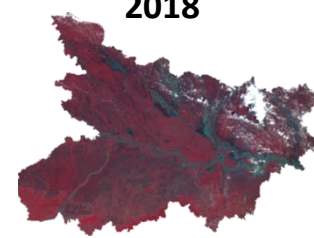
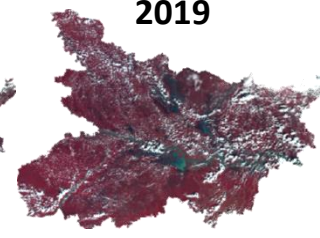


## Major Highlights

- *Under ISRO-DMS programme, NRSC has been monitoring and mapping floods in Bihar State for more than two decades*
- Flood maps derived from 274 satellite images over 22 years (1998- 2019) obtained from 15 Space Missions are used
- CWC's gauge data of 40 stations in computing district level hazard index
- Through ground validation by DM Department of Govt. of Bihar

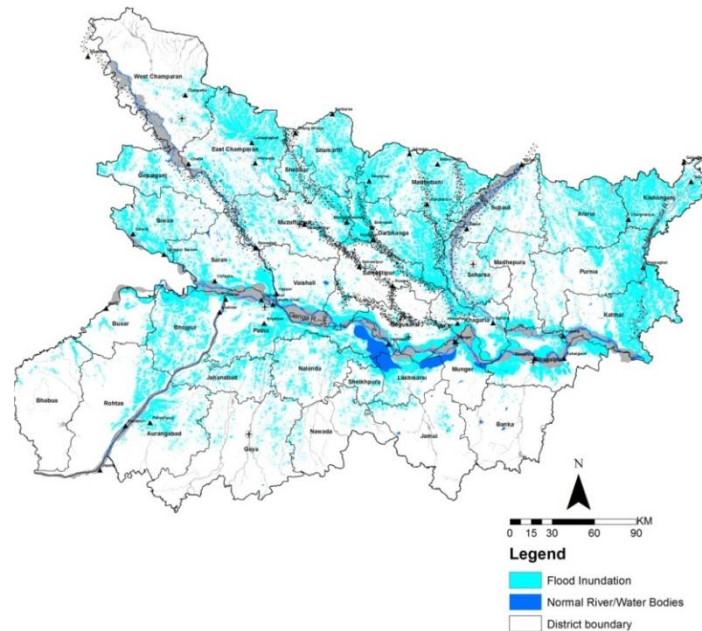
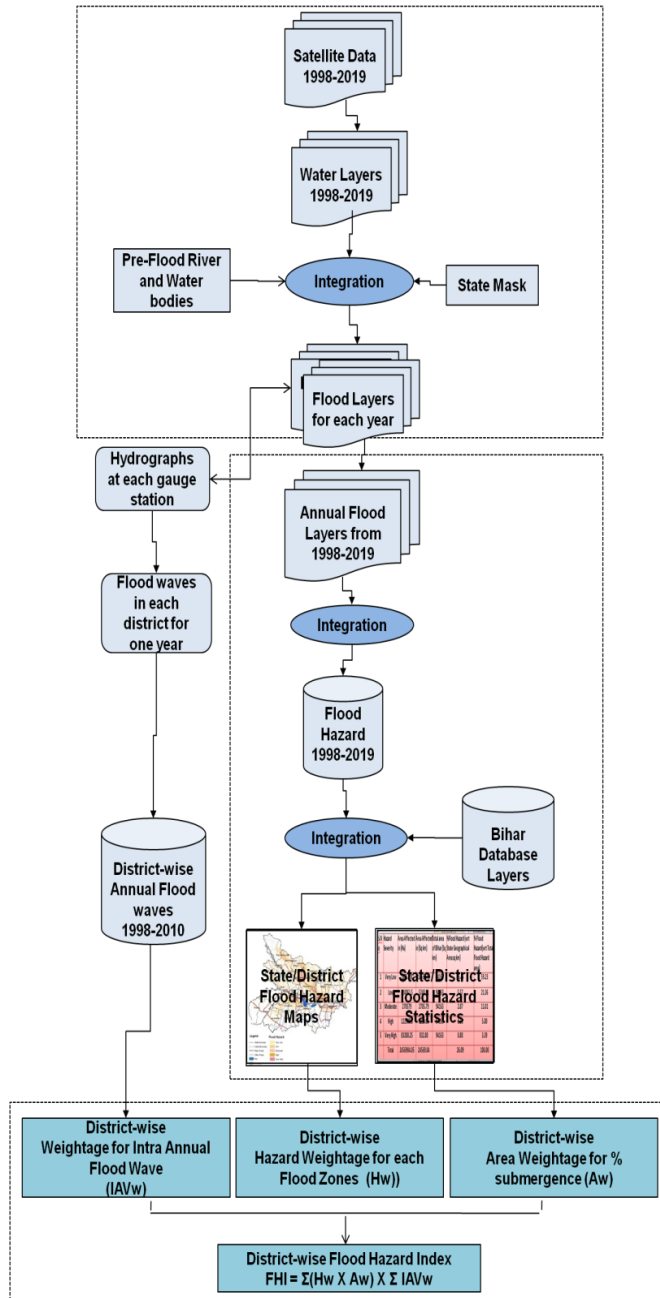
## End Use

- One of the best non-structural methods in flood DRR
- To plan flood control measures in floodplain areas
- To control the developmental activities in the floodplains
- To plan relief, rescue, and health centers in floodplains
- To encourage flood tolerant crops
- To regulate reservoir operations

**1998****1999****2000****2001****2002****2003****2004****2005****2006****2007****2008****2009****2010****2011****2012****2013****2014****2015****2016****2017****2018****2019**

# Broad Methodology

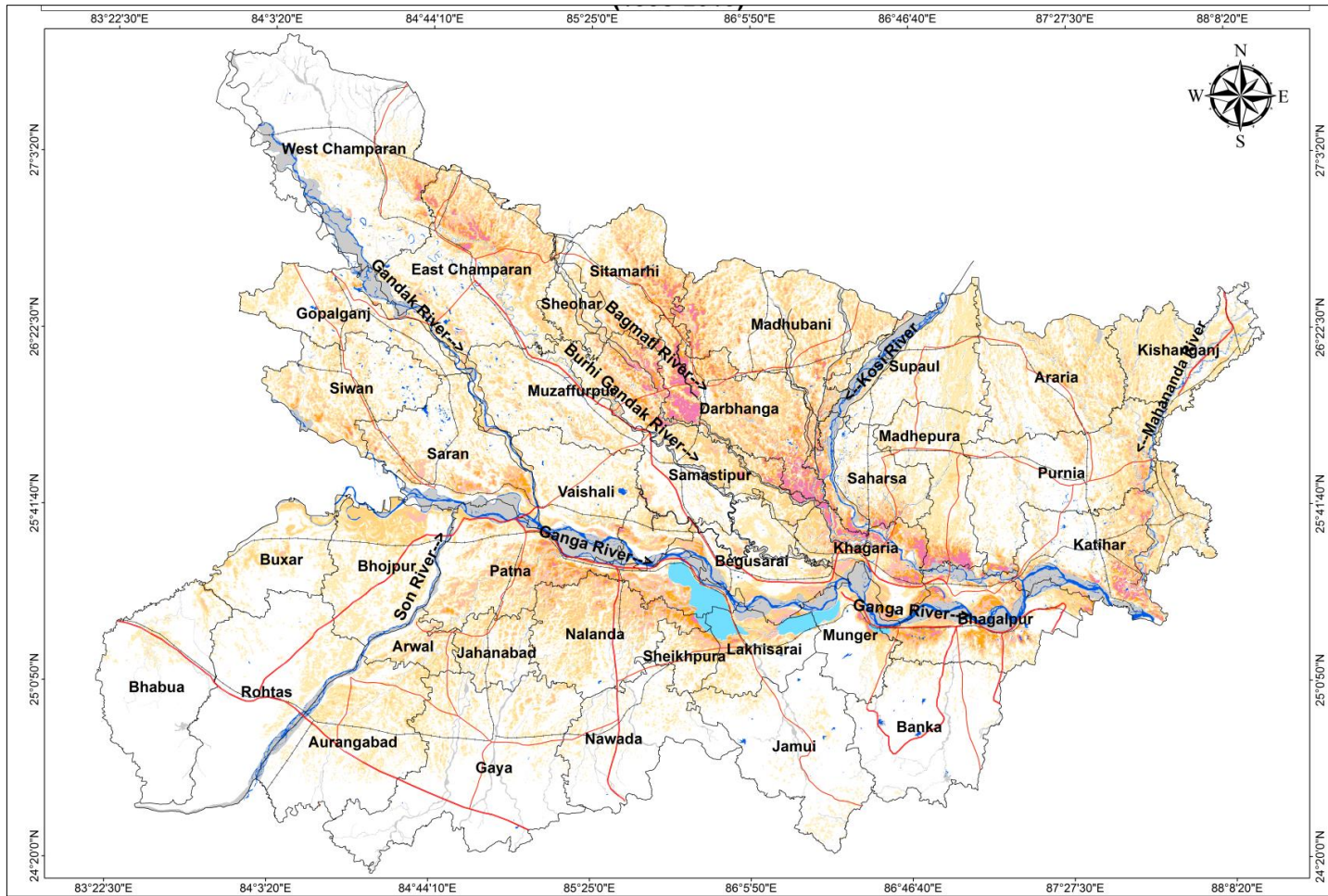
- Flood maps of each year
- Preparation of annual cumulative flood map
- Integration of annual layers
- Flood frequency and classification as per the expert committee guidelines of NDMA
- CWC gauge data, analysis and integration
- Flood hazard index at district level



Total extent of Flood Inundation in Bihar in 2019



# Flood Hazard Zonation Map - Bihar State



FHZ Classification	No. of times the area is affected to flood
Very low	1-2 times
Low	3-5 times
Moderate	6-9 times
High	10-13 times
Very high	>13 times

## Legend

- Settlement
- District Hq
- District boundary
- ..... Taluk boundary
- Village Boundary
- +--- Railway
- == National Highway
- == District Road

## Flood Hazard

- Very low
- Low
- Moderate
- High
- Very High
- River/Waterbodies

- ❖ About 35.06 lakh hectares (37.24%) in Bihar state is flood affected
- ❖ 29 out of 38 Districts are moderate to very high flood affected
- ❖ Very High and High Hazard category 1096, Moderate Hazard 1336 villages

District	District Area (Hectares)	Total Flood Inundated Area (Hectares)	% Flood Hazard Area	Flood Hazard Index FHI= $\Sigma (Hw \cdot Aw) \cdot \Sigma (IAVw)$
Darbhanga	227900	198559	87	174
Khagaria	148600	106314	72	126
Sitamarhi	220000	141752	64	120
Katihar	305700	154715	51	114
Muzaffarpur	317200	159812	50	114
Patna	320200	169725	53	110
Bhagalpur	256900	116133	45	108
Samastipur	290400	130926	45	108
East Champaran	396800	217660	55	95
Madhubani	350100	214910	61	95
Nalanda	235500	133094	57	95
Saharsa	170200	83734	49	95
Madhepura	178800	96348	54	90
Purnia	322900	114132	35	85
Sheohar	44300	23738	54	80
Siwan	221900	98363	44	76
Araria	283000	138003	49	72
Saran	264100	109878	42	72
Supaul	241000	93249	39	72
Begusarai	191800	83205	43	68
Gopalganj	203300	71648	35	68
Munger	141900	30448	21	64
Vaishali	203600	55570	27	64
West Champaran	522800	68285	13	60
Bhojpur	247400	111039	45	57
Kishanganj	188400	104972	56	57
Aurangabad	330500	91509	28	34
Buxar	162400	53226	33	51
Gaya	497600	63719	13	48
Bhabua	336200	20942	6	45
Nawada	249400	21875	9	45
Arwal	63800	31373	49	40
Sheikhpura	68900	33403	48	38
Jahanabad	156900	41261	26	32
Lakhisarai	122800	42629	35	32
Jamui	309800	25211	8	30
Rohtas	385100	36964	10	30
Banka	302000	11376	4	15

