

# BOLT FROM THE BLUE

Why are LIGHTNING STRIKES killing so many?

SATURDAY, JULY 17, 2021

2.30-3.30 PM INDIA TIME

PLATFORM: ZOOM

LANGUAGE: ENGLISH AND HINDI

## ANCHOR

**RICHARD  
MAHAPATRA**

Managing Editor,  
Down to Earth

## SPEAKERS

**SANJAY  
SRIVASTAVA**

Convener, Lightning  
Resilient India Campaign  
and Head, Climate  
Resilient Observing  
Systems Promotion  
Council (CROPC), Delhi

**SUNIL D PAWAR**

Scientist F, Atmospheric  
Electricity, Indian  
Institute of Tropical  
Meteorology, Pune

**SHAKTI  
KUMAR**

District Disaster  
Management  
Officer, Bokaro,  
Jharkhand

**AKSHIT  
SANGOMLA**

Senior Reporter,  
Down To Earth

# Lightning – the unrecognized biggest killer

presentation by

Col Sanjay Srivastava

Chairman, Climate Resilient Observing Systems Promotion Council(CROPC)

Convener

Lightning Resilient India Campaign- joint initiative of India Met Department-CROPC- World Vision India

Email [sanjaysonisa@gmail.com](mailto:sanjaysonisa@gmail.com), [cropcn@gmail.com](mailto:cropcn@gmail.com) Website [www.cropc.org](http://www.cropc.org) Mob +917631089049

Credits :All data on lightning strikes have been taken from Lightning Resilient India Campaign's Annual lightning Reports which in turn has been prepared based on data from Indian Institute of Tropical Meteorology and EW products from India Meteorological Department, Ministry of Earth Science.

Death records have been compiled from NCRB, NDMA, SDMAs, Media reports and our volunteers network of NGOs and CSOs

# Lightning in India

- Its mostly cloud to cloud or cloud to ground lightning
  - (i) Hills Jungle areas Lightning
  - (ii) River basin Lightning
  - (iii) Coastal Lightning
  - (iv) Urban/semi urban Lightning
- Period – Maximum Lightning March , Heavy lightning June to October during the monsoon , especially in initial and terminal phase of monsoon,
- Number of lightning days are less but deadly and intense
- Lightning is on rise due to global warming, deforestation, depletion of water bodies, environmental degradation and climate change extremities
- It is estimated approximately 2500 plus deaths per year due to lightning , per strike casualties are in large number
- Rural areas and Forests with tall trees and water bodies are most vulnerable , 96 % deaths are in rural areas and people standing under tall trees
- Urban areas are less vulnerable due to having large number of lightning conductors , less number of trees and water bodies



# Lightning Resilient India Campaign

## वज्रपात सुरक्षित भारत अभियान

1

### वज्रपात की पूर्व चेतावनी

दामिनी ऐप डाउनलोड करें और हमेशा सूचित और सतर्क रहें। प्लेस्टोर का लिंक [https://play.google.com/store/apps/details?id=com.lightning.live.damini&hl=en\\_IN](https://play.google.com/store/apps/details?id=com.lightning.live.damini&hl=en_IN)



दामिनी : बिजली चेतावनी  
DAMINI: Lightning Alert

17/07/21



2

### क्या करें, क्या न करें

वज्रपात के दौरान सुरक्षित रहने के उपाय



3

### तड़ित सुरक्षा प्रणाली

क्या मेरा घर, स्कूल, कार्यालय या मैदान वज्रपात सुरक्षित है? कृपया लाइटनिंग कंडक्टर / रोधक की जाँच करें और स्थापित करें।



तड़ित चालक या रोधक ही आसमान से धरती पर आने वाली विद्युत-प्रवाह को जमींदोज करता है।

# Lightning Resilient India Campaign

## Patrons

Sri P.P. Shrivastav,(IAS) (Retd)  
Member ,NDMA Advisory Committee  
Sri Anil Kumar Sinha, IAS(Retd)  
Fellow ICIMOD, Frmr VC BSDMA  
Dr. K.J. Ramesh, former DG  
Indian Meteorological Department  
Dr. M. Mohapatra, DG  
Indian Meteorological Department  
Sri R.K. Jain, IAS  
Secretary General , IRCS  
Prof A.K.Gosain, IIT Delhi  
Dr. VS Prakash  
Founder Director KSNDMC  
Prof. S.K. Dash, CAS, IIT Delhi  
Dr Aditi Kapoor, IFRC  
Dr. N.M. Prusty, President HAI  
Sri. Thomas Cherian, World Vision

India

Convener

17/07/21

## Aim

1. To reduce Lightning deaths of human beings, livestock and wild animals by 80% in next 03 years

## Vision

2. The vision of Lightning Safe Indian Campaign is to create a Lightning Resilient Society through a comprehensive, multipronged innovative approach and collective action thereby taking Multi Hazard Early Warning to the community up to last mile, capacity building and creating lightning safe infrastructures with focus on local disaster hotspots in accordance with the Sendai Framework for Disaster Risk Reduction(SF DRR) and zero tolerance towards avoidable disasters.

## Mission

3. Lightning safe India Campaign's mission is to bring down the deaths due to lightning by 80% in a period of three years from 2019 to 2021 through increased standardized instrumentation ,prompt dissemination of early warning to last mile through committed volunteers in user friendly manner, create a culture of safety through active capacity building through education, awareness & training and guidance on

Grateful for support to

National Disaster Management Authority

Ministry of Home Affairs

Indian Meteorological Society (IMS)

Association of Agro-meteorologists

IIT Delhi

SCDR, JNU

All India Radio

International Federation of Red Crescent (IFRC)

Indian Red Cross Society

UNISDR

GNDR

State Governments

NRSC ISRO

IITM PLINE



# Lightning Resilient India Campaign

## To stop deaths due to lightning by aggressive actions

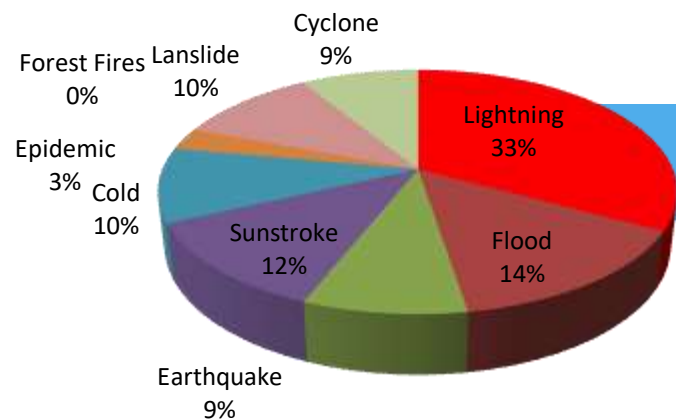
- Lightning Early Warning – its operationalization to MCs/ SDMAs and dissemination to farmers, cattle grazers ,children and people in open areas
- Create a network of volunteers and NGOs/ CSOs with Government and community to ensure Lightning safety Programme
- Develop Local Lightning Safety Action Plan and implement it
- Lightning Risk Assessment
- Scientific Research and Development – recording of all lightning strikes and mapping it
- Designation of Lightning Hotspots
- Education ,awareness and practice Dos and Don'ts
- Install Lightning Protection devices
- Lightning Risk Audit
- Preparation of Lightning Atlas
- Policy level interventions
- Enlist Lightning as a disaster to ensure institutionalized effort
- Create a sense of competition amongst state to become Lightning Resilient
- Make government and community understand veracity of Lightning
- Function as technical knowledge bank and serve government and community
- Create various solutions to reduce the fatalities

## Climate Change adaptation for environmental up-gradation

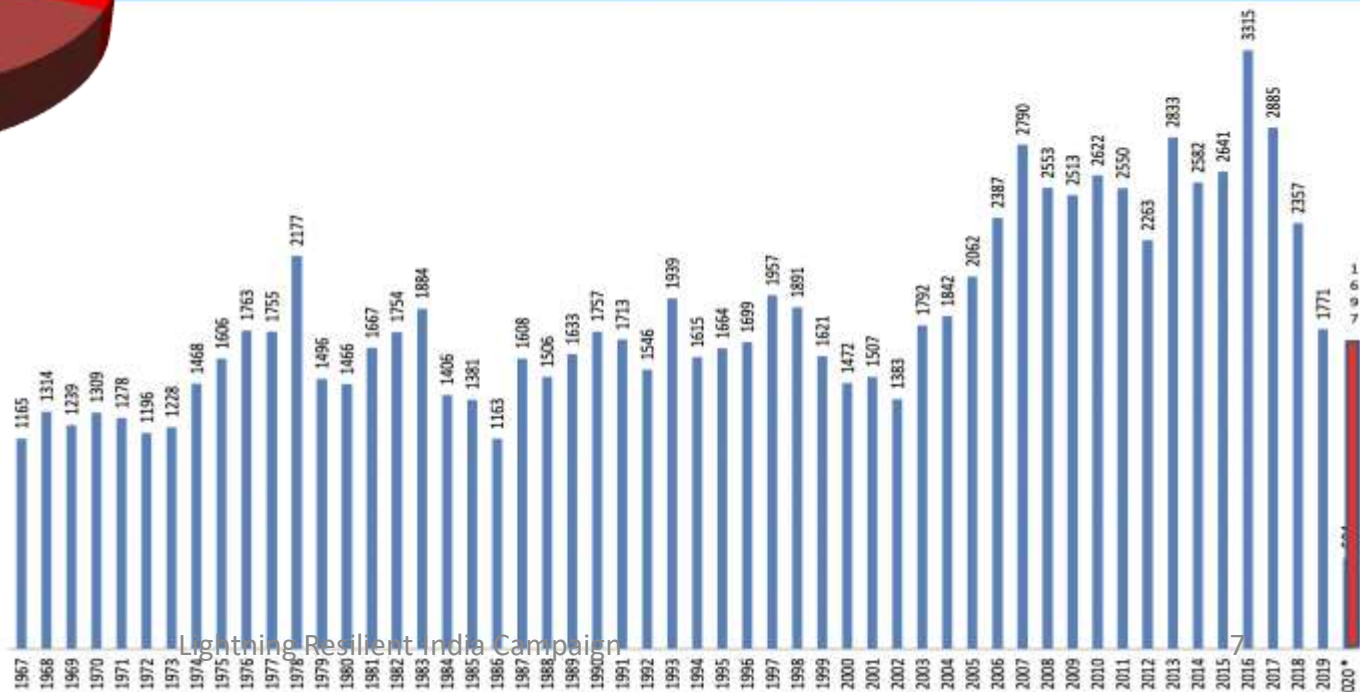
- Assess local environmental condition at measurable scale in terms of various components like water, forest cover, pollution, weather extremes like heat wave, cold, heavy rains, lightning etc. etc.
- Carry out reverse modeling with an aim to come out with sector wise adaptation Programme like conservation of water, forest, reduction in pollution
- Institutional action plans and indicators
- Draw out individual behavioural changes and implementation Programme
- Start Programme to mitigate lightning like plantation of Coconut trees or tall trees around living hutments
- Stop/reducing high temperature yielding activities
- Reduce pollution
- Invest in plants and environmental conservation

# Lightning deaths in India

## Natural Hazard Casualty 1967-2019

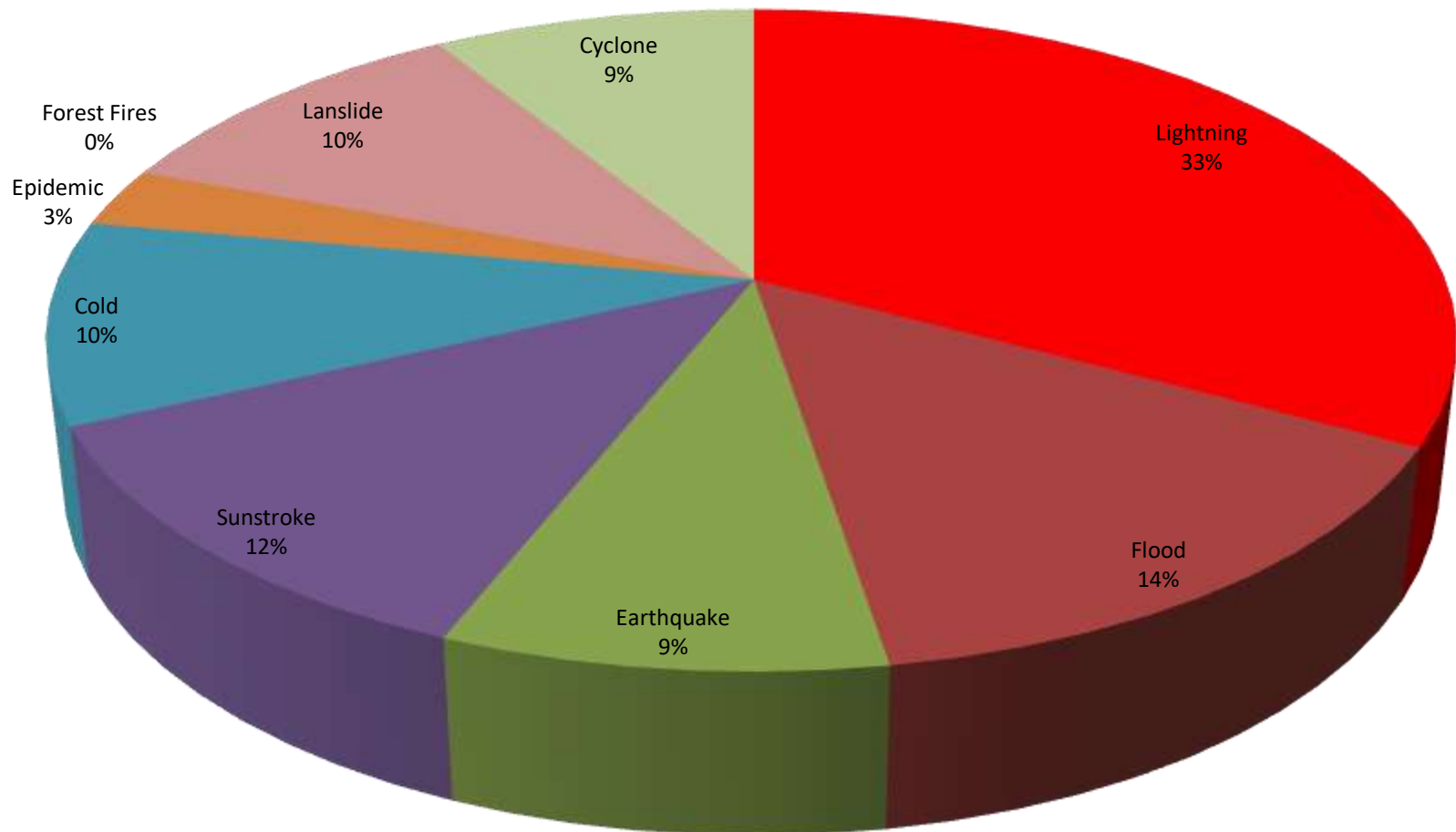


## Lightning deaths in India 1967-2020



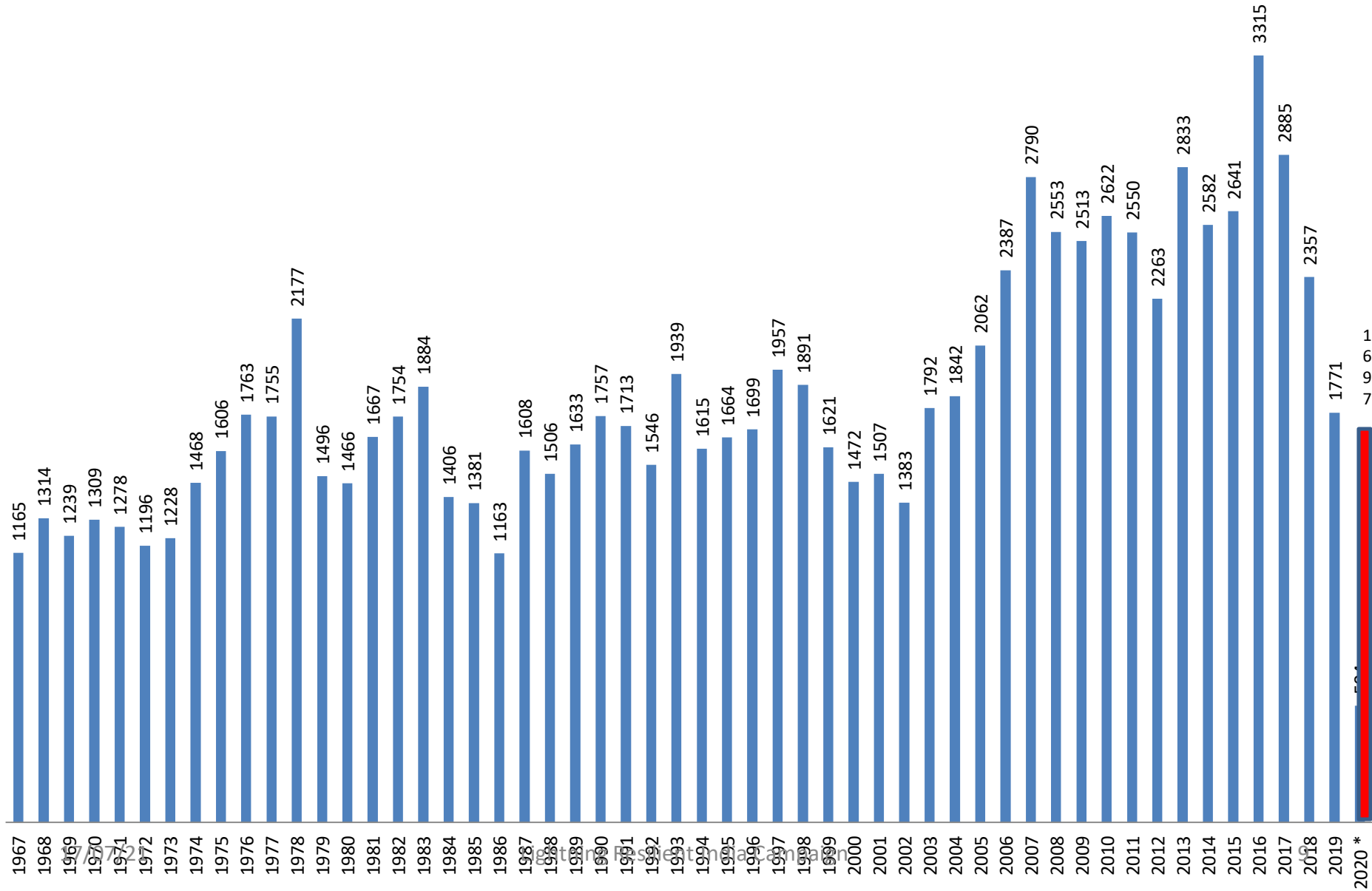
# Lightning deaths in India 1967-2020

Natural Hazard Casualty 1967-2019





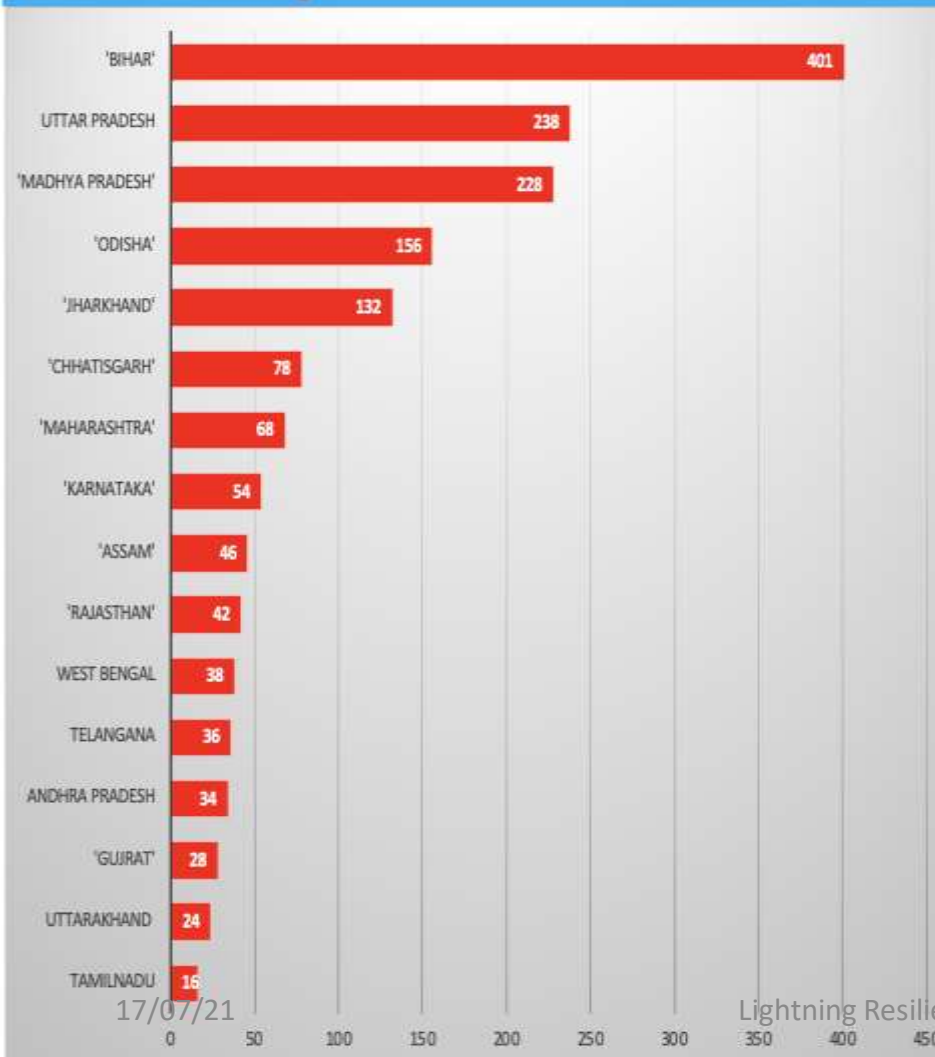
# Lightning deaths in India 1967-2020



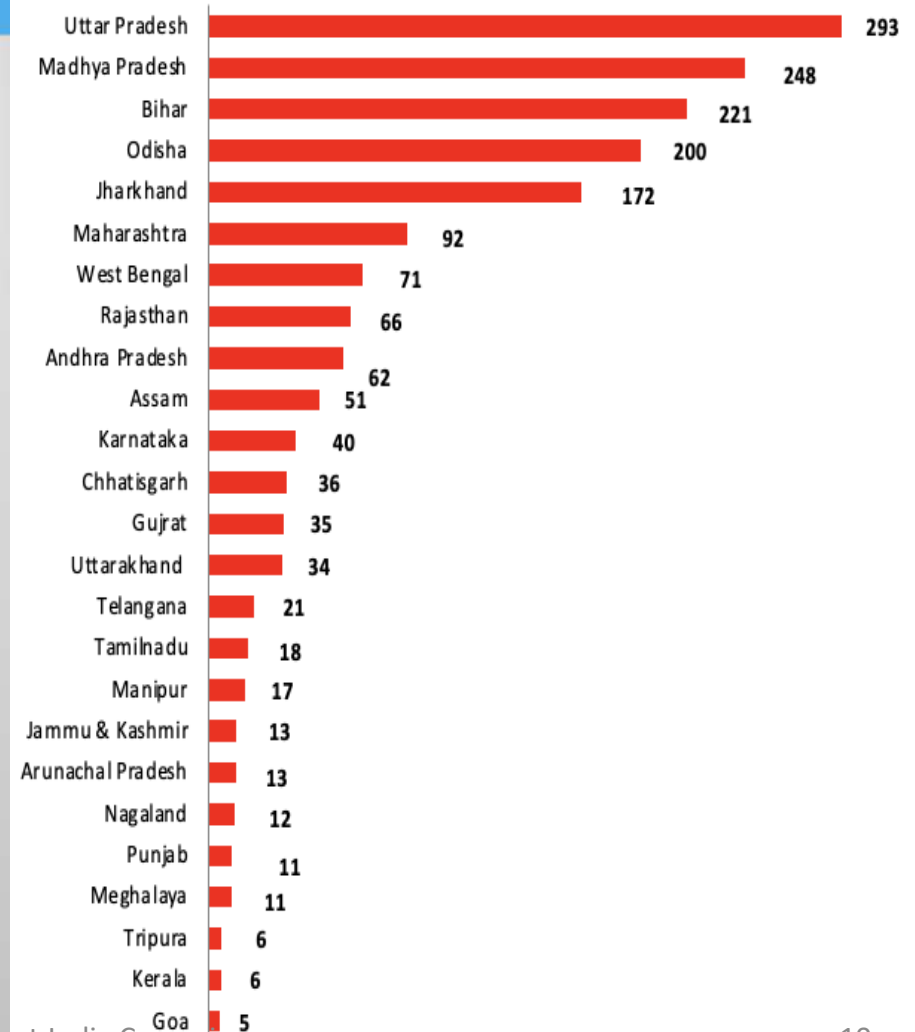
# Lightning Deaths 2019-2020 vs 2020-2021

## Lightning Deaths: Top 16 States

01 April 2020 to 31 March 2021



## Lightning Deaths 2019-2020



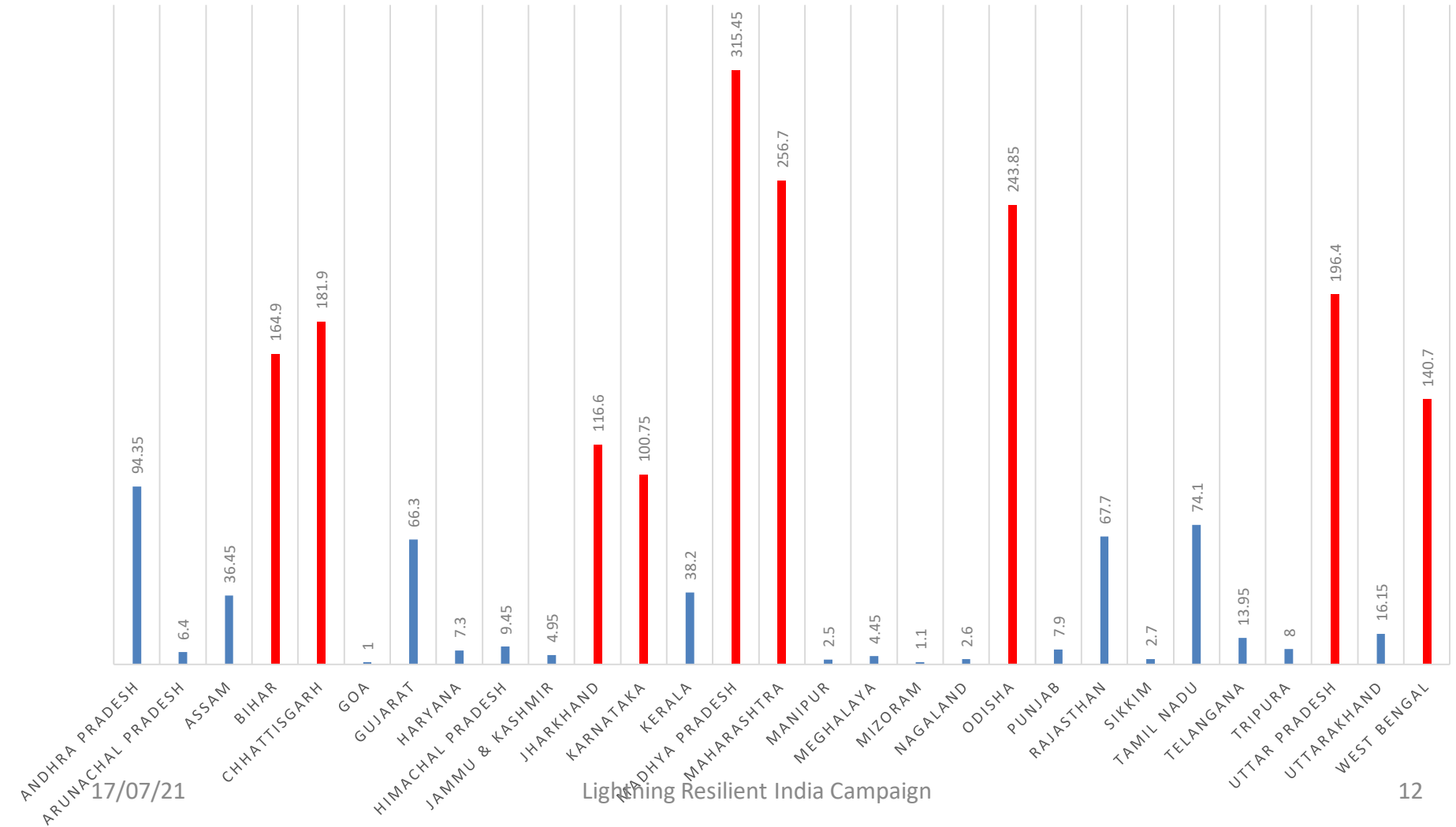
# Lightning Deaths In India Over A Decade



Source: NCRB | Accidental Deaths and Suicides in India

# State wise trends of Lightning deaths

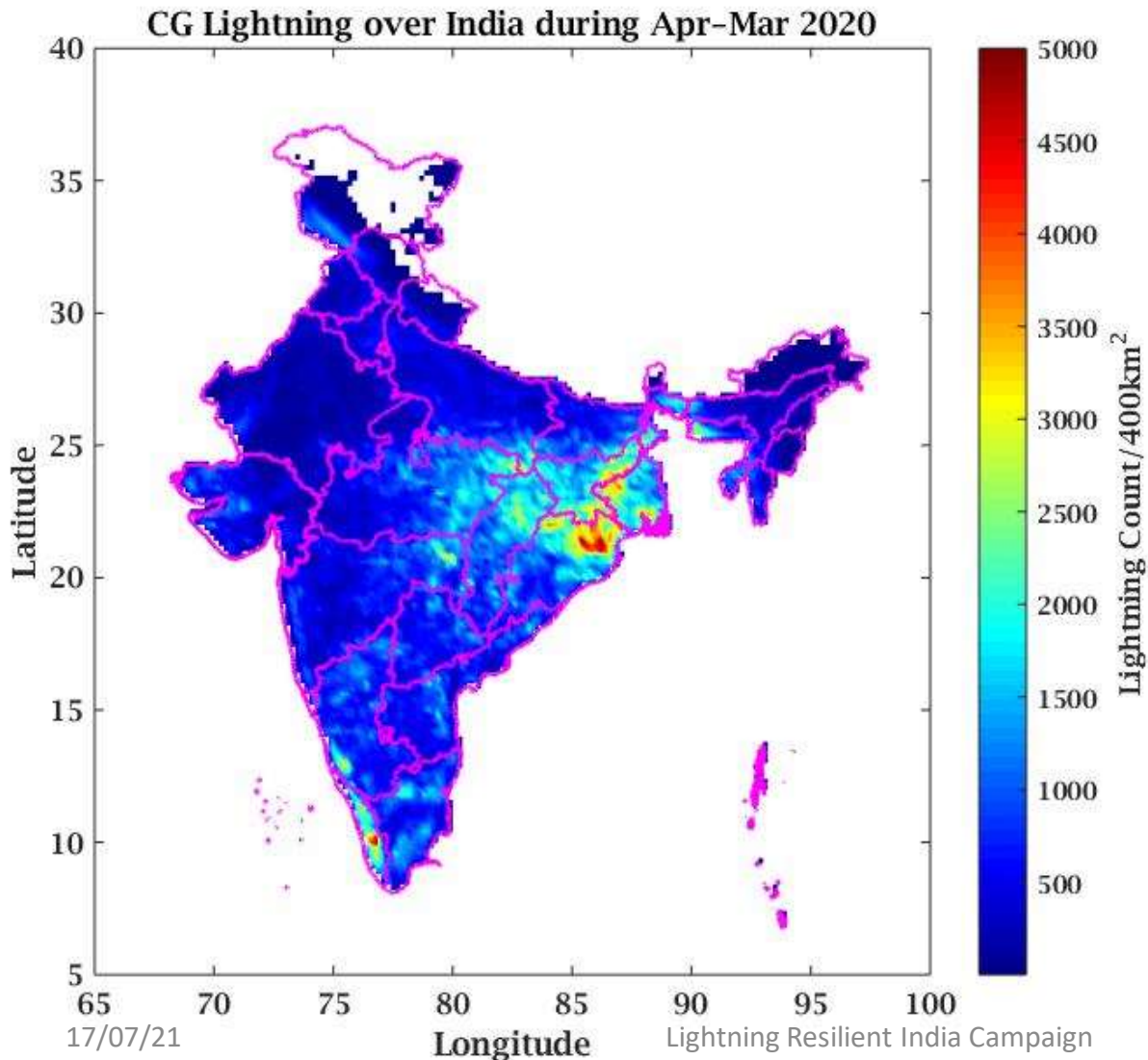
## 20 YEARS AVERAGE OF LIGHTNING DEATHS 2001-2020



# Seasonality deaths and its relation to lightning strikes and seasonality



# Lightning Over India Apr 2019- Mar 2020

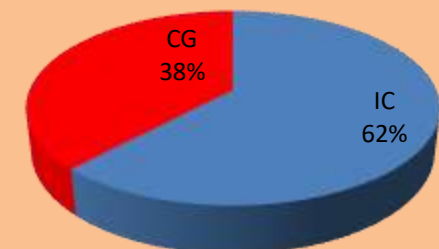


**Total Lightning -13864664**

**Inter Cloud – 8847042**

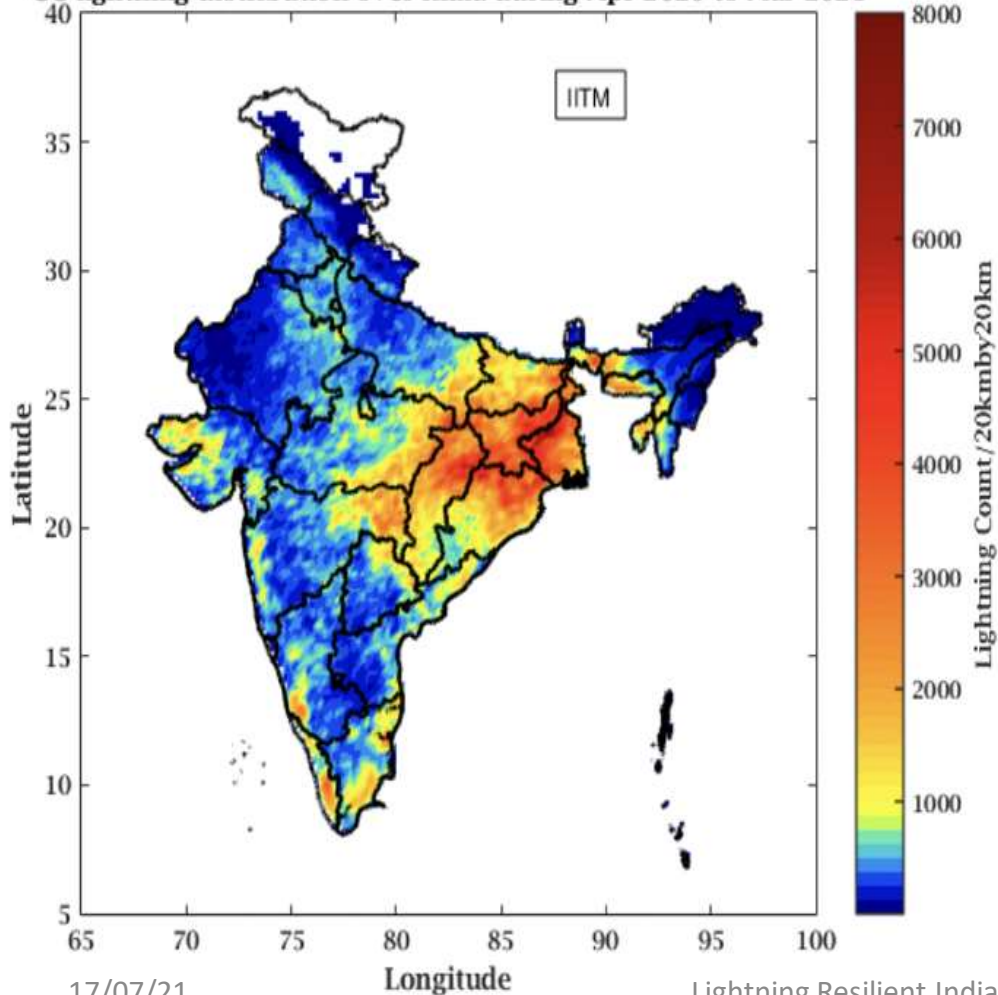


**Cloud to Ground 5017622**



# Lightning in 2020-2021

CG lightning distribution over India during Apr 2020 to Mar 2021



## Total Lightning Strike 01 April 2021-31 March 2021

**1,85,443,367**

**Total Lightning strikes**

**60,39,256**



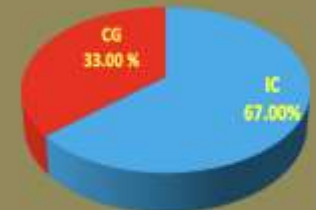
**Total Lightning**

is the combination of cloud to ground (CG) and in-Cloud (IC) lightning strikes



**Cloud to ground Lightning**

**Total Lightning**



**Cloud to Ground Lightning**

Lightning that happens between opposite charges in a cloud and on the ground

**In-Cloud Lightning**

Lightning that occurs between opposite charges within a thunderstorm

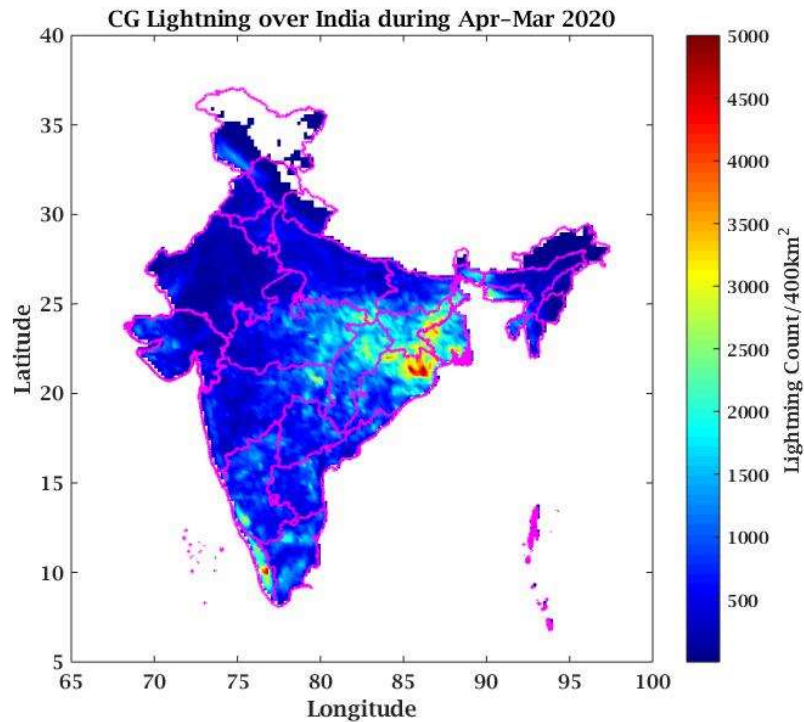
**125,50,111**

**In- Cloud (IC) Lightning**

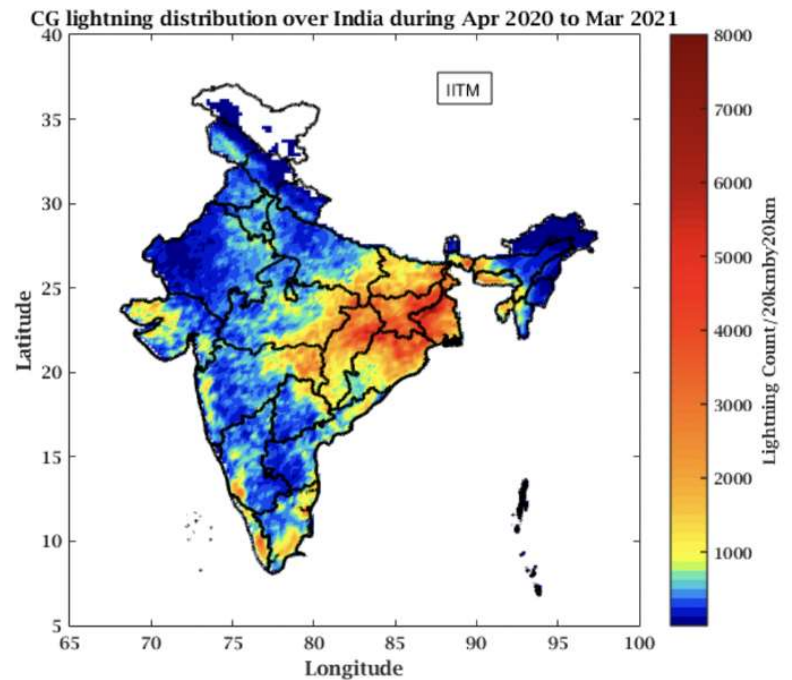


# Comparison Lightning strikes

**2019-2020**



**2020-2021**



# Comparison Lightning strikes

2019-2020



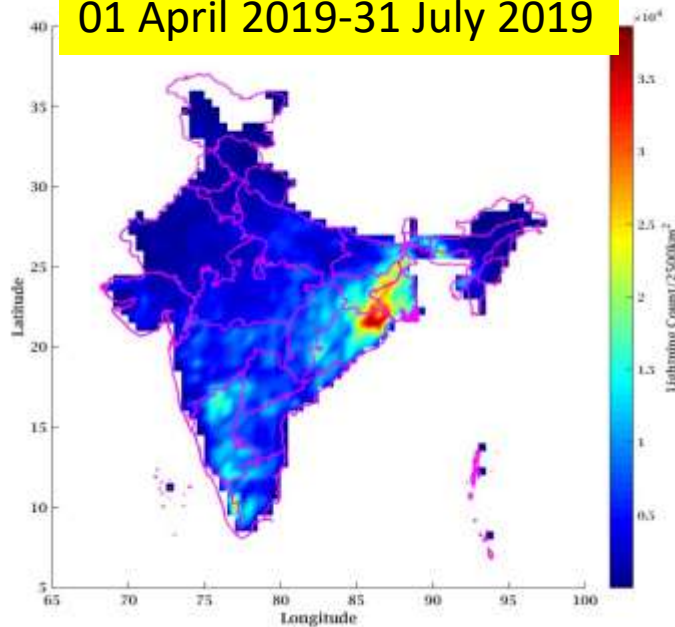
2020-2021



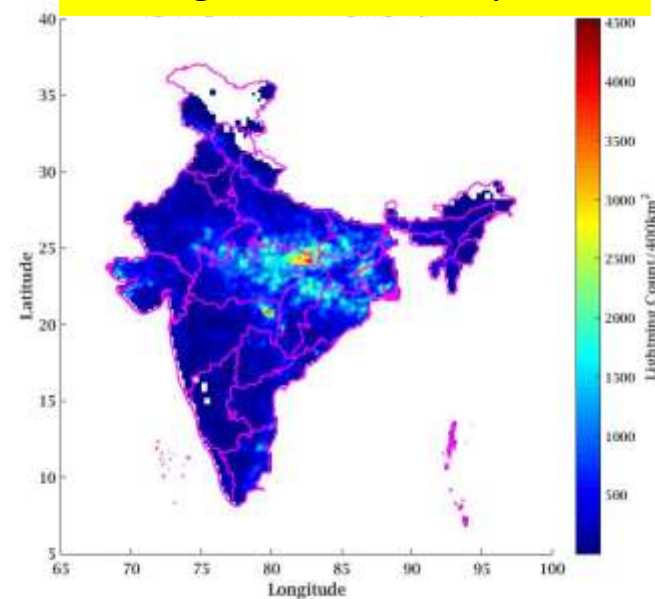


# Quarterly Lightning Mapping : Analysis

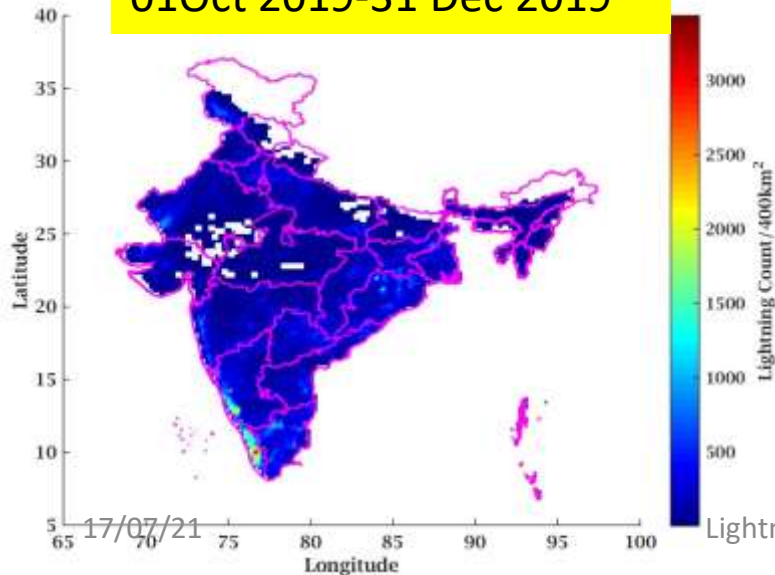
01 April 2019-31 July 2019



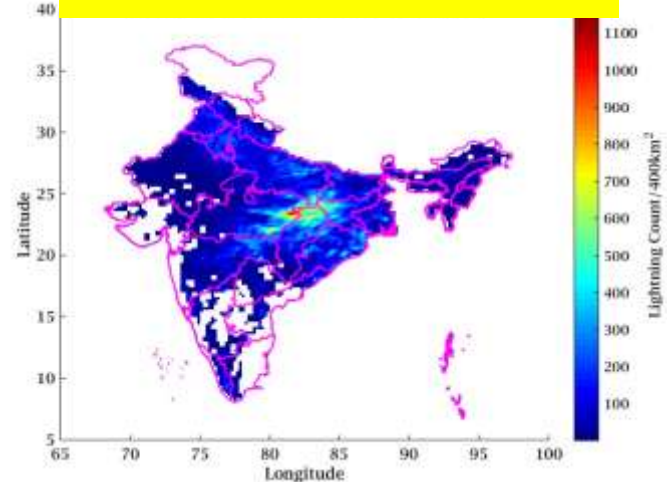
01 August 2019-30 Sep 2019



01 Oct 2019-31 Dec 2019



01 Jan 2020-31 Mar 2020



# Top 10 states in Lightning strike counts in each quarter

**1<sup>st</sup> Quarter - 01 April- 31 July 2019**



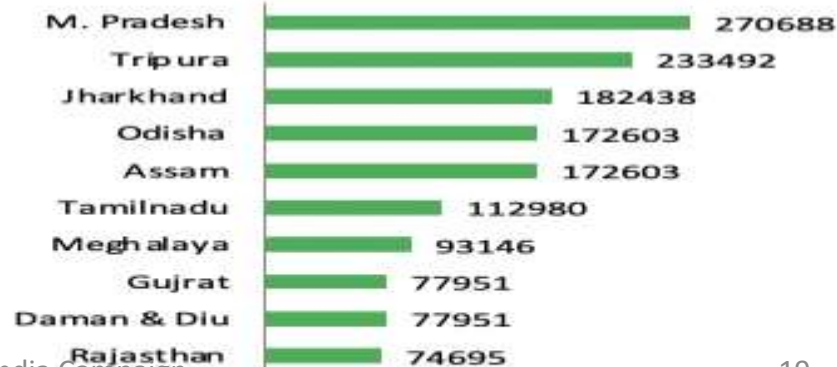
**2<sup>nd</sup> Quarter - 01 August – 30 September 2019**



**3<sup>rd</sup> Quarter - 01 October – 31 December 2019**

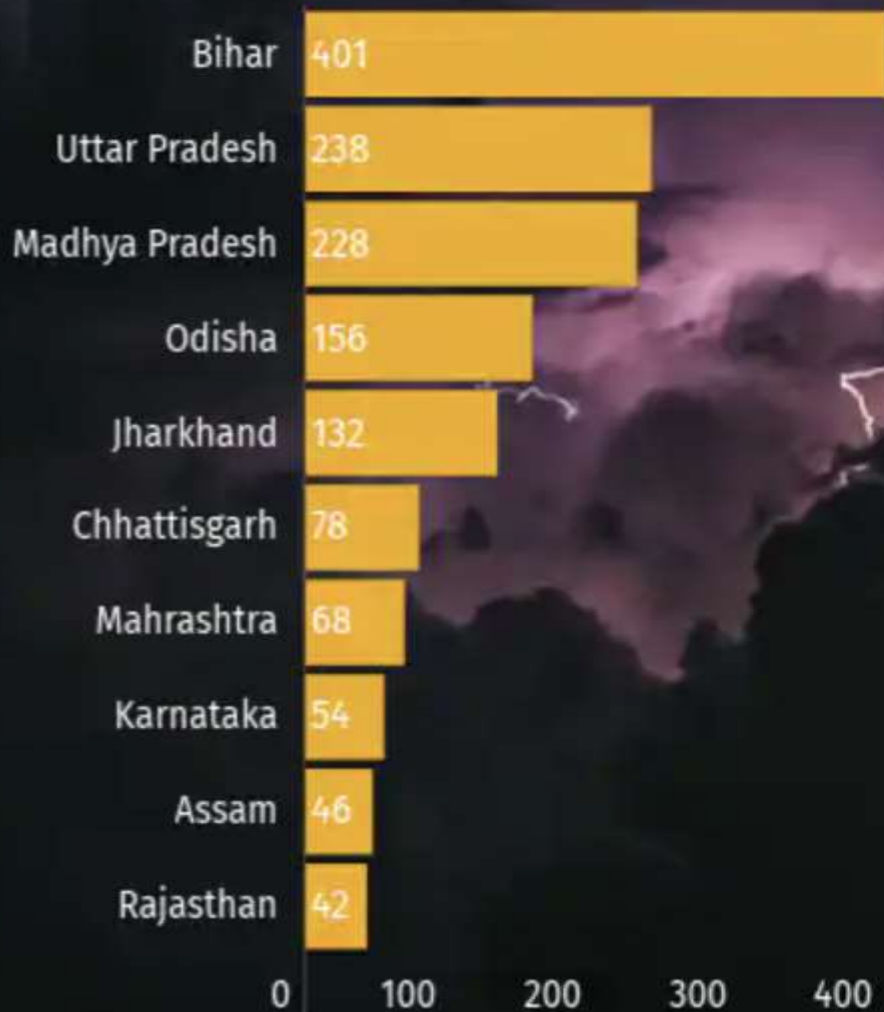


**4<sup>th</sup> Quarter - 01 January – 31 March 2020**



## Lightning Deaths

(Top 10 States)



## Lightning Counts

(Top 10 States)



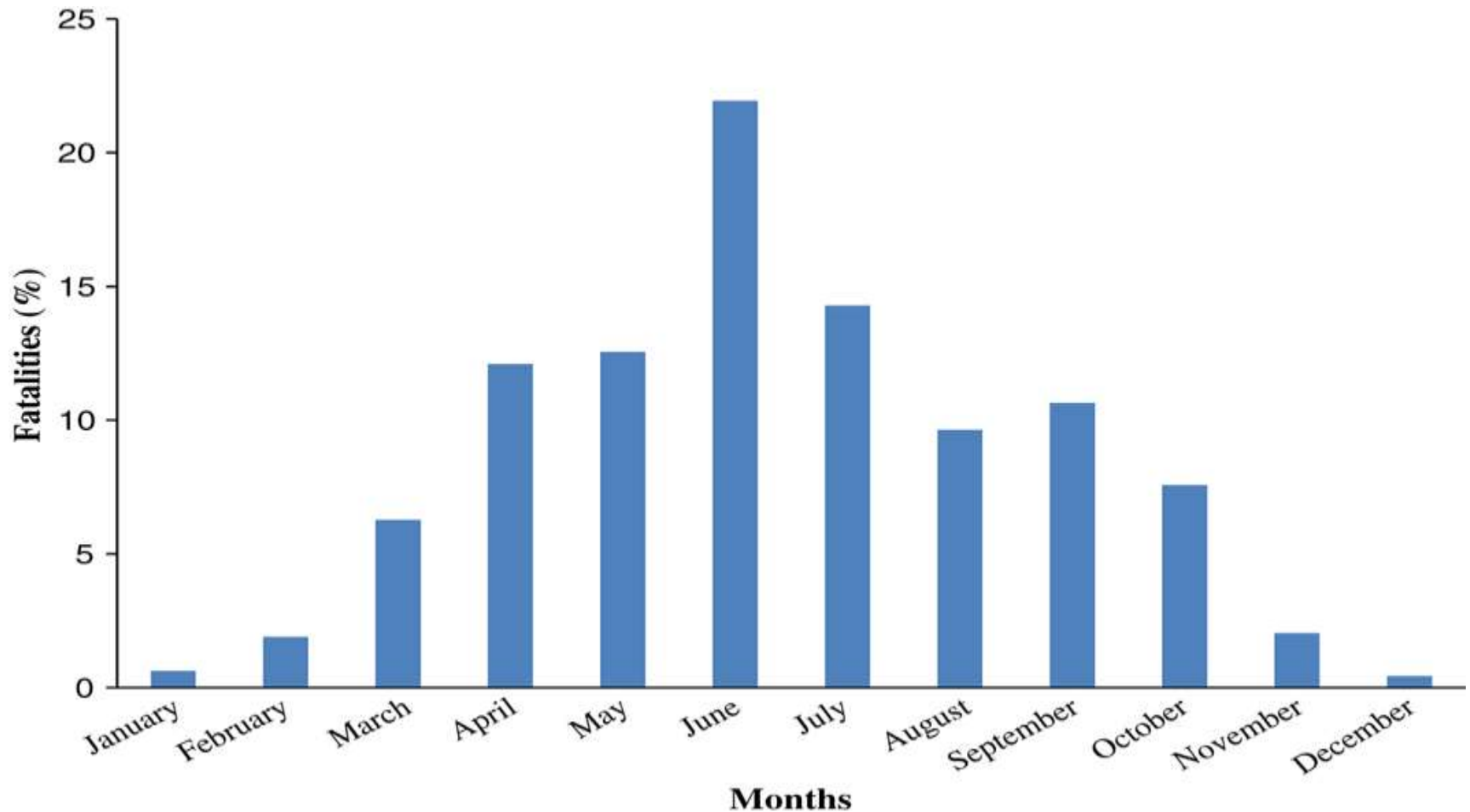
17/07/21

Lightning Resilient India Campaign

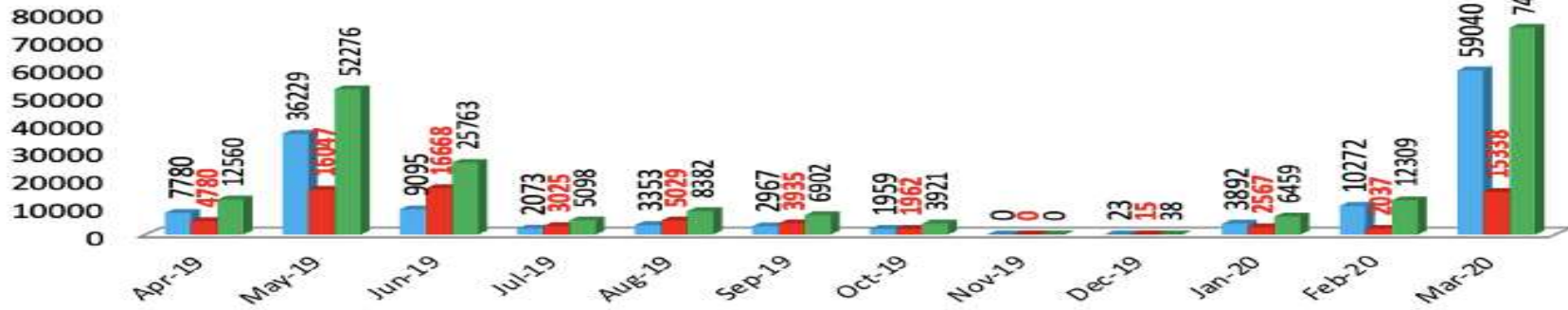
Source: Annual Lightning Report 2020-2021 | Lightning Resilient India Campaign



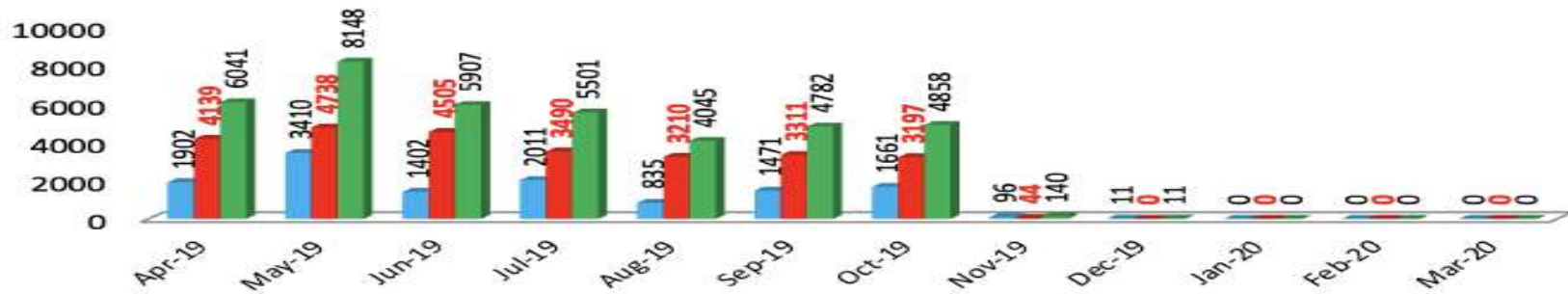
# Lightning Fatalities Month wise trend



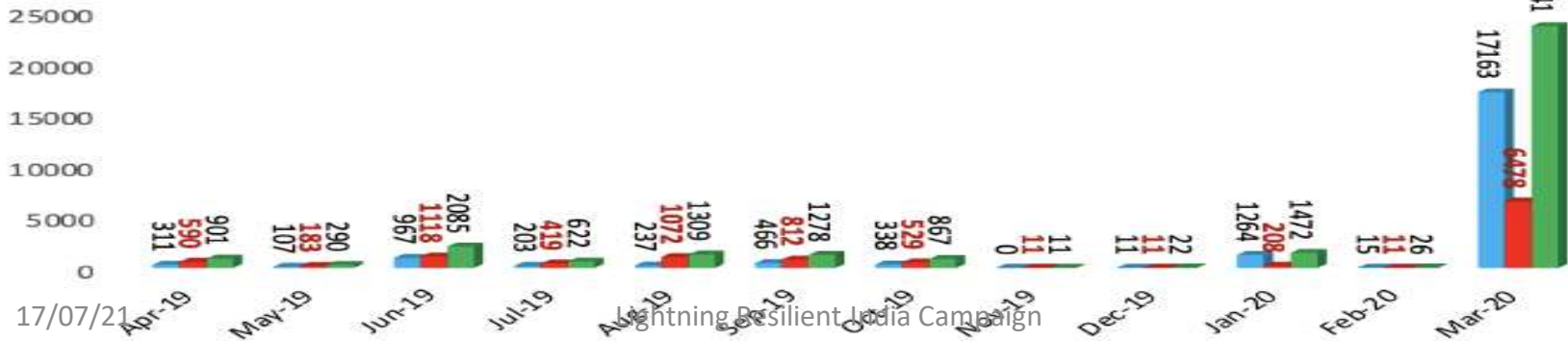
## Meghalaya



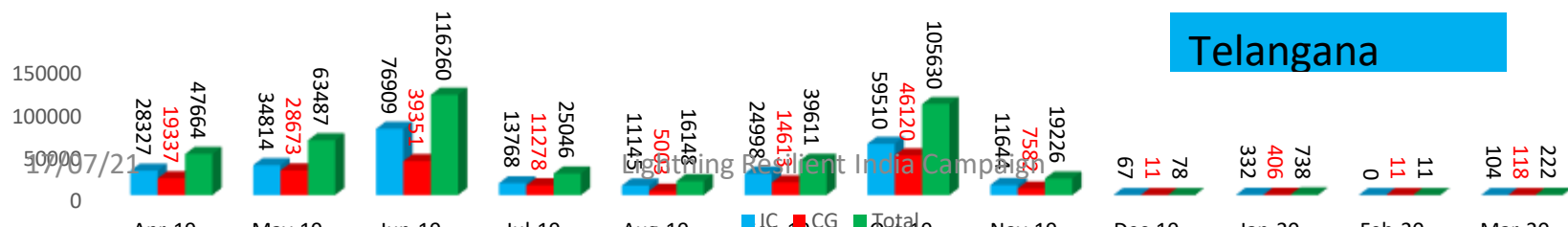
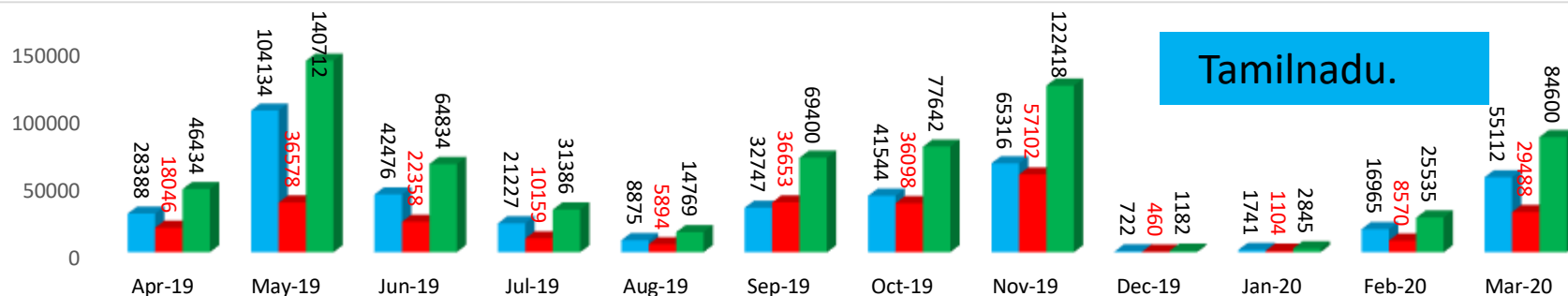
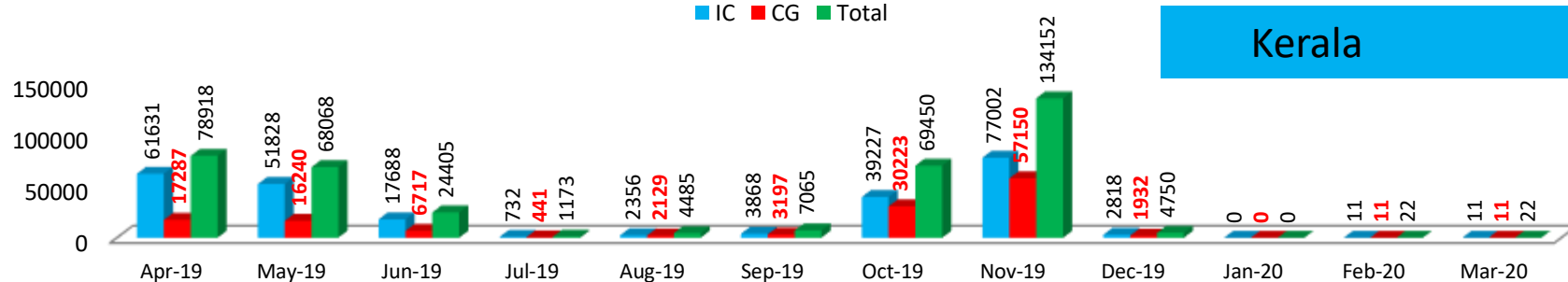
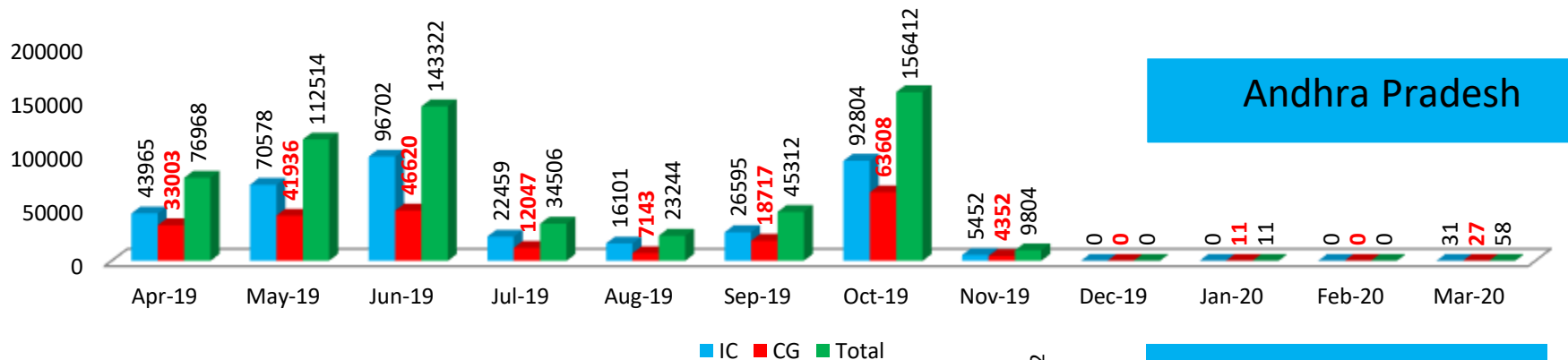
## Mizoram



## Nagaland



# Comparative Analysis of seasonality– Southern states

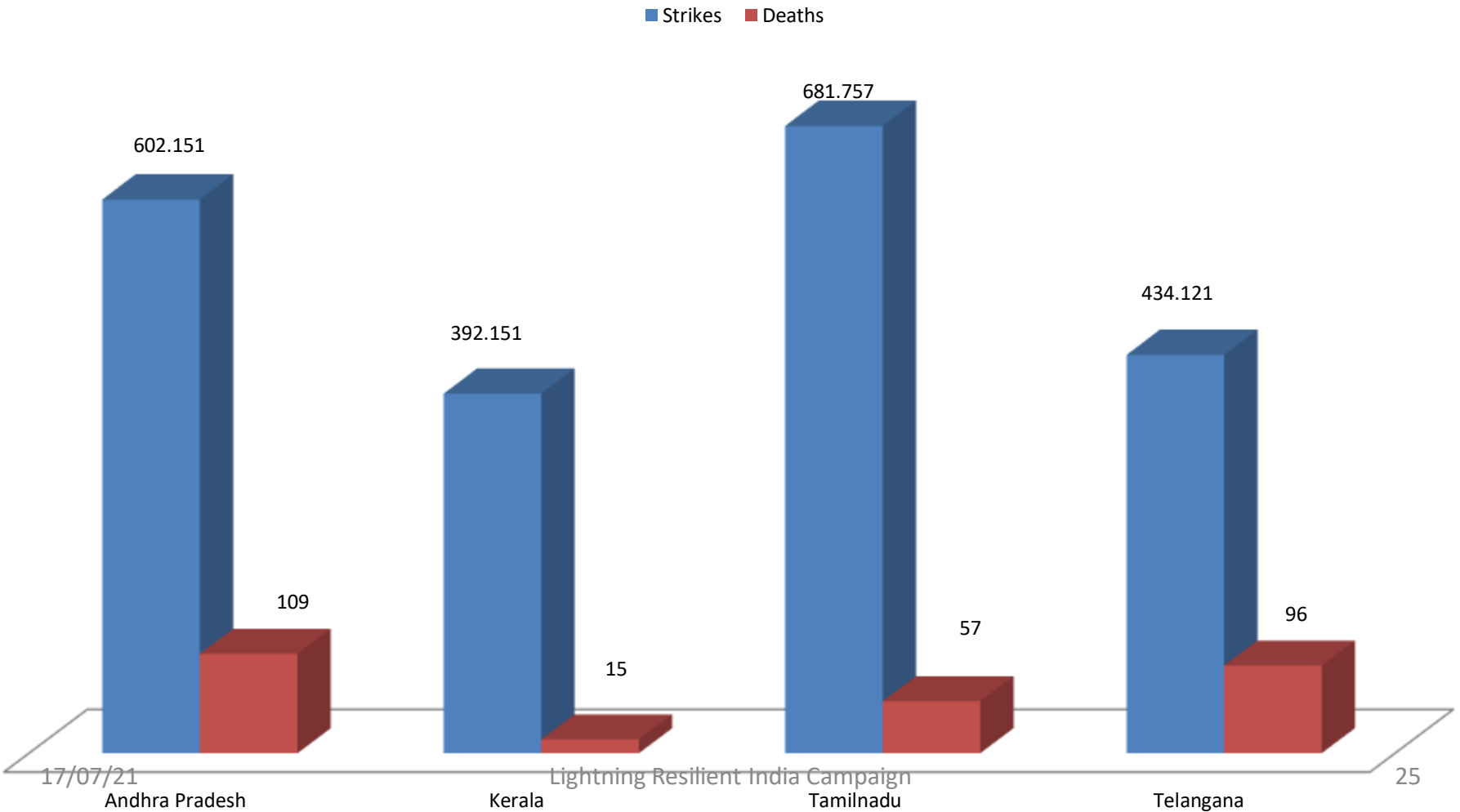


# South India:Lightning strikes vs Deaths

| State          | Strikes | Deaths |
|----------------|---------|--------|
| Andhra Pradesh | 602.151 | 109    |
| Kerala         | 392.151 | 15     |
| Tamilnadu      | 681.757 | 57     |
| Telangana      | 434.121 | 96     |
| Total          | 2110.18 | 277    |

# South India:Lightning Strikes Vs Deaths

Lightning Strikes Vs Deaths





# Lightning Timing of Occurrence

## Timing of Lightning strikes

Maximum strikes  
Light strikes



Moderate  
strikes  
Least



I

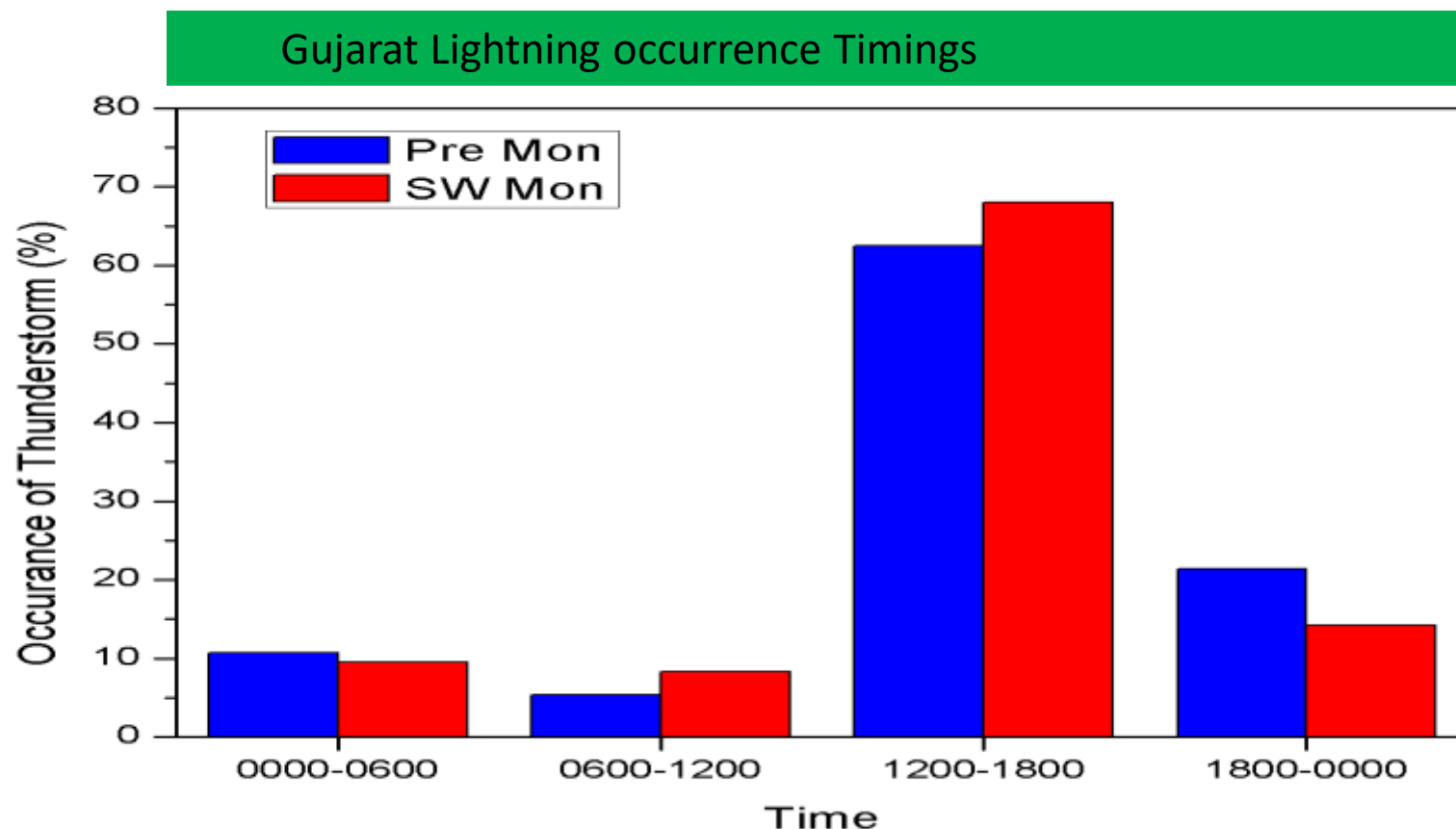
II

III

IV

| Ser | Name of State/UT  | 06 AM-11:59 AM | 12-6 PM | 6-11:59PM | 12-06 AM |
|-----|-------------------|----------------|---------|-----------|----------|
| 1   | Andaman & Nicobar |                |         |           |          |
| 2   | Andhra Pradesh    |                |         |           |          |
| 3   | Arunachal Pradesh |                |         |           |          |
| 4   | Assam             |                |         |           |          |
| 5   | Bihar             |                |         |           |          |
| 6   | Chandigarh        |                |         |           |          |
| 7   | Chhatisgarh       |                |         |           |          |
| 8   | Dadar & N Haveli  |                |         |           |          |
| 9   | Daman & Diu       |                |         |           |          |
| 10  | Delhi             |                |         |           |          |
| 11  | Goa               |                |         |           |          |
| 12  | Gujarat           |                |         |           |          |
| 13  | Haryana           |                |         |           |          |
| 14  | Himachal          |                |         |           |          |
| 15  | Jammu & Kashmir   |                |         |           |          |
| 16  | Jharkhand         |                |         |           |          |
| 17  | Karnataka         |                |         |           |          |
| 18  | Kerala            |                |         |           |          |
| 19  | Lakshadweep       |                |         |           |          |
| 20  | Madhya Pradesh    |                |         |           |          |

# Lightning Occurrence time :Risk



**1200-1800 hours : 68%**

**1800-2400: 64%.**

## Lightning Vulnerability of states in terms lightning per square kilometers

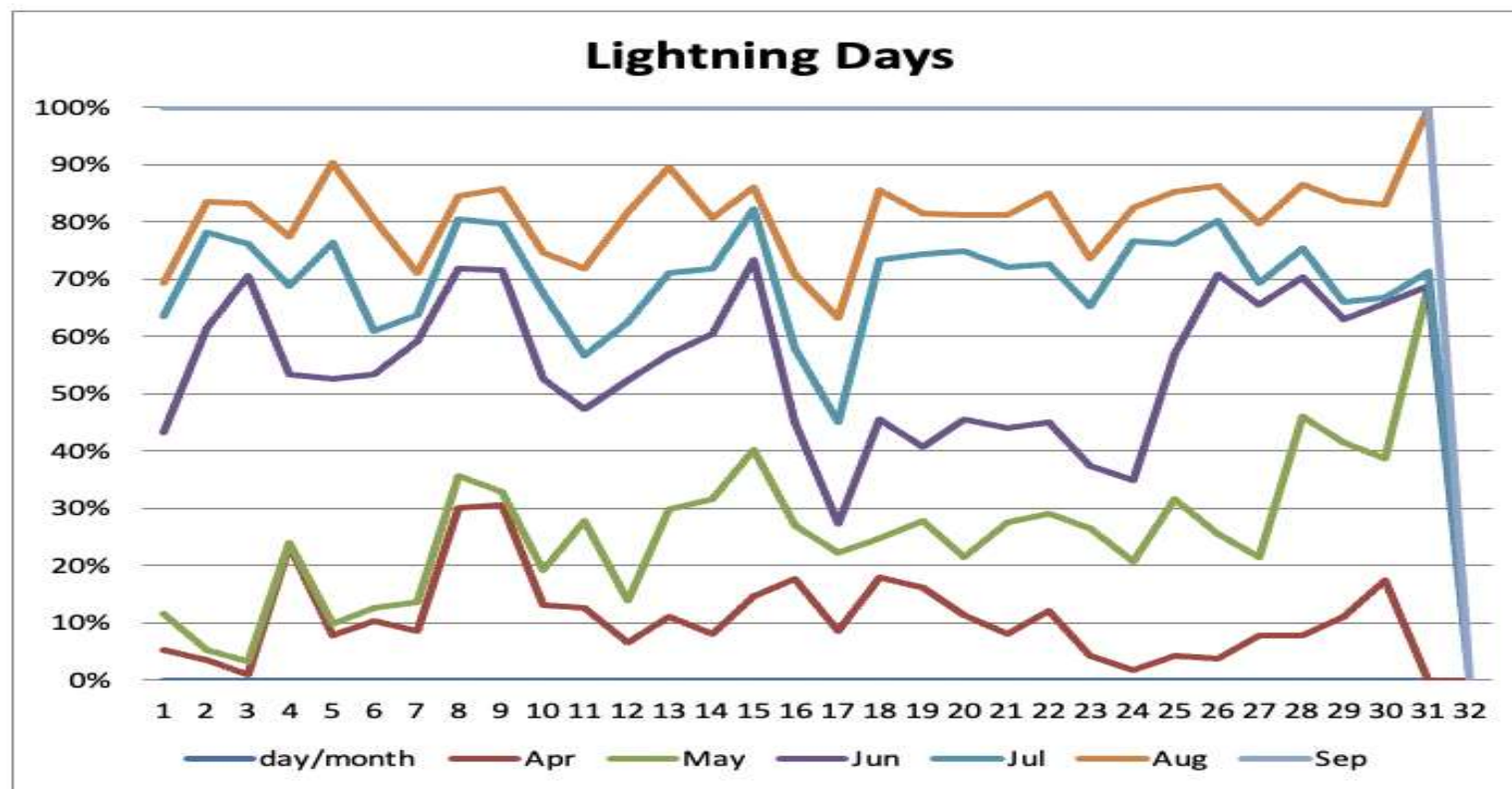
| Serial No | States           | Total Lightning counts | Area in Sq Km | No of lightning strikes per sq km | Ranking |
|-----------|------------------|------------------------|---------------|-----------------------------------|---------|
|           |                  | 13860378               | 32,87,263     | 178.96                            |         |
| 1         | Lakshadweep      | 1612                   | 32            | 50.37                             | 1       |
| 2         | Kerala           | 423456                 | 38863         | 10.89                             | 2       |
| 3         | Jharkhand        | 819638                 | 79714         | 10.28                             | 3       |
| 4         | Odisha           | 1483349                | 155707        | 9.52                              | 4       |
| 5         | West Bengal      | 807097                 | 88752         | 9.09                              | 5       |
| 6         | Goa              | 22974                  | 3702          | 6.2                               | 6       |
| 7         | Chhattisgarh     | 804332                 | 135191        | 5.94                              | 7       |
| 8         | Tripura          | 59156                  | 10486         | 5.64                              | 8       |
| 9         | Meghalaya        | 119832                 | 22429         | 5.34                              | 9       |
| 10        | Bihar            | 501640                 | 94163         | 5.32                              | 10      |
| 11        | Karnataka        | 941801                 | 191791        | 4.91                              | 11      |
| 12        | Madhya Pradesh   | 1445368                | 308245        | 4.68                              | 12      |
| 13        | Delhi            | 6773                   | 1490          | 4.54                              | 13      |
| 14        | Tamilnadu        | 574640                 | 130058        | 4.41                              | 14      |
| 15        | Uttar Pradesh    | 1000949                | 240928        | 4.15                              | 15      |
| 16        | Telangana        | 458289                 | 112077        | 4.08                              | 16      |
| 17        | Maharashtra      | 1241905                | 307713        | 4.03                              | 17      |
| 18        | Andhra Pradesh   | 642422                 | 162968        | 3.94                              | 18      |
| 19        | Haryana          | 159945                 | 44212         | 3.61                              | 19      |
| 20        | Dadar & N Haveli | 1405                   | 491           | 2.86                              | 20      |
| 21        | Gujarat          | 528446                 | 196024        | 2.69                              | 21      |
| 22        | Chandigarh       | 297                    | 114           | 2.6                               | 22      |
| 23        | Puducherry       | 1190                   | 492           | 2.41                              | 23      |
| 24        | Rajasthan        | 815070                 | 342239        | 2.38                              | 24      |
| 25        | Mizoram          | 40404                  | 21081         | 1.91                              | 25      |
| 26        | Assam            | 122532                 | 78438         | 1.56                              | 26      |
| 27        | Punjab           | 71374                  | 50362         | 1.41                              | 27      |
| 28        | Uttarakhand      | 73174                  | 53483         | 1.36                              | 28      |
| 29        | Daman & Diu      | 536                    | 491           | 1.09                              | 29      |
| 30        | Himachal         | 48412                  | 55673         | 0.86                              | 30      |
| 31        | Jammu & Kashmir  | 97414                  | 125535        | 0.77                              | 31      |
| 32        | Manipur          | 13135                  | 22327         | 0.58                              | 32      |

Lightning Vulnerability of population in terms of Lightning strike per 1000 persons

| Serial No | States            | Total Lightning counts | Population (As per Census 2011) | No of lightning strikes per person | Ranking          |
|-----------|-------------------|------------------------|---------------------------------|------------------------------------|------------------|
|           | India             | 13439527               | 1,380,004,385                   | 102                                | National average |
| 1         | Chandigarh        | 297                    | 10,55,450                       | 3554                               | 1                |
| 2         | Delhi             | 6773                   | 1,67,87,941                     | 2479                               | 2                |
| 3         | Puducherry        | 1190                   | 12,47,953                       | 1049                               | 3                |
| 4         | Andaman & Nicobar | 817                    | 3,80,581                        | 466                                | 4                |
| 5         | Dadar & N Haveli  | 1405                   | 5,86,956                        | 418                                | 5                |
| 6         | Punjab            | 71734                  | 2,77,43,338                     | 387                                | 6                |
| 7         | Sikkim            | 1703                   | 6,10,577                        | 359                                | 7                |
| 8         | Assam             | 122532                 | 3,12,05,576                     | 255                                | 8                |
| 9         | Nagaland          | 9063                   | 19,78,502                       | 218                                | 9                |
| 10        | Manipur           | 13135                  | 28,55,794                       | 217                                | 10               |
| 11        | Arunachal Pradesh | 8195                   | 13,83,727                       | 169                                | 11               |
| 12        | Haryana           | 159945                 | 2,53,51,462                     | 159                                | 12               |
| 13        | Himachal Pradesh  | 48412                  | 68,64,602                       | 142                                | 13               |
| 14        | Uttarakhand       | 73174                  | 1,00,86,292                     | 138                                | 14               |
| 15        | Andhra Pradesh    | 642422                 | 8,45,80,777                     | 132                                | 15               |
| 16        | Jammu & Kashmir   | 97414                  | 1,25,41,302                     | 129                                | 16               |
| 17        | Tamilnadu         | 574640                 | 7,21,47,030                     | 126                                | 17               |
| 18        | Gujarat           | 528446                 | 6,04,39,692                     | 114                                | 18               |
| 19        | West Bengal       | 807097                 | 9,12,76,115                     | 113                                | 19               |
| 20        | Daman & Diu       | 536                    | 52,076                          | 97                                 | 20               |
| 21        | Rajasthan         | 815070                 | 6,85,48,437                     | 84                                 | 21               |
| 22        | Kerala            | 423456                 | 3,34,06,061                     | 79                                 | 22               |
| 23        | Telangana         | 458289                 | 3,51,93,978                     | 77                                 | 23               |
| 24        | Karnataka         | 941801                 | 6,10,95,297                     | 65                                 | 24               |
| 25        | Goa               | 22974                  | 14,58,545                       | 63                                 | 25               |
| 26        | Tripura           | 59156                  | 36,73,917                       | 62                                 | 26               |
| 27        | Madhya Pradesh    | 1445368                | 7,26,26,809                     | 50                                 | 27               |
| 28        | Jharkhand         | 819638                 | 3,29,88,134                     | 40                                 | 28               |
| 29        | Lakshadweep       | 1612                   | 64,473                          | 40                                 | 29               |
| 30        | Chhattisgarh      | 804332                 | 2,55,45,198                     | 32                                 | 30               |
| 31        | Odisha            | 1483349                | 4,19,84,218                     | 28                                 | 31               |



# Lightning Days 01 April 2019 to 31 March 2020



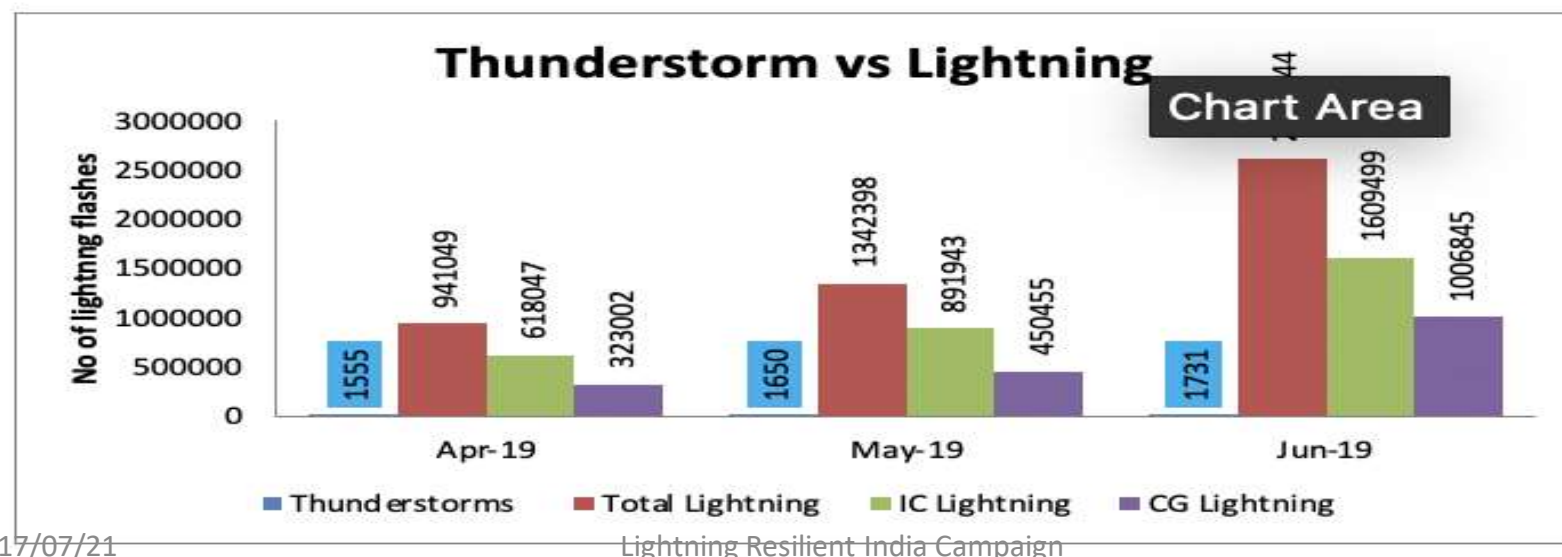
**Figure 5: Monthly lightning days 01 Apr 2019 to 31 March 2020**

There has been significant rise in number of lightning days across India, every month progressively. September witnessed highest lightning days, especially in the later half due to turbulent onset of monsoon. There has been constant lightning almost every day in one or the other parts of country. Madhya Pradesh and Central India along with Odisha and western Karnataka, Jharkhand, West Bengal remained have so far been most lightning active states. Ideally, location specific mapping of lightning days would figure out the trend for which states can approach CROPC separately with their specific requirements.

# Thunderstorm vs Lightning

| Ser          | Month      | Number of Thunderstorms observed | Total Lightning strikes in                                          | Inter Cloud Lightning | Cloud to ground lightning |
|--------------|------------|----------------------------------|---------------------------------------------------------------------|-----------------------|---------------------------|
| 1            | March 2019 | 403                              | Not available as lightning forecast started by IMD on 01 April 2020 |                       |                           |
| 2            | April 2019 | 1555                             | 941049                                                              | 618047                | 323002                    |
| 3            | May 2019   | 1650                             | 1342398                                                             | 891943                | 450455                    |
| 4            | June 2019  | 1731                             | 2616344                                                             | 1609499               | 1006845                   |
| <b>Total</b> |            | <b>5339</b>                      | <b>4899791</b>                                                      | <b>3119489</b>        | <b>1780302</b>            |

The relation between the number of thunderstorms vis a vis occurrence of lightning has been depicted below:-





# Mid Monsoon 2019 Lightning Report

## East to North East – the lightning road

Eight states of North East comprising of Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim –the 2.4% of geographical area of India with 3.86% of national population falls in the most hot lightning rod zone. Our research reveals that it originates from Chotanagpur Plateau – the confluence of Odisha, West Bengal and Jharkhand ; extend through Bangladesh to Patkai plateau of Meghalaya affecting other North eastern states. This corroborates the study done by Prof. Sanjay Sharma and his team of Kohima Science College, Kohima presented at NESAC , Shillong on 22 June 2019 during Lightning Resilient India Campaign in North East.

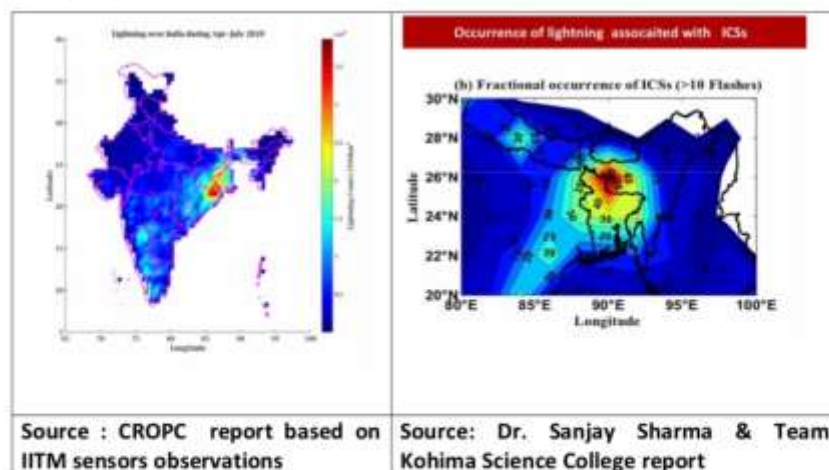
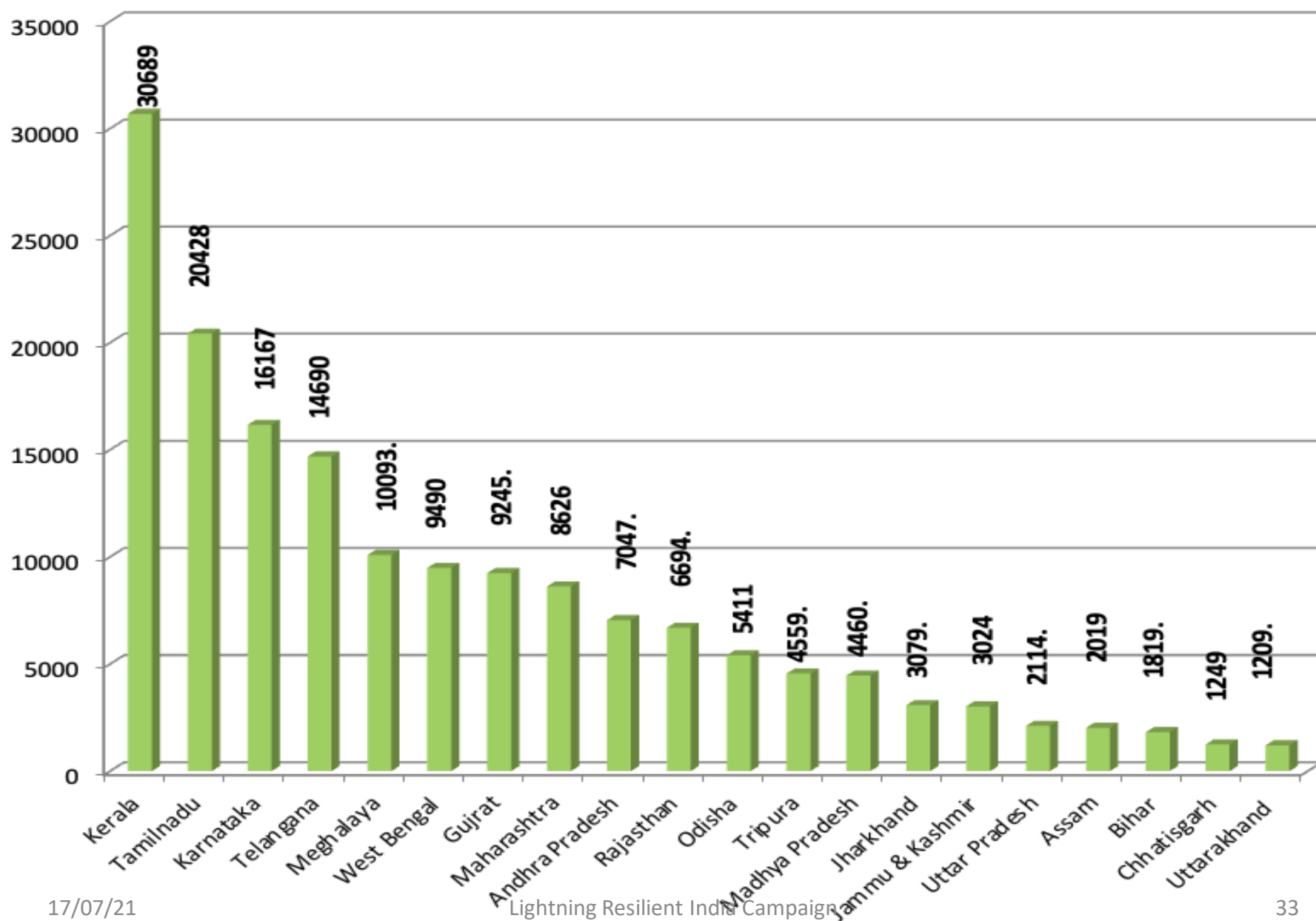


Figure 5: Lightning hotspots comparative analysis

# Lightning Resilience strikes vs. Kill Ratio

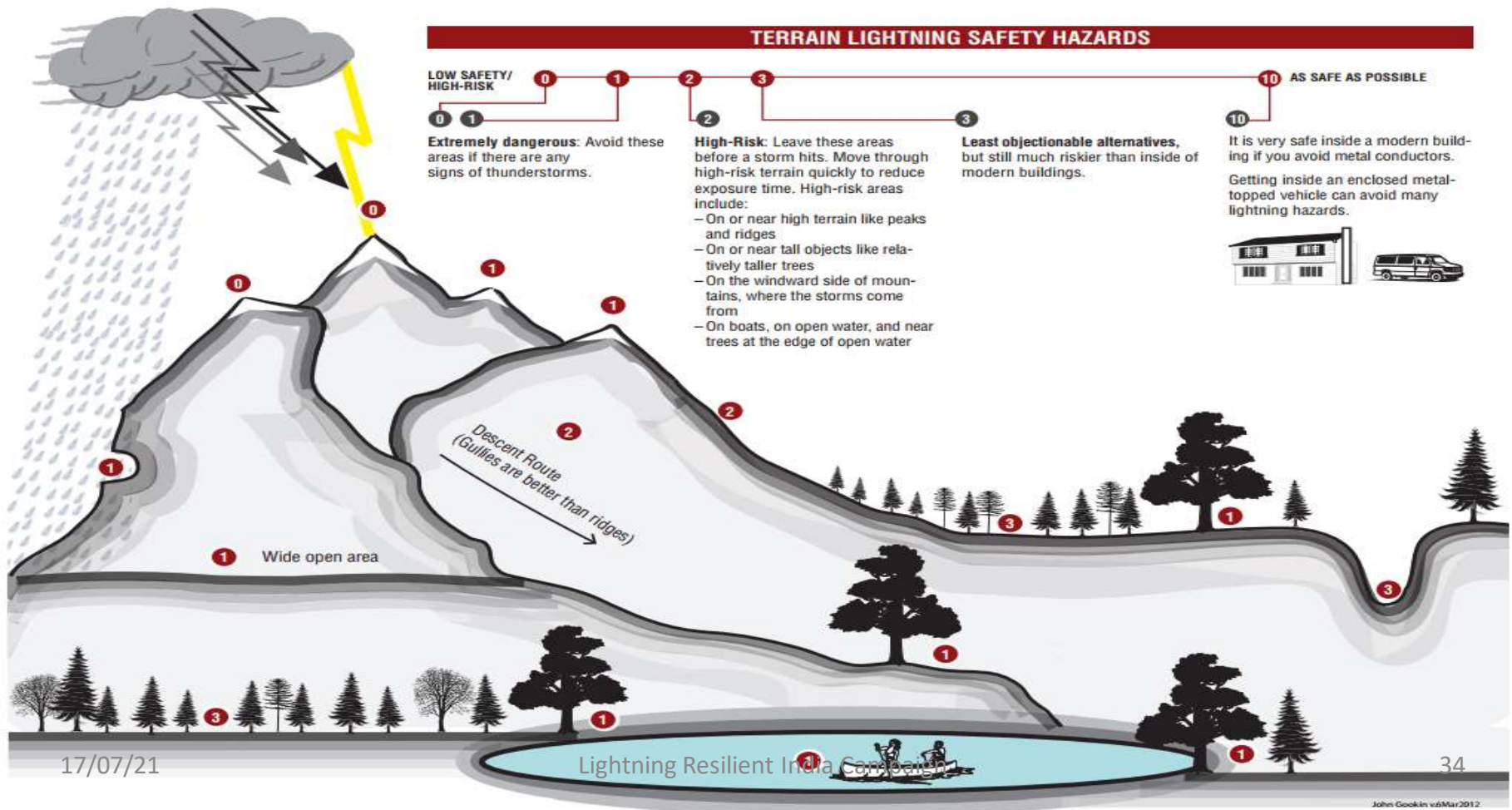


# Geography of occurrence

## Backcountry Lightning Risk Management

### BACKCOUNTRY LIGHTNING RISK MANAGEMENT

No place outdoors is safe from lightning. Lightning is an objective hazard. Your behavior can reduce the risk of that hazard harming you.





# Backcountry Management of Lightning Risk



## REDUCING LIGHTNING RISK IN THE BACKCOUNTRY

Backcountry settings are at least a 30-minute walk from the nearest vehicles or modern buildings, where you can easily find safe shelter. There are four actions that can reduce your lightning risk in the backcountry, but none of them can make you as safe as getting in a modern building or a metal-topped vehicle. These actions are listed in order, and each is roughly twice as important as the next.

### 1. TIME YOUR VISITS TO HIGH-RISK AREAS WITH LOCAL WEATHER PATTERNS.

Timing activities with safe weather requires knowledge of both typical and recent local weather patterns. There is no such thing as a surprise or flash storm. You must get turnaround times that will get you off of exposed terrain before storms arrive. You need to observe the changing weather and discuss the status with your group. If you have logistical delays, you may need to change your plan rather than ascending a peak or crossing open ground during a thunderstorm. Begin your turnaround if you hear thunder (which means lightning is less than 10 miles away).

### 2. FIND SAFER TERRAIN IF YOU HEAR THUNDER.

**SAFER TERRAIN** in the backcountry can decrease your chances of being struck. Lightning tends to hit high points and the surrounding terrain. Avoid peaks, ridges, and significantly higher ground during an electrical storm. If you have a choice, descend a mountain on the side that has no clouds over it, since strikes tend to be less frequent on that side until the clouds move over it. Once you get down to low, rolling terrain, strikes are so random you shouldn't worry about terrain as much. Move to safer terrain as soon as you hear thunder, not when the storm is upon you.

**Select tent sites** that may reduce your chances of being struck or injured by ground current. If you are in a tent, stay away from the tent's perimeter, as it is best to be in the center of the tent. Lying flat increases the risk of injury by ground current.

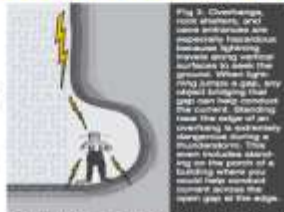
If your tent is in a more dangerous location, such as on a ridge, in a broad open area, or near a tall tree, you should exit the tent and get to safer terrain before the storm arrives, and stay there until it has passed.

In gently rolling hills, lower flat areas are not safer than the higher flat areas because none of the gentle terrain attracts leaders. Strikes are random in this terrain. Look for a dry ravine or other significant depression to reduce risk. The flash-ringing ranging system measures how far away a thunderstorm is, but sometimes it is impossible to tell which flash is associated with which ring. The flash of light travels fast enough that it is virtually instantaneous. The sound travels a mile every five seconds (1/5 sec) so identify you just count the number of seconds between the obvious flash and the obvious bang, and divide by five to determine how many miles away the storm is. Divide the time by three to see how many kilometers distant the storm is. Do not shake your life on the reliability of this ranging system.

### 3. AVOID TREES AND LONG CONDUCTORS ONCE LIGHTNING GETS CLOSE.

**Wide open ground** offers high exposure to lightning. Avoid trees and bushes that rise above others, since the highest objects tend to generate upward leaders. Your best bet is to look for an obvious ravine or depression below the storm hits, then spread out your group at 20 foot (7m) intervals to reduce the risk of multiple injuries. Assume the lightning position.

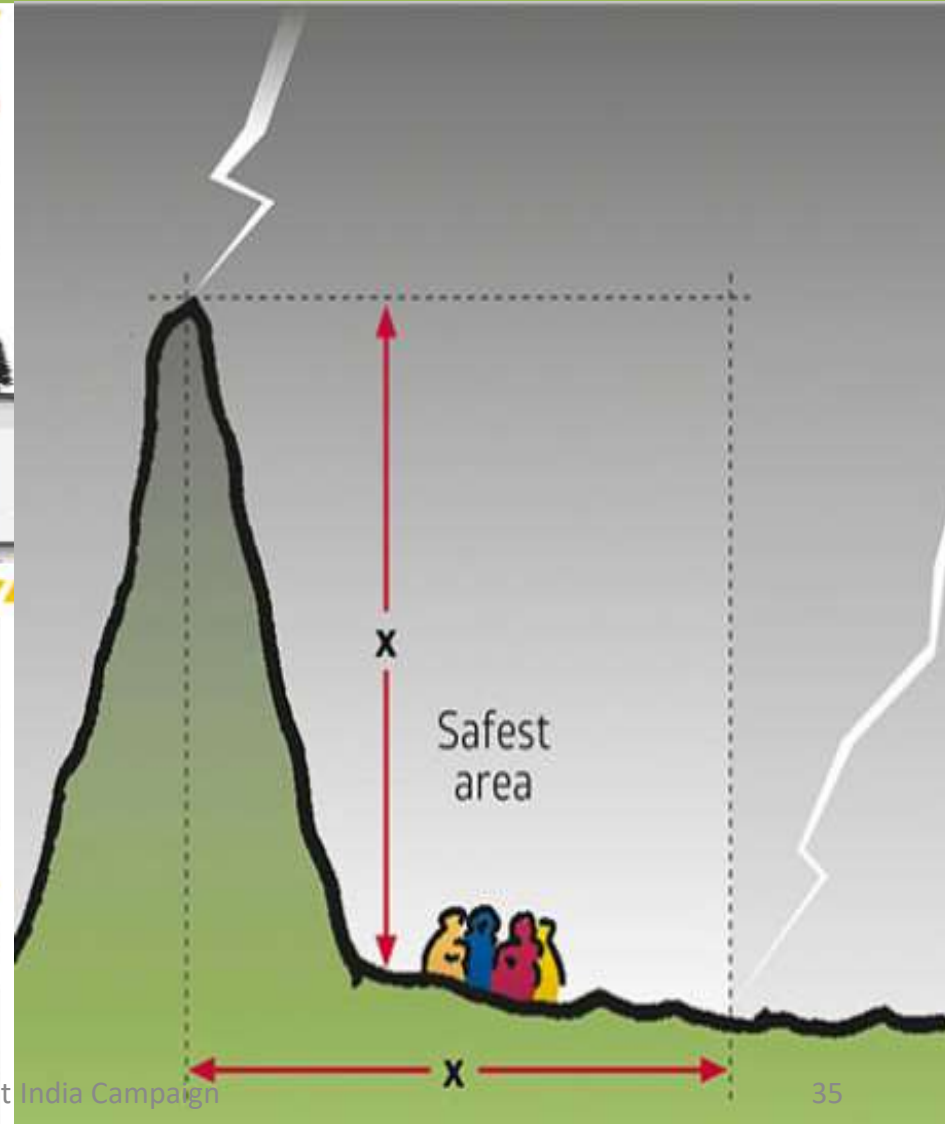
**Cavities** (Fig. 3) should avoid cave entrances during thunderstorms. Small overhangs can allow air to cross the gap, feature caves that go far into the ground can be struck, either via the entrance or through the ground. People have been shocked standing in water half a mile inside caves. If you are caving near an entrance during electrical activity, don't stand in water, avoid metal conduits like bellows, cables, and cables, and avoid bringing the gap between ceiling and floor.



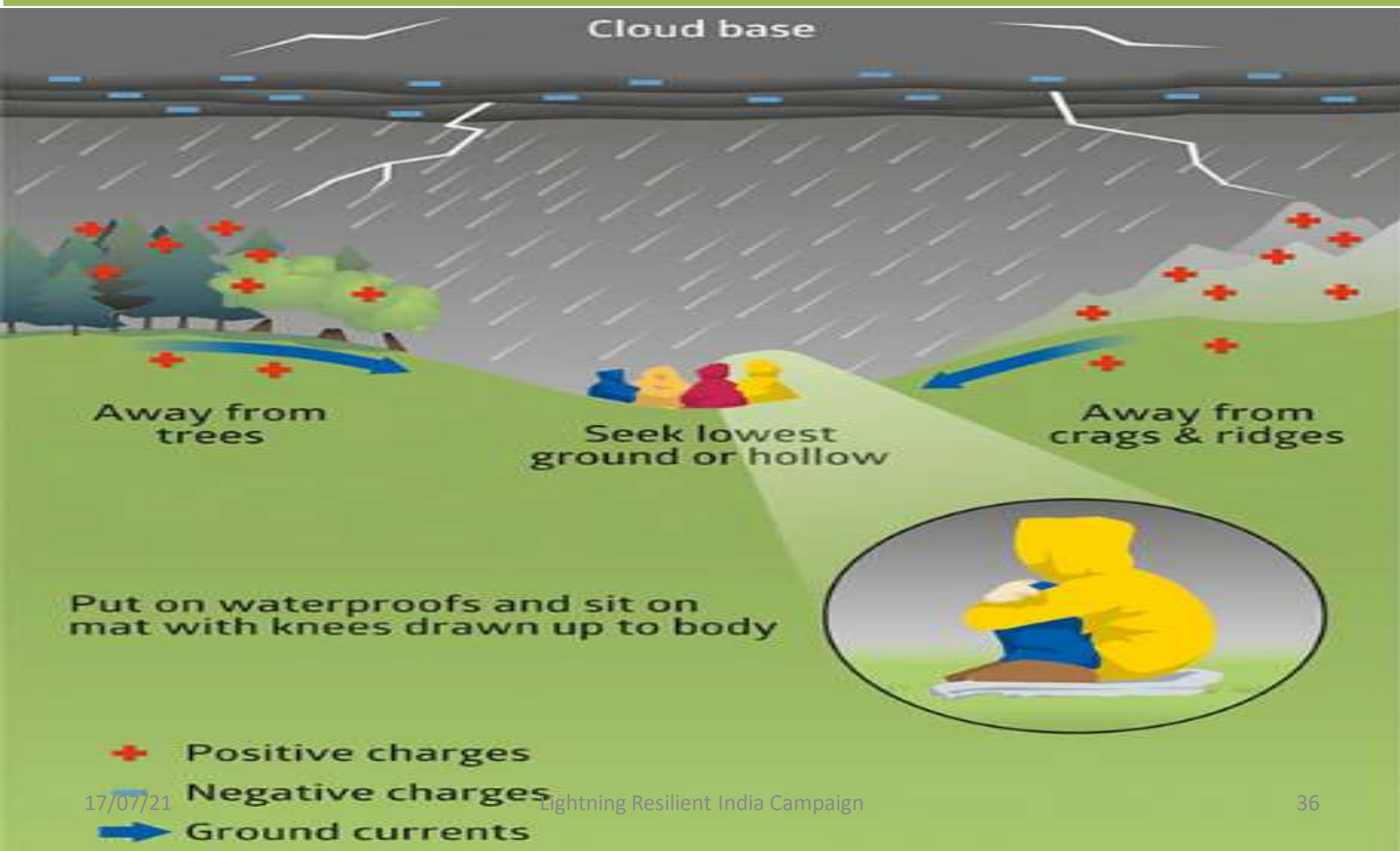
Boaters need to start getting off the water long before a storm arrives. Avoid tall trees near the edge of the water.

### 4. GET IN THE LIGHTNING POSITION IF LIGHTNING IS STRIKING NEARBY AND YOU CAN'T GET TO SAFER TERRAIN.

The lightning position (Fig. 4) is for walking out storms in stationary situations when it is impractical to move to a safer location. It is important to reduce your overall footprint on the ground (Fig. 5).



# Lightning Safe areas







# Lightning origins – Highlights



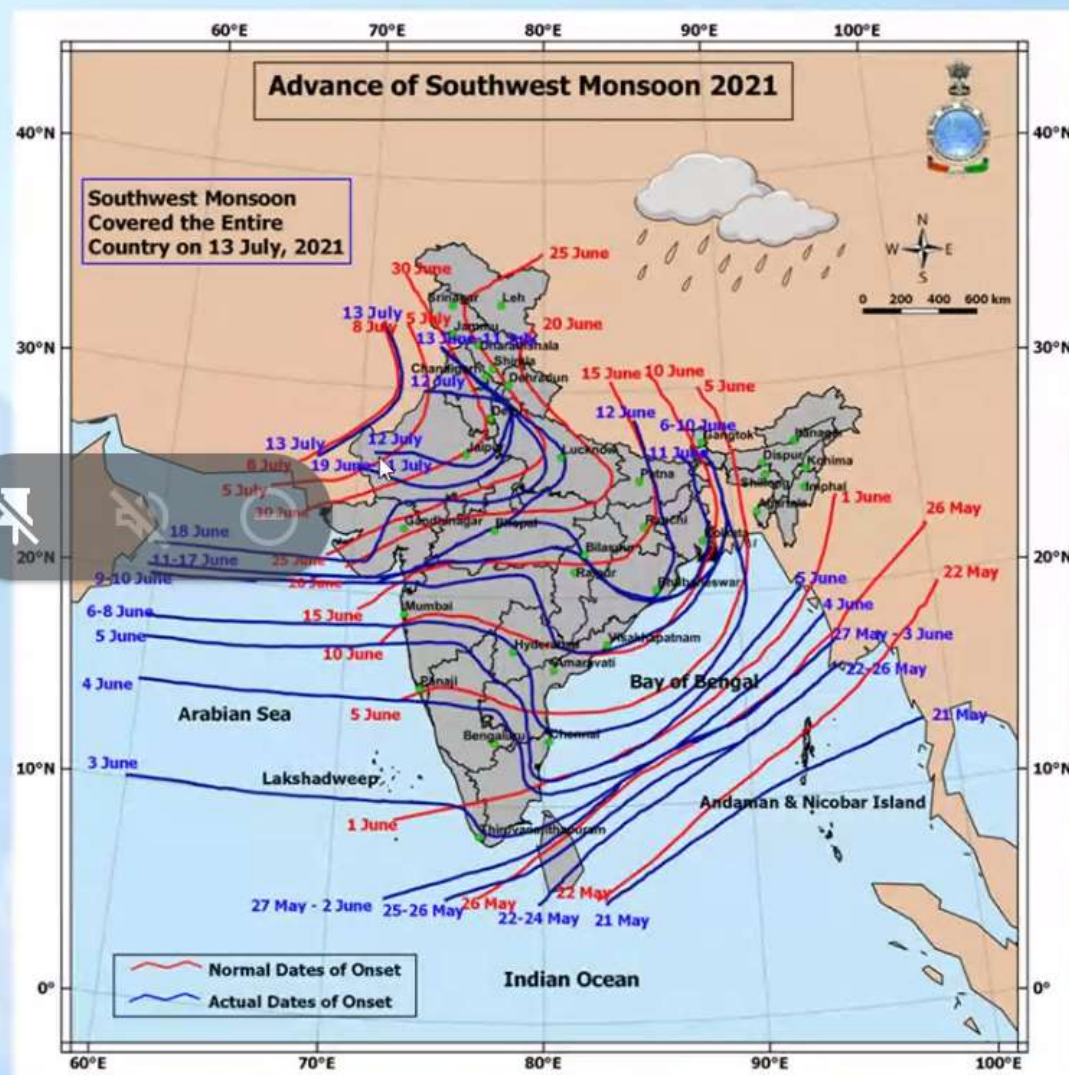
# ONSET OF MONSOON 2021

**ONSET : 18 JUNE from Kota  
Udaipur division**

**Stagnation of Monsoon  
around 22 days.**

**Monsoon revived in Jaipur,  
Bharatpur, Ajmer & Jodhpur  
division on 10-11 July.**

**It likely to cover entire state  
during next 24-48 hrs.**



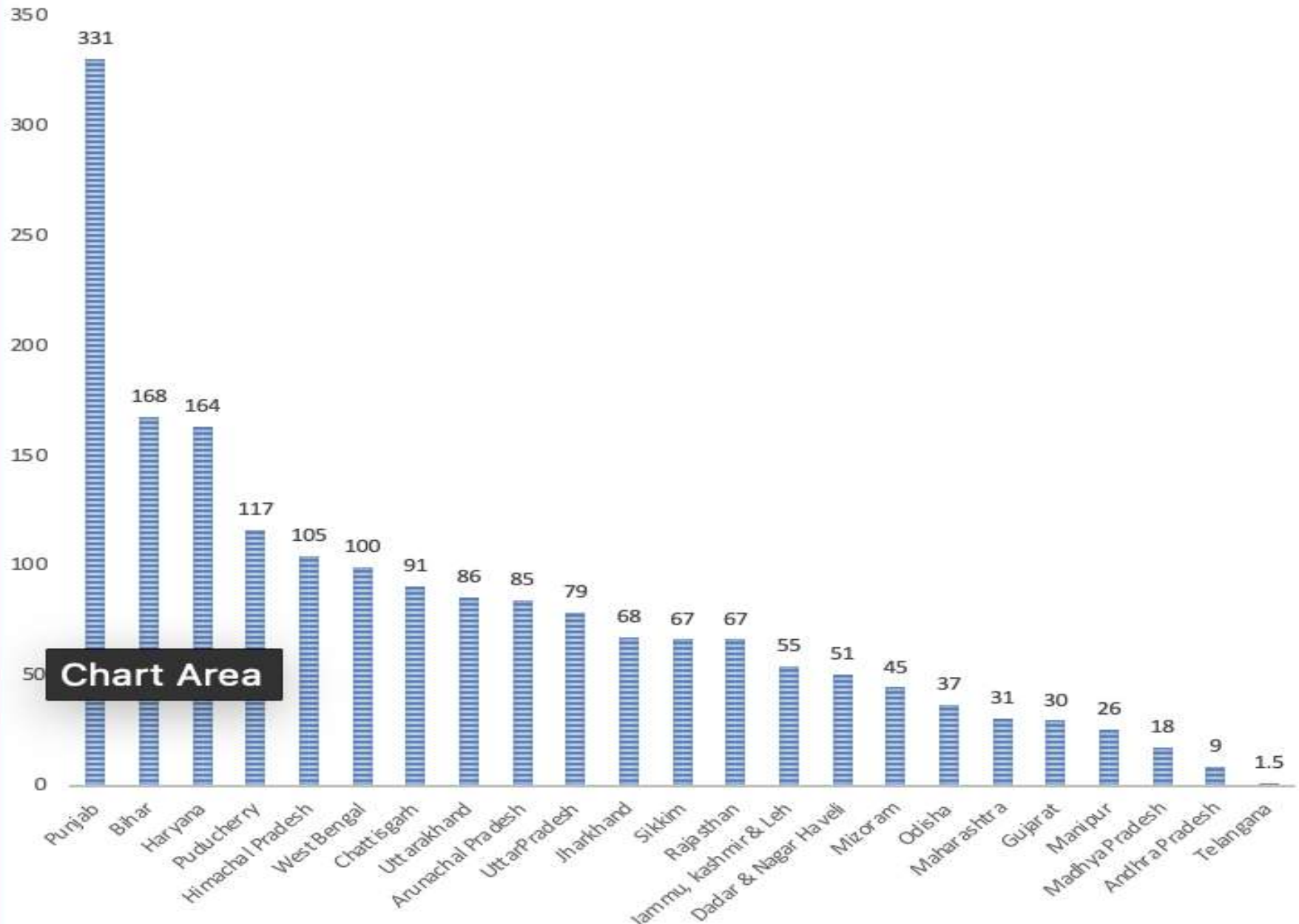
17/07/21

# Lightning and Climate Change – Lightning is promulgation of cumulative extremes of climate change

# Lightning and climate change

- 1 degree C rise in temperature increases lightning 12 times
- Annual Lightning Report 2020-2021 shows 34% rise in lightning.
- States like Punjab 331%, West Bengal 100%
- Many states recorded less lightning
- Final comment by 2024 after 5 years study on climatology of lightning

## PERCENTAGE INCREASE IN LIGHTNING STRIKES

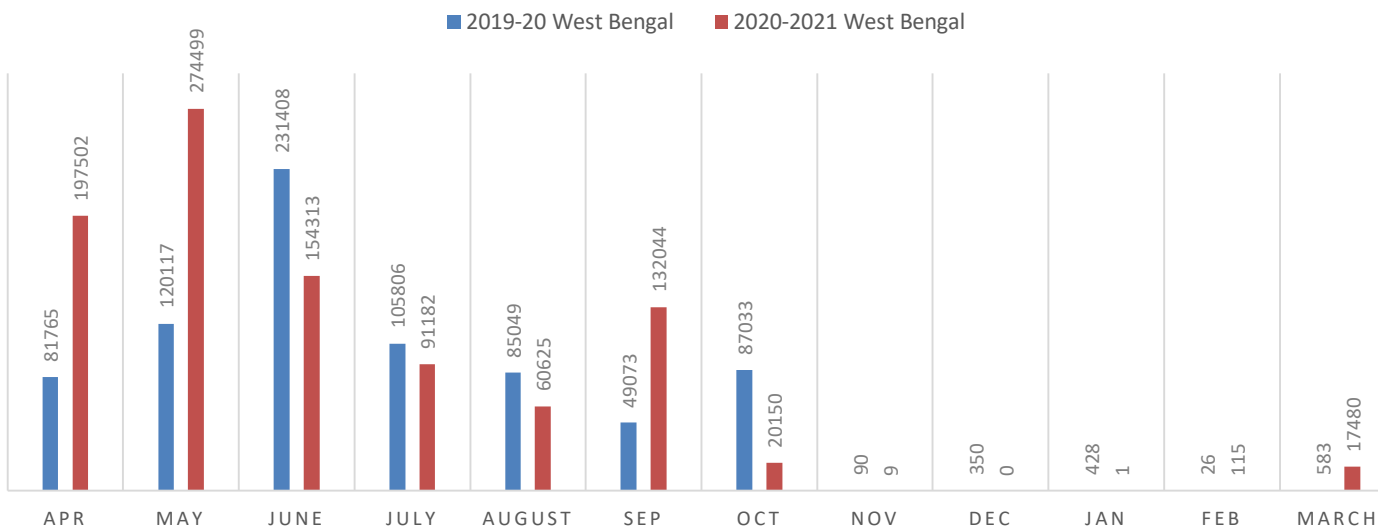






# Comparison of Lightning Strikes Flashes in West Bengal between 2019-20 & 2020-2021

## COMPARISON LIGHTNING STRIKES IN 2019-20 TO 2020-2021



Increase —  
99.78%

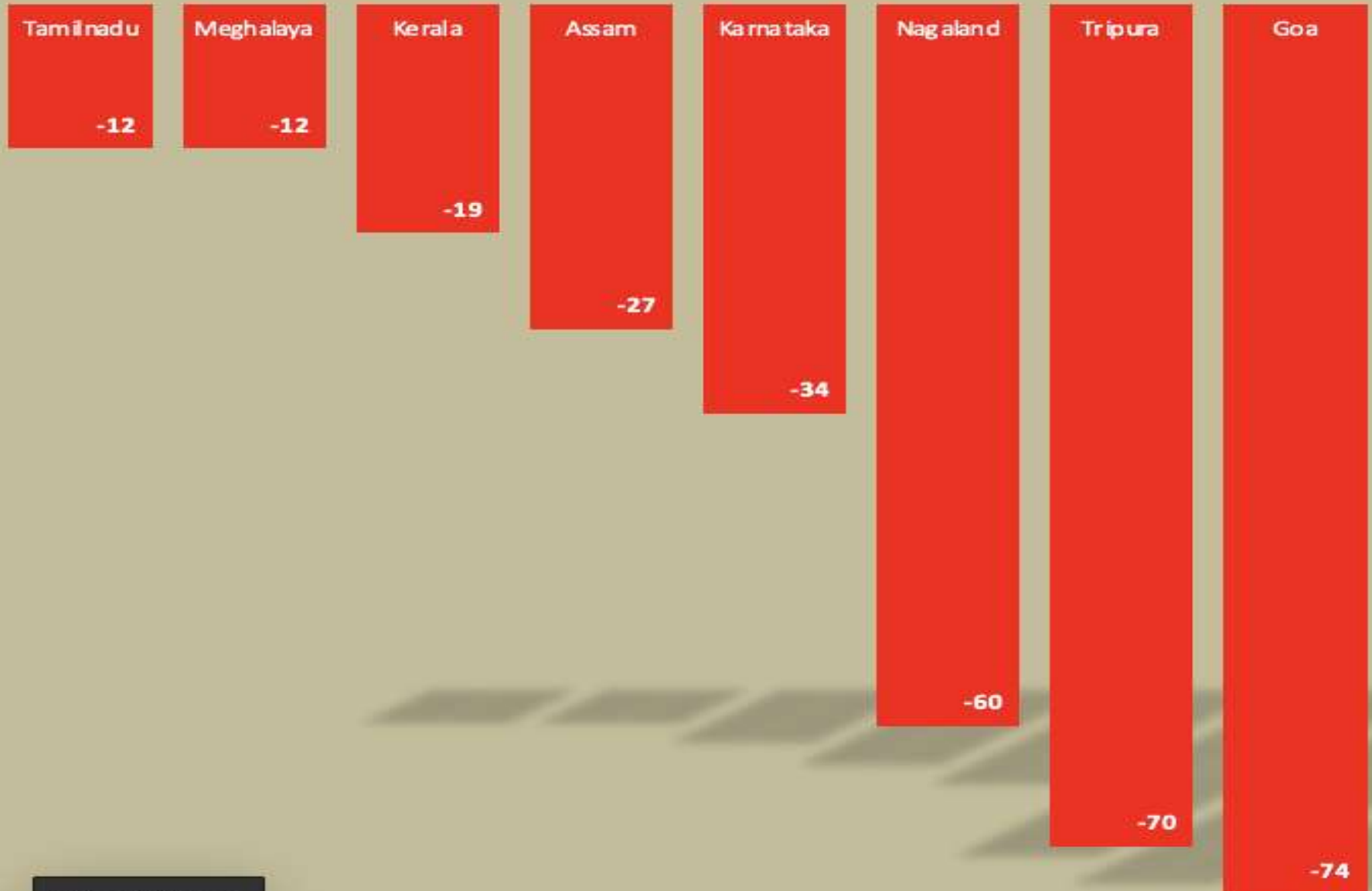
76172  
8

2019-20

15217  
86

2020-2021

## Percentage decrease in Lightning

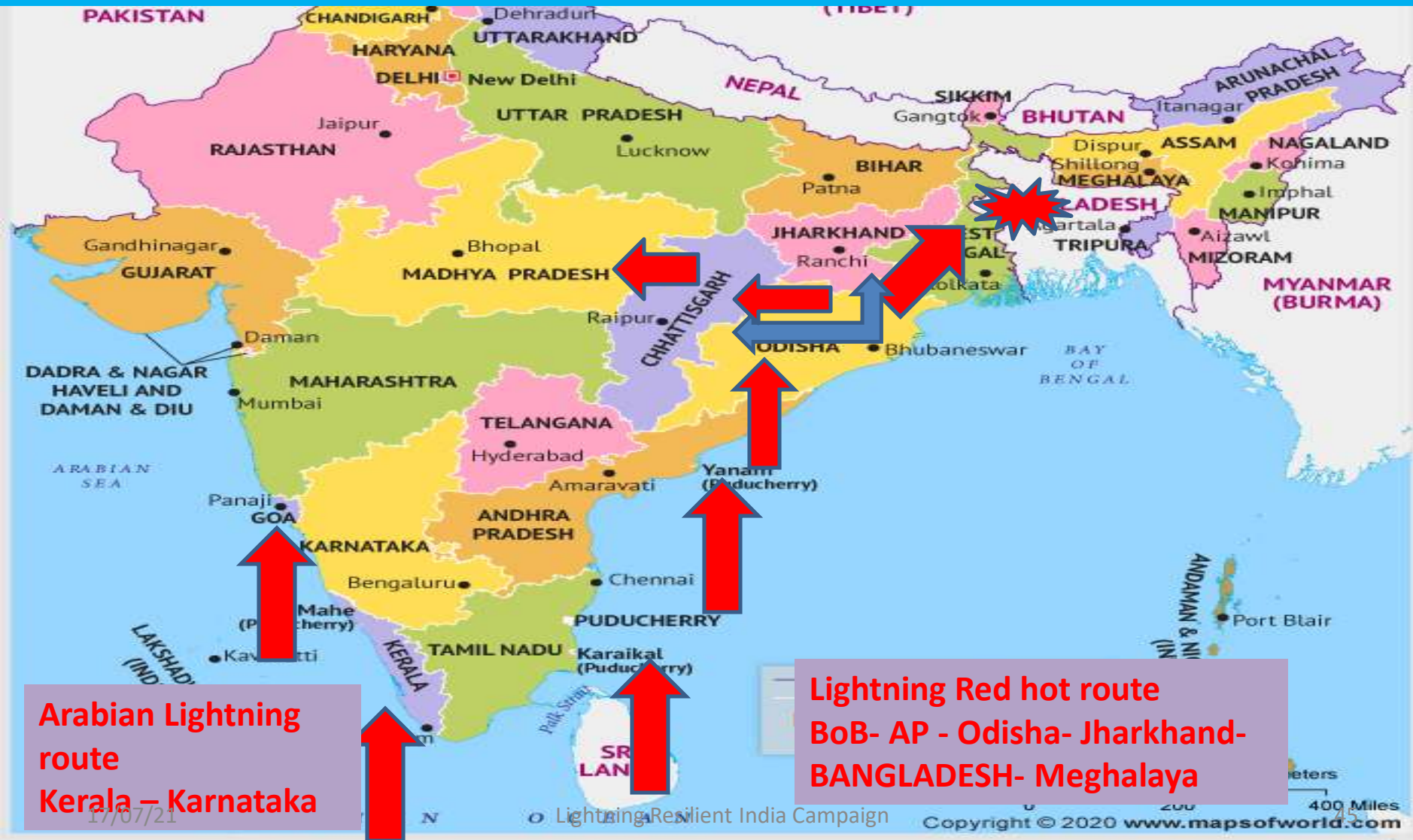


**Plot Area**

# Odisha- North East- Hotrod Zone

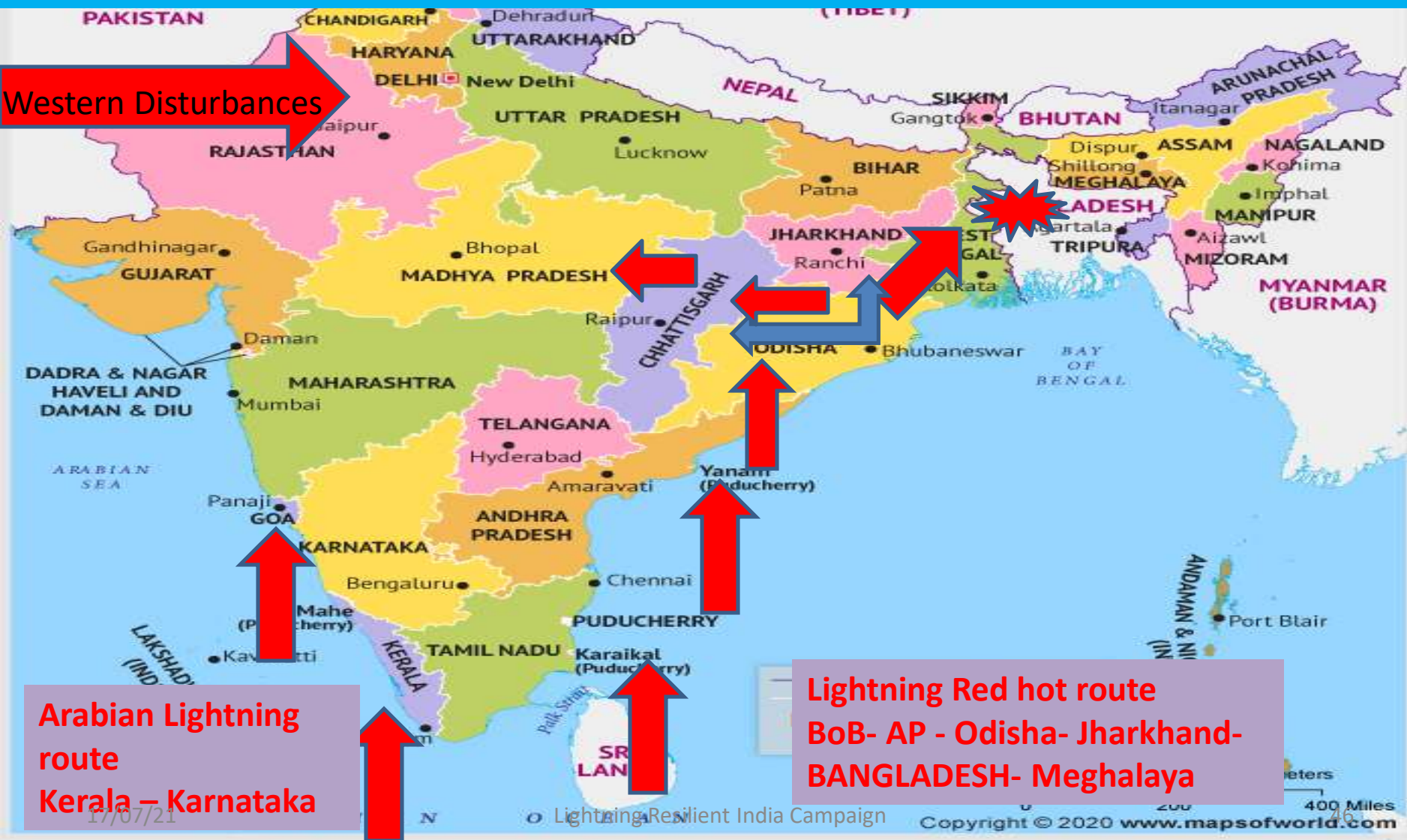


# Bay of Bengal & Arabian Sea - Lightning Routes



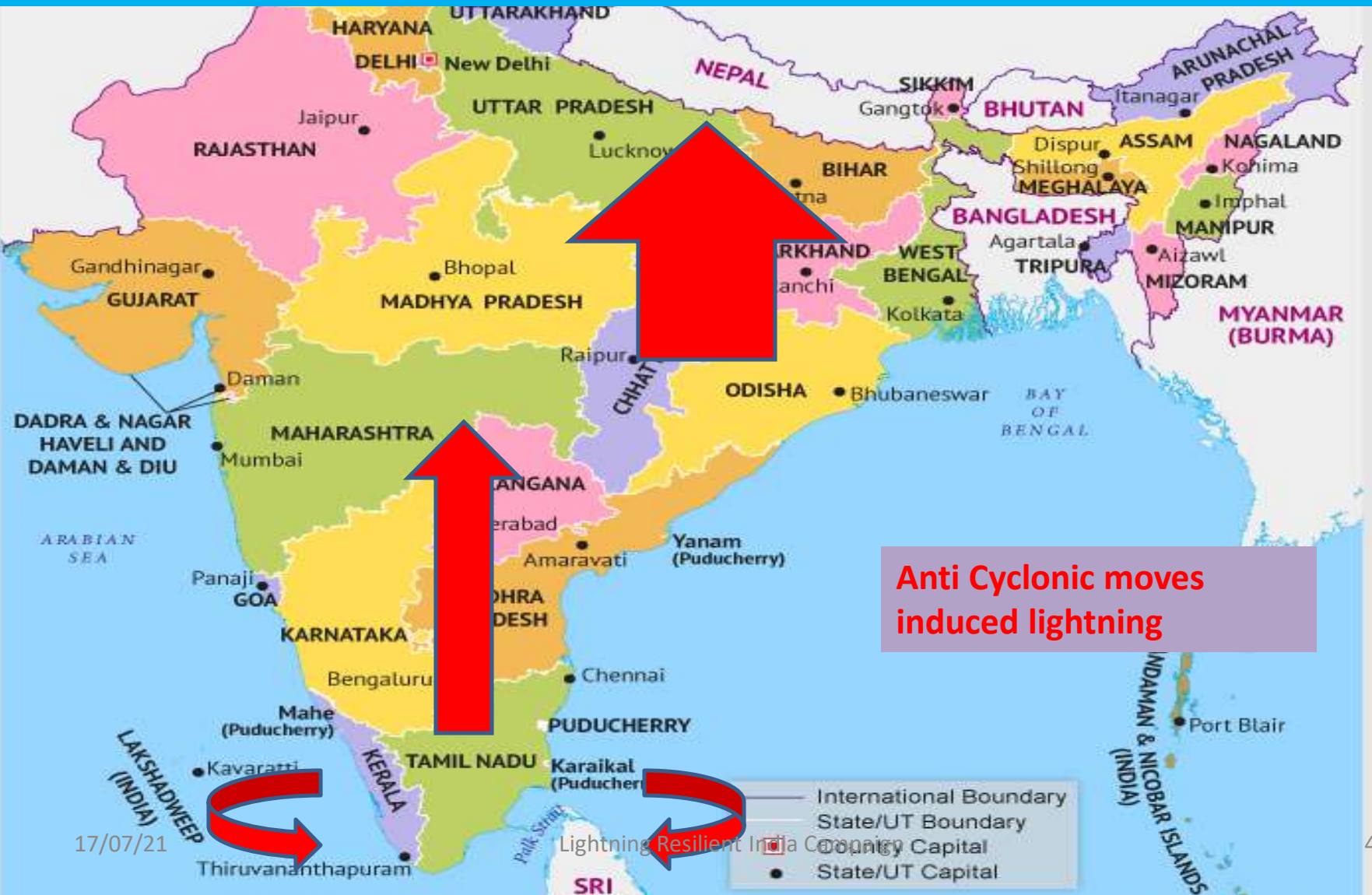


# Western Disturbance induced Bay of Bengal & Arabian Sea - Lightning Routes

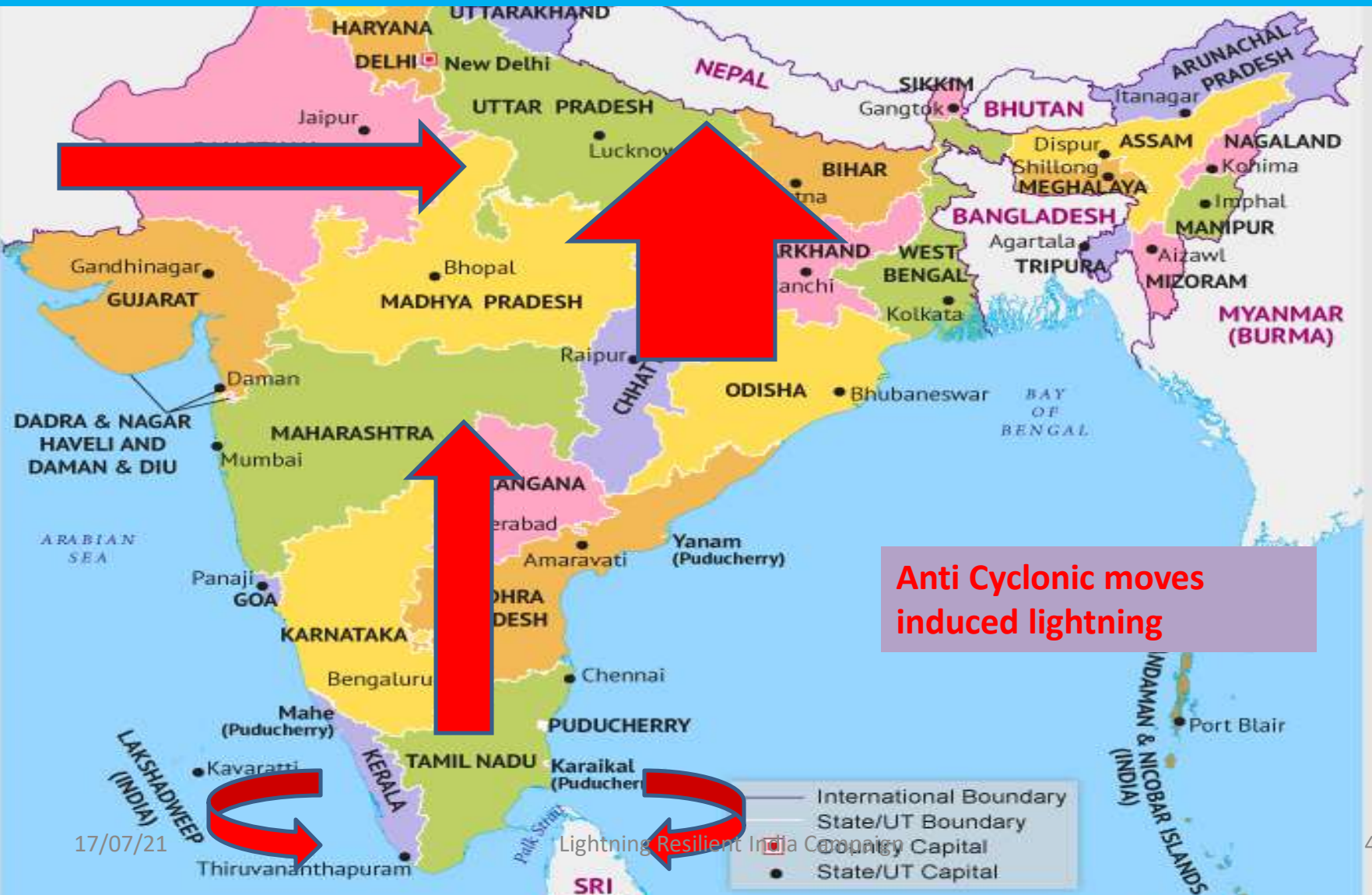




# Anti cyclonic lightning trends



# Western Disturbance - Anti cyclonic lightning trends



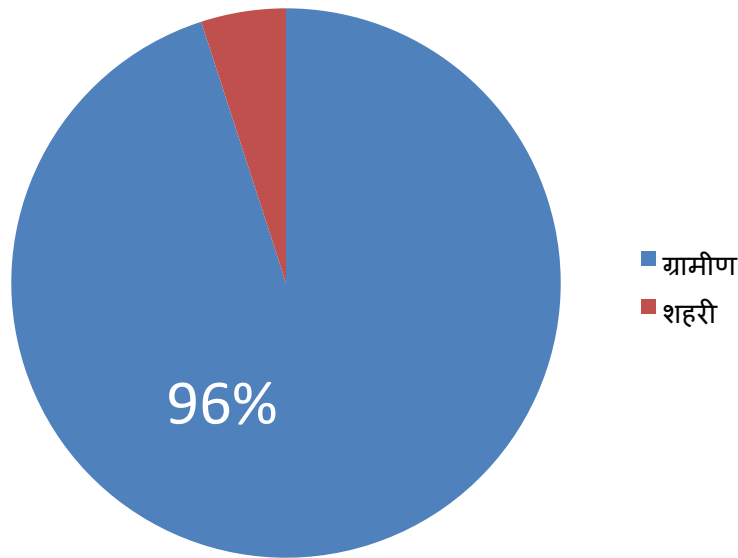




# Lightning Victims ? > ?

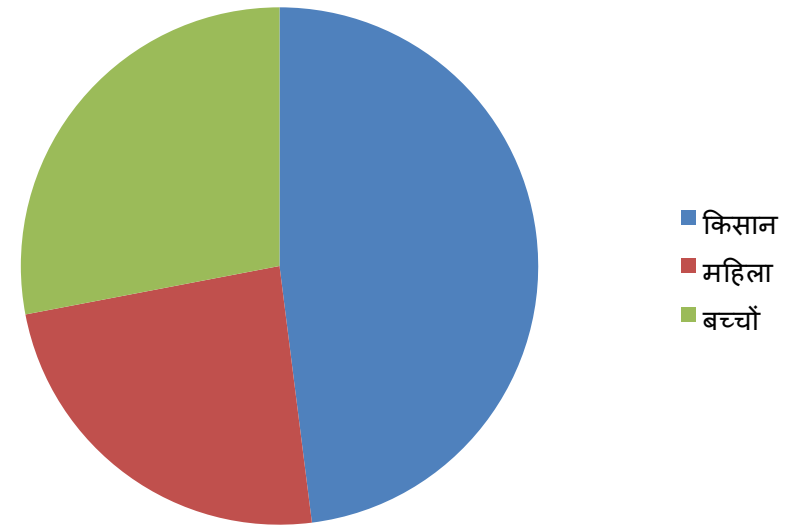
# Annual Lightning Report 2019-2020

## Lightning deaths Category wise



Urban 4 %

Rural 96%

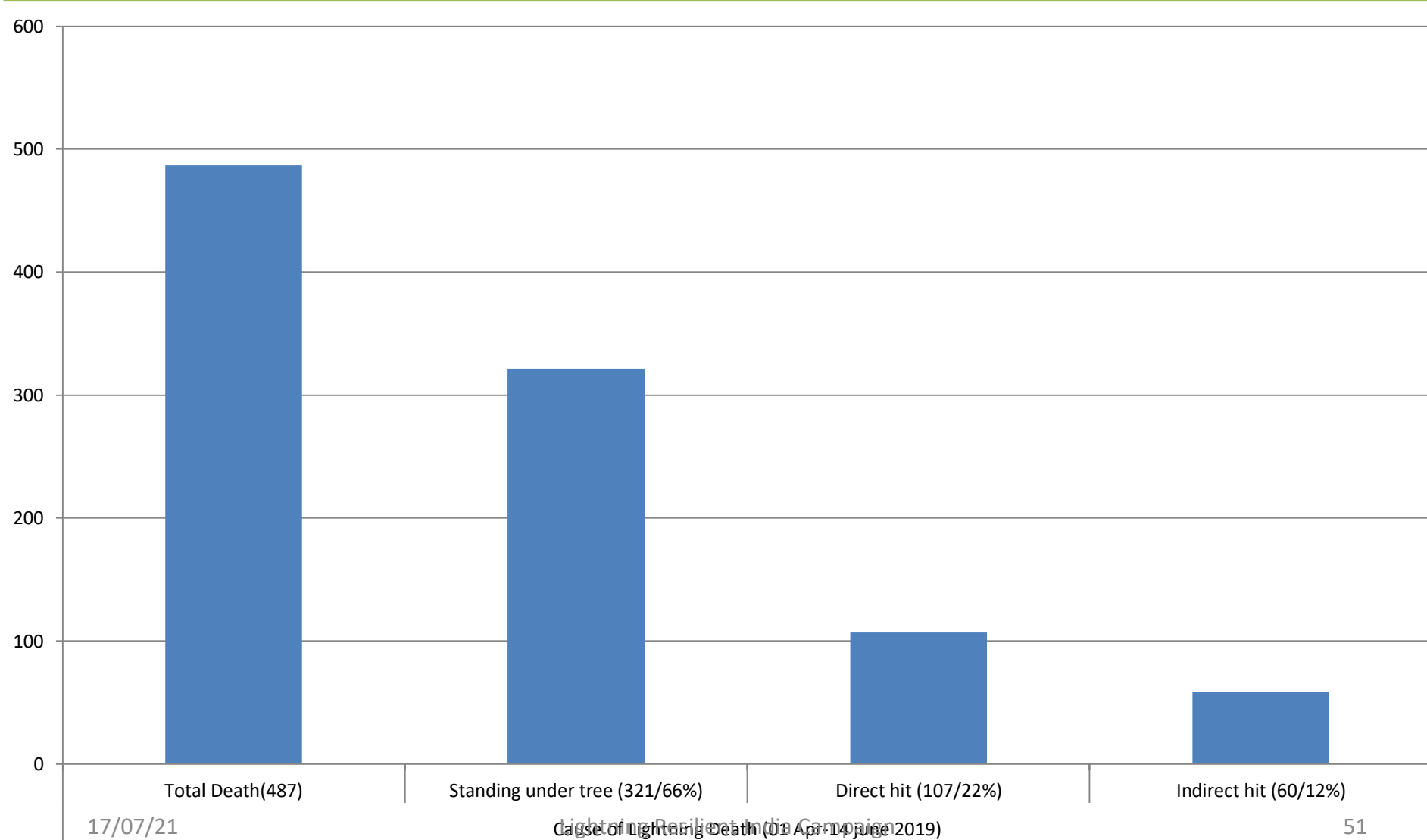


Farmer 70 %

Women 34%

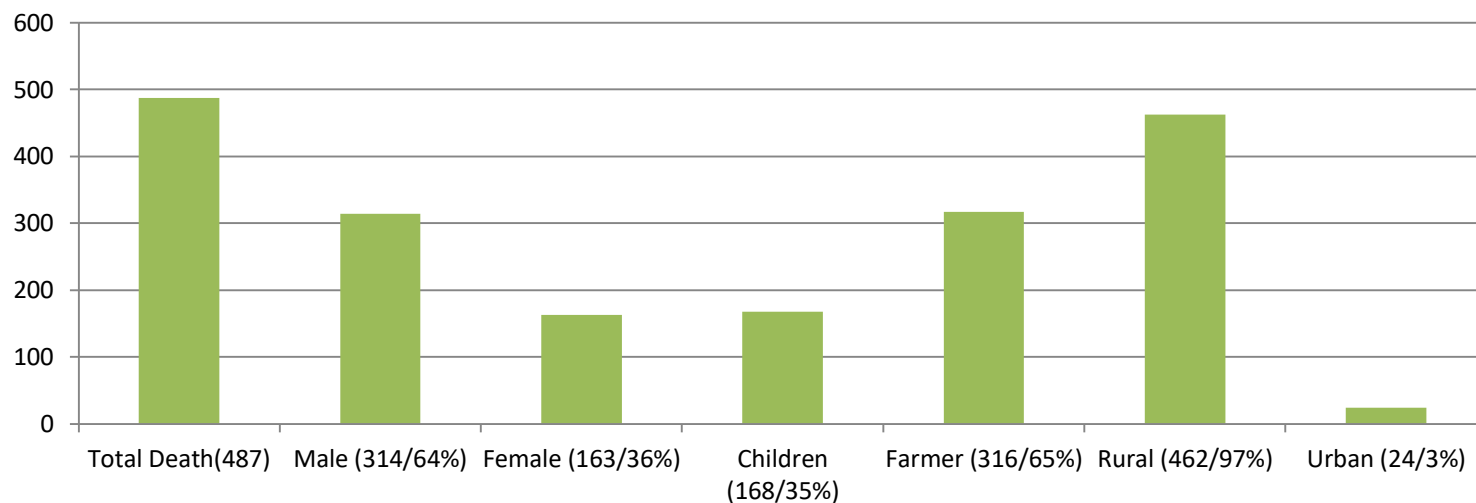
Children 35%

# Cause of deaths :Lightning Deaths





# Lightning Deaths Category wise



Urban 3 %

Rural 97%

Farmer 65 %

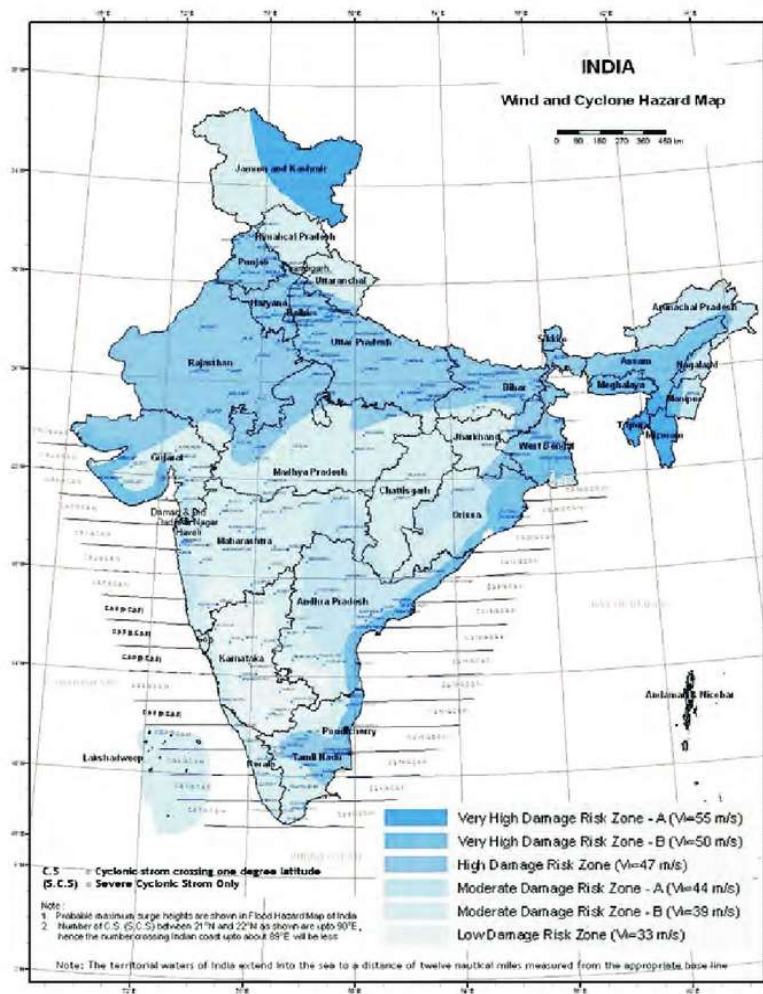
Women 34%

Children 35%

# Lightning impact over child's mental health : article in Readers Digest June 2020

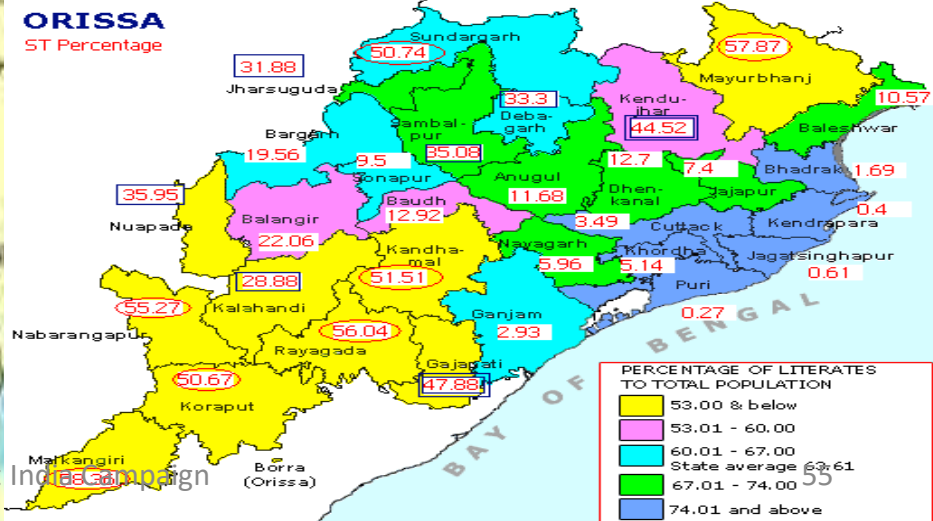
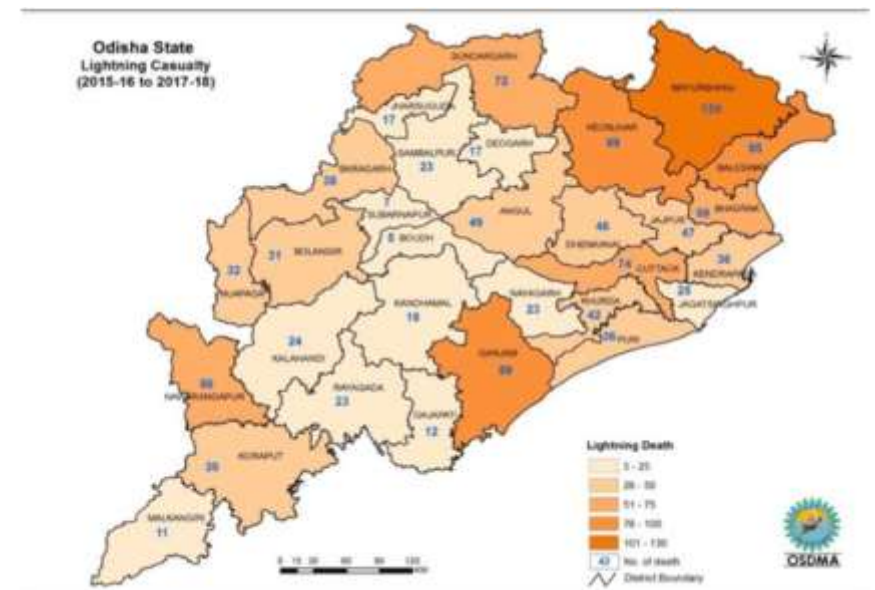


# Lightning Vs Tribal Relationship





# Lightning Deaths Max in Tribal areas





# Lightning Deaths of Animals

**NEWS CLICK** INTERACTIVE EDUCATION APP  
POLITICS INDIA

## Uttar Pradesh: Cows Continue Dying At State Run Shelters Due to Rain And Lightning

Following the escalating number of cow deaths, CM Adityanath suspends eight officials.

NewsClick Report 15 Jul 2019



Representational Image. Image Courtesy: IANS

## आकाशीय बिजली गिरने से 250 से अधिक भेड़ बकरियों की मौत

**पुरोला।** प्रखंड पुरोला के दूरस्थ गांव शिकार में गुरुवार देर रात आकाशीय बिजली गिरने से शिकार व इकट्ठा गांव में 250 से भी अधिक भेड़ बकरियों की मौत हो गयी। गांव वालों ने घटना की सूचना तहसील प्रशासन को दे दी है। तहसील प्रशासन ने घटना में हुए नुकसान का जायजा लेने के लिए राजस्व टीम घटनास्थल के लिए भेज दी है।

गुरुवार देर रात शिकार गांव से कुछ ही दूरी पर मोर पाव नामे गोक में अत्यधिक वर्षा के साथ आकाशीय बिजली गिरने से शिकार गांव व इकट्ठा गांव के पूरा चन्द, दीवान सिंह, उपेन्द्र सिंह, देवेंद्र सिंह, चीन सिंह, जयेंद्र सिंह, इकट्ठा के बिनोद शर्मा, बंदेली के विजयपाल सजवान अदि की 250 से अधिक भेड़-बकरियों की मौत हो गयी। गांव के दीवान सिंह ने बताया की अत्यधिक वर्षा होने पर उन्होंने सभी भेड़-बकरियों को पेड़ों के नीचे इकट्ठा कर लिया था। रात को करीब दो बजे तेज गर्जना के

साथ बिजली गिरी और उनको सैकड़ों बकरियां काल के गाल में समा गई। ग्रामीण प्रताप सिंह रावल व मनमोहन रावा ने प्रशासन से भेड़ पालकों को मुआवजा देने की मांग की है। तहसीलदार जेएस नेगी ने बताया की नुकसान का जायजा लेने के लिए राजस्व उपनिरीक्षक को घटनास्थल के लिए भेज दिया गया है। रिपोर्ट आते ही कार्रवाई की जायेगी।

**पैदल मार्ग शक्तिशाली गोपेश्वर।** गुरुवार रात बारिश के कारण देवखाल से बिजुला तक के पैदल मार्ग बुरी तरह क्षतिग्रस्त हो गए हैं। अविर्गुष्ट के कारण भट्ठा गांव से गोगनाथानी के पैदल रास्ते, सिनवाई नहर, देवखाल से बिजुला तक के विभिन्न गांवों को जोड़ने वाले जिला पंचायत के पैदल सड़क मार्ग बुरी तरह भस्म हो गए हैं। इसके साथ ही गांवों को पेयजल स्रोत तथा पेयजल लाइनें भी क्षतिग्रस्त होने से लोगों के सामने दिक्कतें आ खड़ी हो गई हैं।

## More than 200 sheep, goats killed after lightning strike in Ganderbal

By KR Web Desk on July 14, 2019 · Comments Off



0 Shares

4th Best University in FORBES

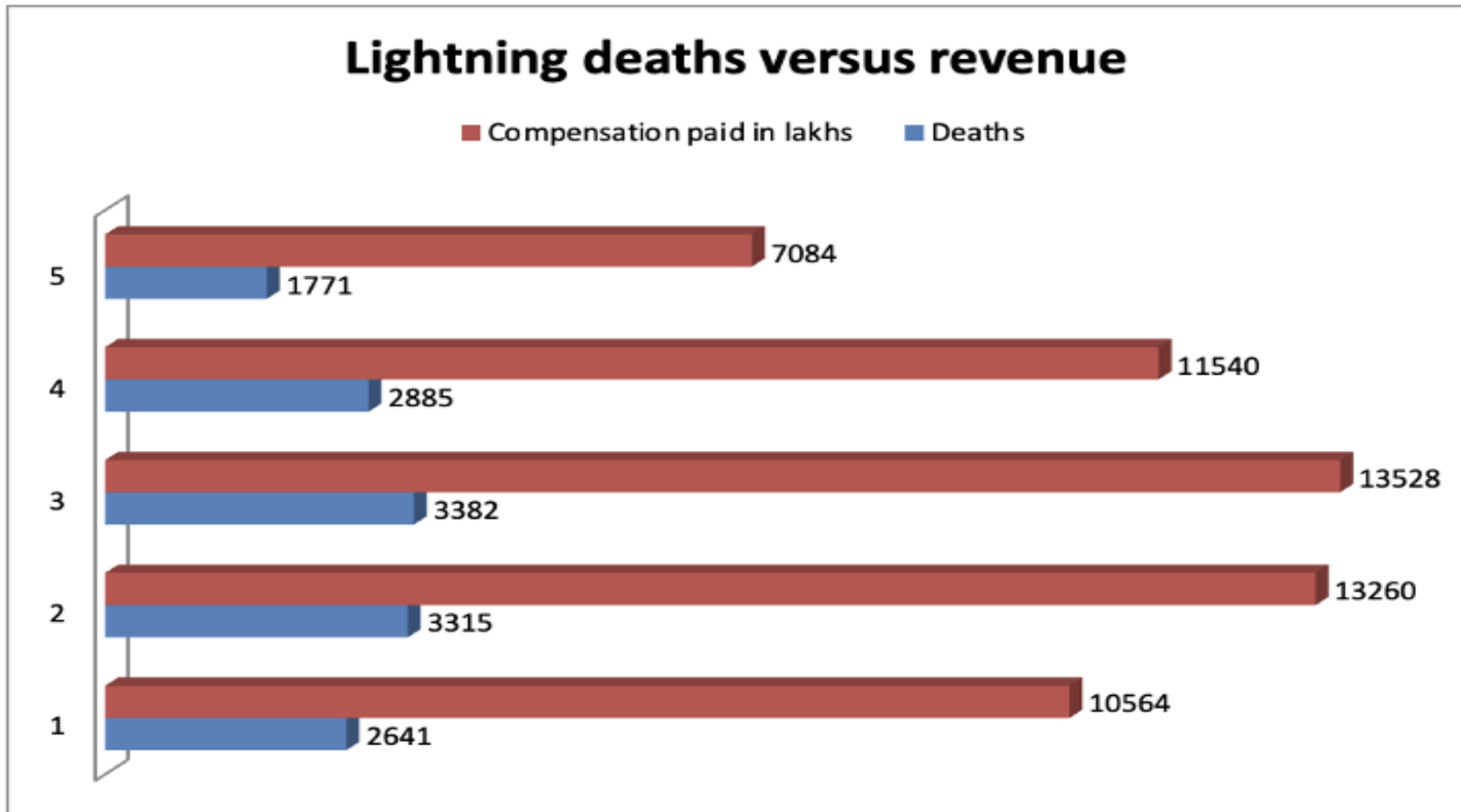
Offer Hassle-free Admission Procedure with No donation & No Entrance Exam OrSMU

OPEN

Srinagar: More than 220 sheep and goats were killed after lightning struck a pasture in upper reaches of Kangan area in Ganderbal district of central Kashmir, reports said.

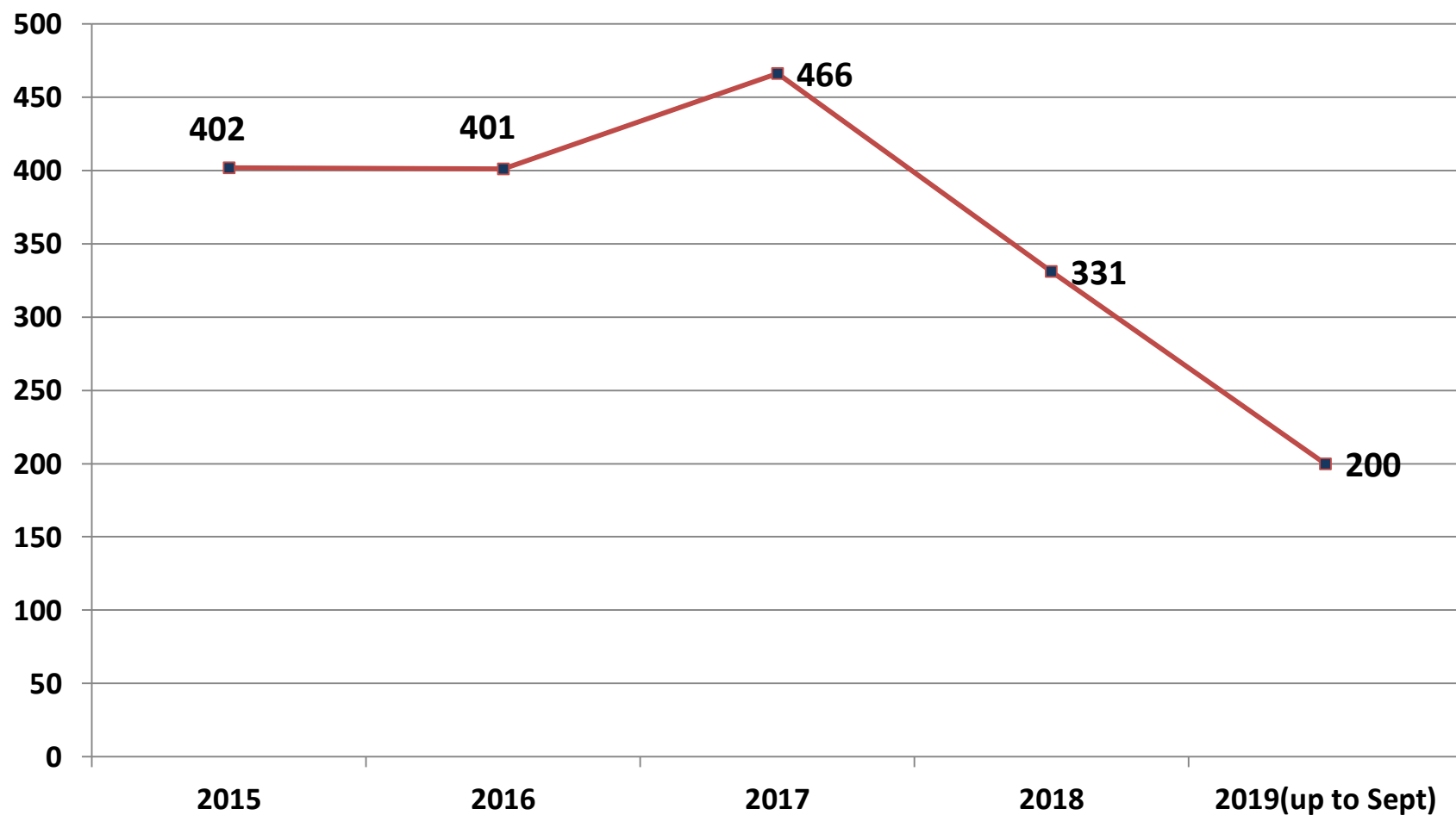


# Revenue Loss



# ODISHA : IMPACTS

## HUMAN CASUALTY



# Most Lightning Resilient State Award 2019





# Lightning Resilience Award 2019- Andhra Pradesh



| Year | Lightning Death |
|------|-----------------|
| 2018 | 138             |
| 2019 | 65              |

# Lightning deaths data

# States trend in reducing lightning deaths

## Green States

- Odisha
- Andhra Pradesh
- Nagaland
- Mizoram
- Jharkhand
- Maharashtra
- Assam
- West Bengal
- Kerala
- Karnataka
- Punjab

## Red states

- **Madhya Pradesh**
- Bihar
- Uttar Pradesh
- Chhattisgarh
- Tamilnadu
- Telangana
- Delhi
- Gujarat
- Rajasthan
- Uttarakhand
- Himachal Pradesh

# Lightning Risk Management- available solutions

|                                                                                                                                                       |                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Lightning Early Warning</b>                                                                                                                        | <b>IMD , Damini App and CROPC volunteers, social media, TV, newspapers</b>                  |
| <b>Lightning Safety Plan- Preparedness, prevention, mitigation and response<br/>Revision of curriculum</b>                                            | <b>CROPC</b>                                                                                |
| <b>Awareness and safety program and materials</b>                                                                                                     | <b>IMD-CROPC-IITM<br/>Open source,<br/>Mukhiya Capacity Building Programme</b>              |
| <b>Mitigation- Lightning Alert systems. Arresters,<br/>Soft measures- awareness, education &amp; training<br/>Structural measures- safe shelters,</b> | <b>Government functionaries at National to state level</b>                                  |
| <b>Lightning Mitigation Protection</b>                                                                                                                | <b>CROPC solutions of safe school, safe farmers, safe temple, mosque,village and cities</b> |
| <b>Capacity building and training- ToT programme</b>                                                                                                  | <b>Farmers , Fishermen, Tribal, Rural Development , PRIs, Teachers<br/>Children</b>         |





# India Meteorological Department (IMD)'s Lightning Early Warning Products

| Time in advance                   | Model                                                                            | Detection                                                               | Action by SDMA                                                                  |
|-----------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 48 hours<br>look out lead<br>time | High resolution<br>Global Model<br>Thunderstorm<br>12.5 km spatial<br>resolution | Lightning flash,<br>Lightning<br>probability, Heavy<br>rain, gusty wind | Inform concerned<br>Districts<br>authorities and<br>last mile                   |
| 24 hours<br>lead time             | High resolution<br>Global Model                                                  | Lightning flash,<br>Lightning<br>probability, Heavy<br>rain, gusty wind | Inform concerned<br>Districts authorities<br>and panchayats,<br>media publicity |
| 2-3 Hours<br>Nowcast              | Multiple models                                                                  | Lightning,<br>thunderstorm,<br>squall, cloudburst                       | Disseminate to<br>effected public schools,<br>TV, Radio and NGOs ,              |

# Damini : Lightning Alert Map



## Source Engine

Satellites

Doppler Radar network

Lightning detection sensors

Available on google play store

[https://play.google.com/store/apps/details?id=com.lightening.live.damini&hl=en\\_IN](https://play.google.com/store/apps/details?id=com.lightening.live.damini&hl=en_IN)



# Meghdoot : Farmers Mobile App



## Source Engine

Satellites  
Doppler Radar network  
Lightning detection sensors

Available on google play store

<https://play.google.com/store/apps>

# Dedicated Lightning Action Plan





**Guidelines for Preparation of Action Plan -  
Prevention and Management of Thunderstorm  
& Lightning/Squall/Dust/Hailstorm and Strong Winds**

**2018**



**National Disaster Management Authority  
Government of India**

<https://ndma.gov.in/sites/default/files/PDF/Guidelines/Guidelines-on-TSL-HSW.pdf>

# Ownership to Lightning disaster

- State to notify Lightning as state specific disaster
- District Level – DDMA
- Community centric
- SDRF , Civil Defence
  - training and awareness on lightning rescue, monitoring and community awareness



# State Lightning Action Plan

- Lightning Seasonal event
  - > Kalbaishakhi- post 13 April 2021
  - > Pre- monsoon & terminal monsoon
  - > Western disturbance
- Hotspot
  - > Identification
  - > Ensure Lightning Arrester/ conductor
  - > Village Risk Management programme
  - > Fort and Archeological heritage management
  - > Lakes, hills, Industries
  - > School, farmers and community places safety

# State Lightning Action Plan

- Understanding the hazard
  - > Lightning unique disaster
  - > Education, awareness and training
- Identify victims
  - > Tourists
  - > Farmers, cattle grazers, people working in open
- IEC – Most important
  - > General public, social media, rural, industries
  - > Panchayat, Farmers, tourists
  - > Children, women



# State Lightning Action Plan

- Early Warning operationalization
  - > IMD Lightning EW
  - > Damini lightning alert app
  - > Dissemination below district level
  - > Incident Response system
  - > Responsible officers/person at Block, panchayat, villages and up to people in open

# State Lightning Action Plan

- Policy intervention
  - > building bye laws
  - > School safety plan
  - > Farmers safety plan
  - > Cattle safety plan
  - > Mainstreaming lightning safety with other government schemes and plans like MGNREGA, Water shed program, PHED/DW program, solar mission etc.

# School Safety Policy – include Lightning

## School Safety Plan- incorporate Lightning



### NATIONAL DISASTER MANAGEMENT GUIDELINES SCHOOL SAFETY POLICY



February 2016



NATIONAL DISASTER MANAGEMENT AUTHORITY  
GOVERNMENT OF INDIA

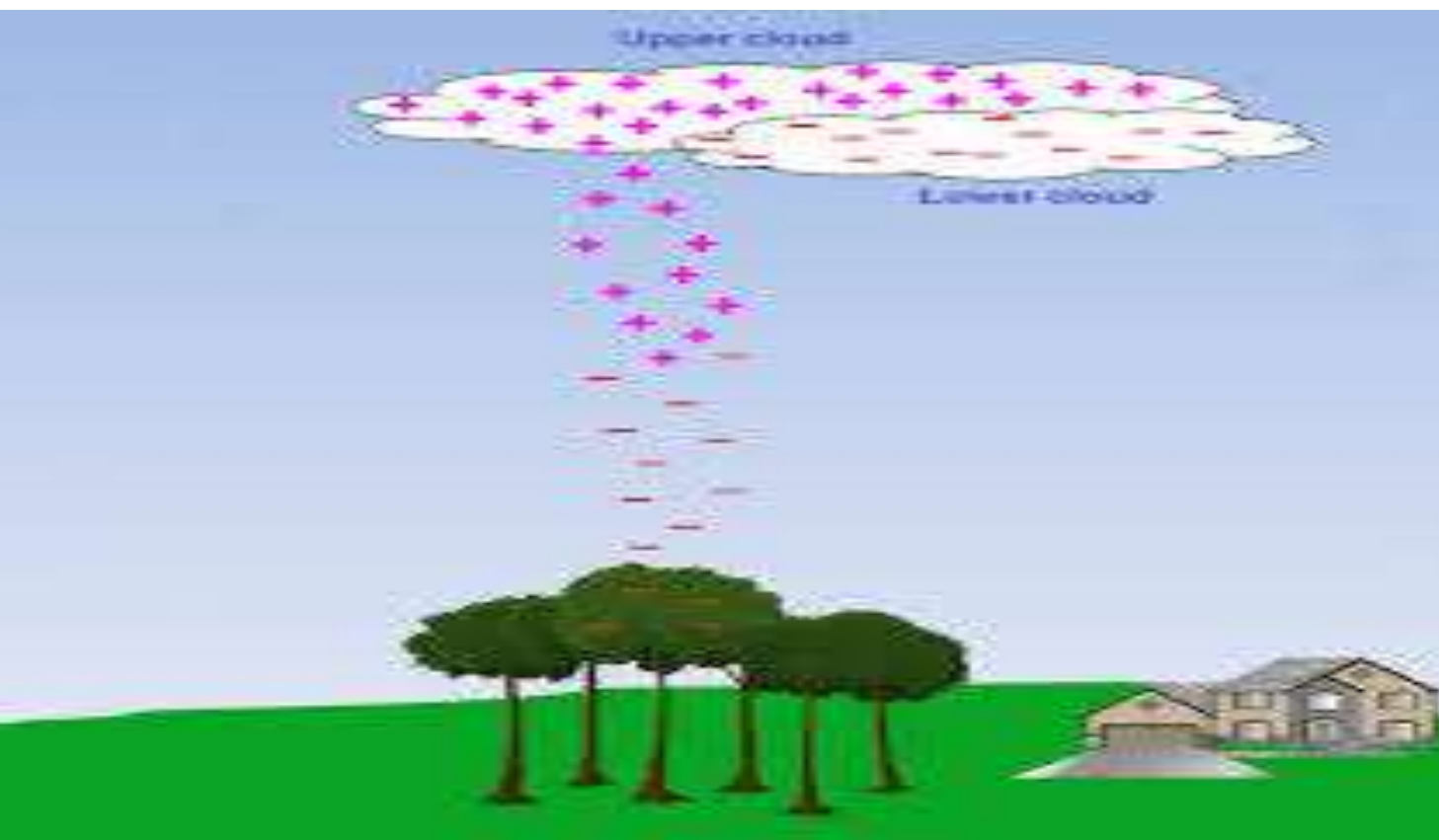
# Lightning Mitigation

# Lightning Safety Action Plan

- Educate about the lightning hazard and risks
- Risk Assessment
- Early warning saves life
  - > Install lightning Early warning System
  - > Install Public Notification System
- Lightning Protection Device- install smart arresters
- Capacity building – Do's and don'ts, awareness and training



# Lightning – understand the hazard



Lightning is occurrence of a natural electrical discharge of very short duration and high voltage between a cloud and the ground or within a cloud, accompanied by a bright flash and typically also thunder.

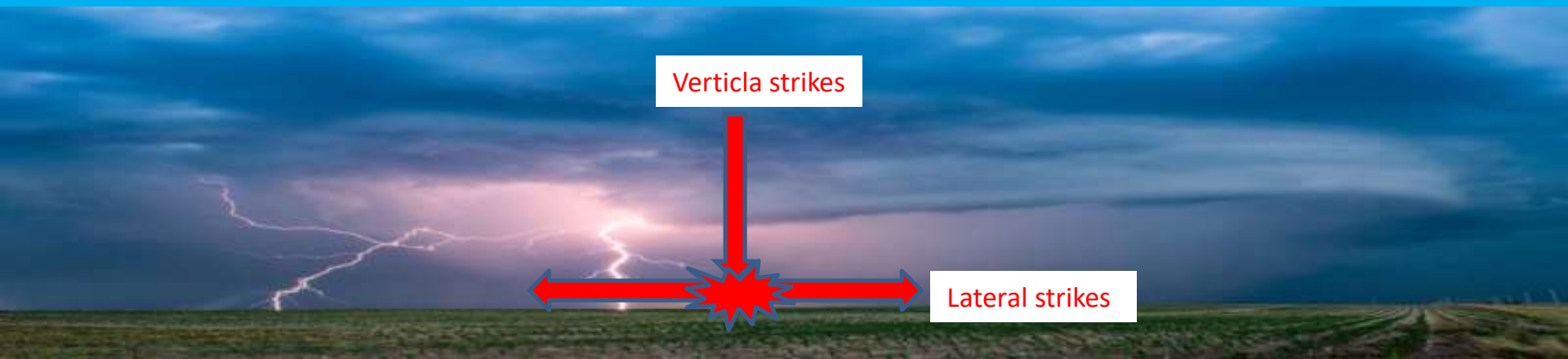
"a tremendous flash of lightning.

## Two types of Lightning

1. Inter Cloud (IC)
2. Cloud to ground (CG)

There may be lightning without thunder too.

# Impact of Lightning



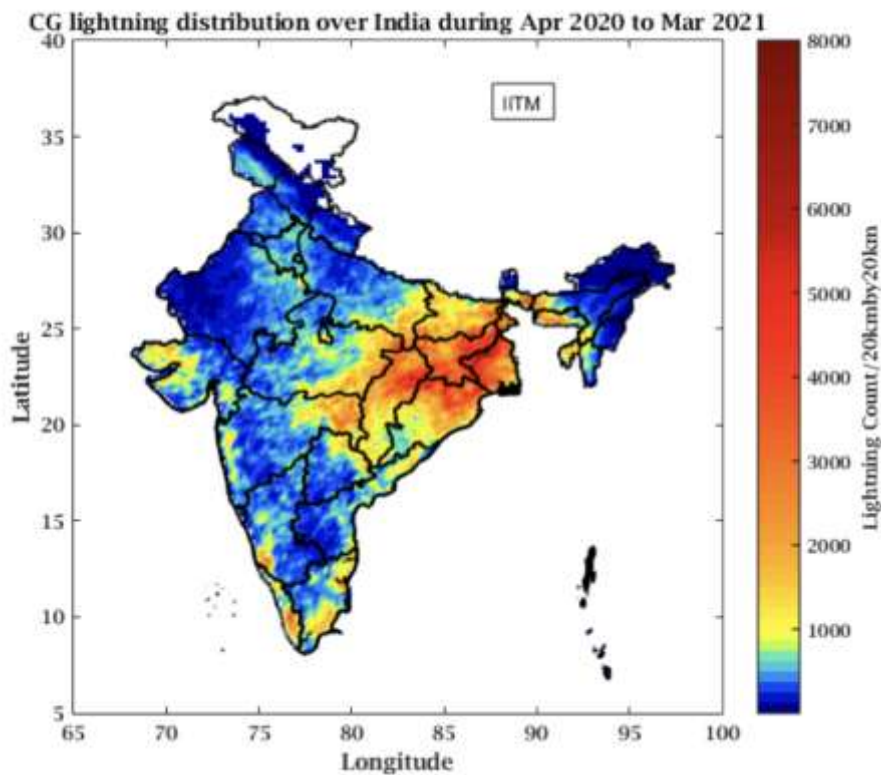
**Vertical strikes are fatal in dense area/height/isolated tall structures like trees, polls, towers – Jungles, rural areas**

**Lateral strikes are fatal in open space, agricultural fields .  
Example –recent deaths in Bihar, UP**

# Risk Assessment Methodology

- Details of the area/asset which needs to be protected
- **Risk = Vulnerability x Exposure**
- Geographical vulnerability – contours, Hill features, slopes, neighboring water bodies,
- Lightning strikes history
  - > Lightning intensity and frequency including positive and negative lightning flashes
  - > Lethal potential – current, bolt and energy contents
  - > Lightning Risk map
  - > Expected number of lightning flashes per square kilometer as per IEC-62305 be obtained and worked out
- **Exposure Risk – It should be calculated in the moderation of 10 to the power -5 ( 1 in 100000) and based on this the lightning exposure of critical assets specially Headquarters, signal centres, IT Centers, transformers, living area, training area, firing range, Parade /PT ground etc be identified and exposure is required to be worked out.**
- Calculate Risk Index

# Lightning Risk Map

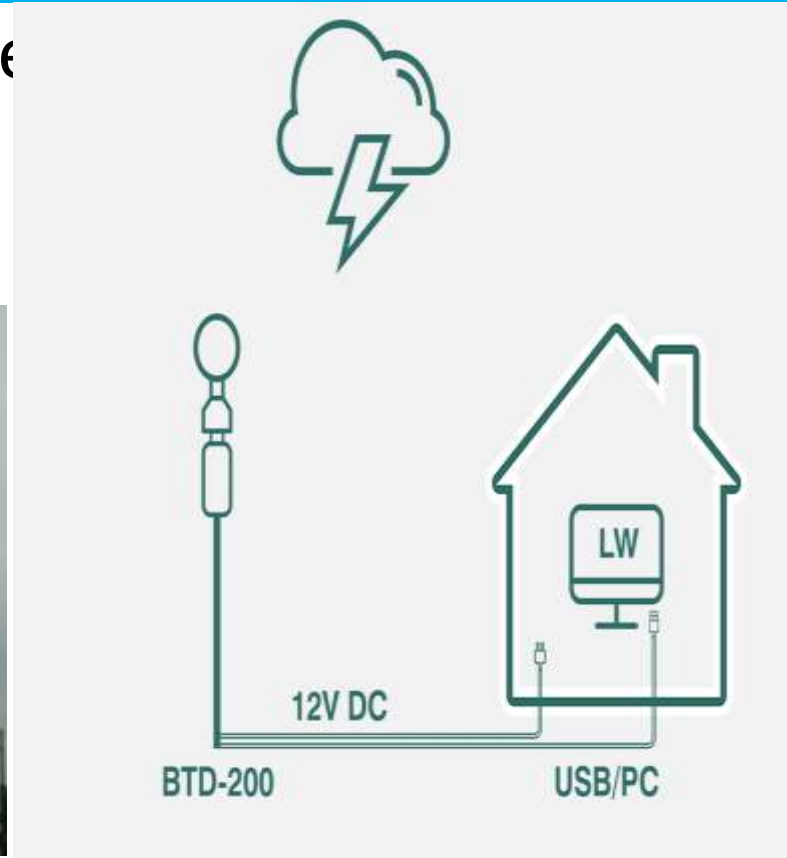


## Total Lightning 01-04-2020 TO 31-03-2021

| States            | IC     | CG     | Total  |
|-------------------|--------|--------|--------|
| Arunachal Pradesh | 6250   | 5348   | 11598  |
| Assam             | 127723 | 81475  | 209198 |
| Manipur           | 10042  | 9129   | 19171  |
| Meghalaya         | 116250 | 66738  | 182988 |
| Mizoram           | 30746  | 26723  | 57469  |
| Nagaland          | 6474   | 6476   | 12950  |
| Sikkim            | 3988   | 2034   | 6022   |
| Tripura           | 53490  | 32010  | 85500  |
|                   | 354963 | 229933 | 584896 |

# Lightning Early Warning System

- It detects storm cell and electric field
- Activates sensors
- Alerts by hooter and PA System
- Range – 20 km





# Lightning Early Warning Public Notification System

- Stand alone remotely operated device
- Components Mike horns- 2, IoT device  
Power box, pole and accessories
- Sound Output – 6-80 db
- **SMS based multi- lingual device**
- Range 5 km diameter
- Used for warning at remote locations, village out posts etc.



# Lightning Capacity Building

Education  
Awareness  
Training  
Dos and Don'ts

# Lightning Safe India Campaign

## Capacity Building Education, Training and knowledge sharing



**INSTALL AUTOMATIC WEATHER  
STATION TO KNOW PRECISE LY  
ABOUT WEATHER HAZARDS**

17/07/21

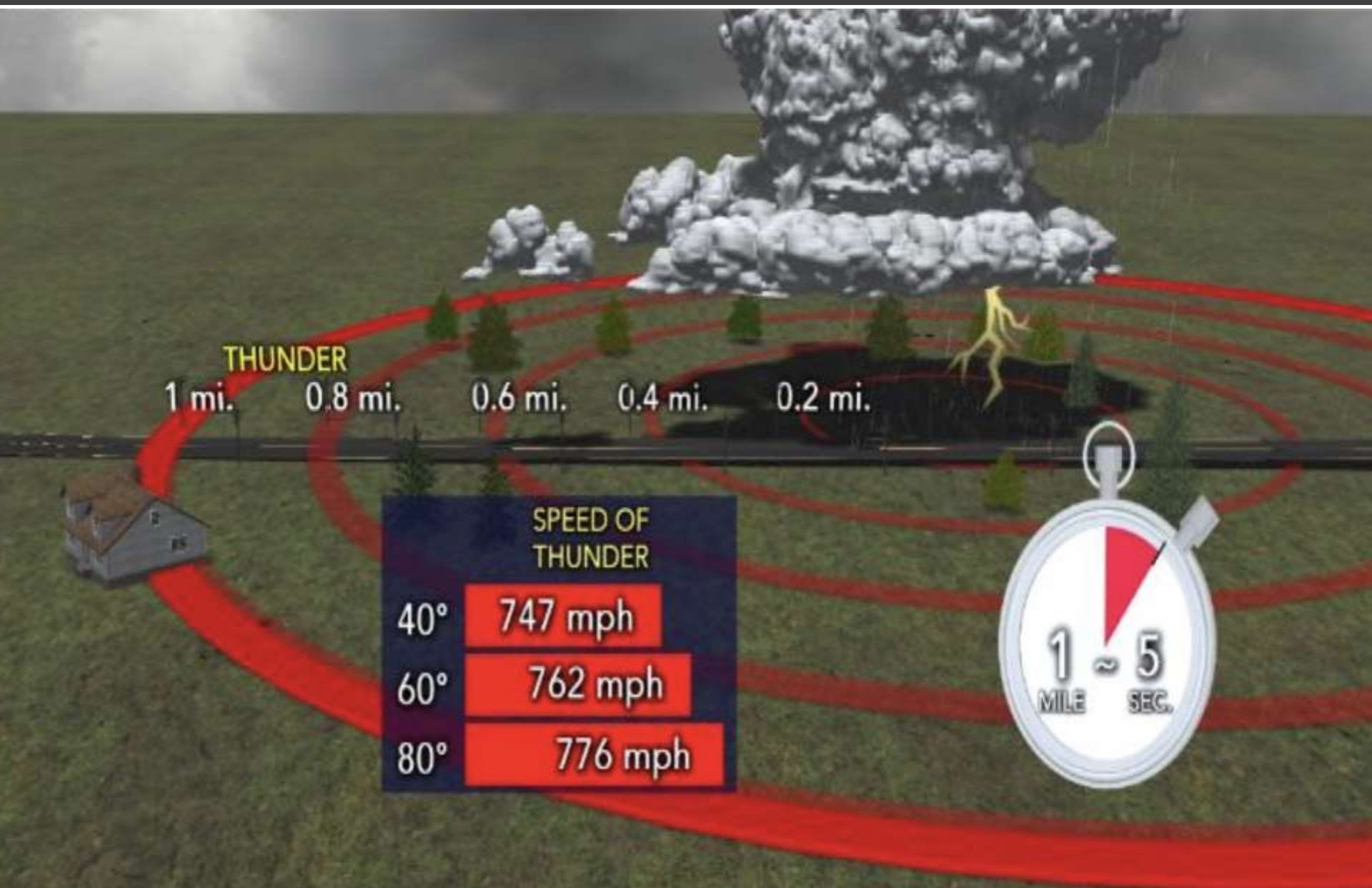
Lightning Resilient India Campaign



**Use genuine Lightning Arrester or  
Conductors , INFERIOR ONES MAY BE  
FATAL**



# Lightning :The 5 seconds Rule



# Natural art Early Warning

## Warning Signs

---

- If you feel your hair stand on end, skin tingle, or hear crackling noises (signs of an imminent lightning strike) assume a “lightning-safe position.”



***If you can see it (lightning), flee it;  
If you can hear it (thunder), clear it.***



# Capacity Building - Awareness



➤ Extensive Public Awareness programmes conducted, specially for rural masses and school children

➤ Safety measures against Lightning hazards being regularly broadcast through TV, Radio etc.

➤ Nukkad natak conducted, IEC materials etc distributed among public



# प्राकृतिक आपदा वज्रपात

## आइये सिखे वज्रपात से कैसे बचे

झारखण्ड में वज्रपात से खतरा बढ़ते जा रहा है। यहां ठनका गिरने से हर साल करीब दो सी लोगों की मौत हो जाती है। जागरूकता से ही इस आसमानी आफत से बचा जा सकता है

झारखण्ड में वज्रपात से खतरा कई से सितम्बर के बीच ज्यादा होता है। सरकार ने वज्रपात से प्रभावितों के लिये मुआवजा का प्रावधान तो किया है, लेकिन जबतक संपन्न अभियान चलकर लोगों को जागरूक नहीं किया जाता, तब तक जान माल के नुकसान को कम नहीं किया जा सकता



पेड़ के नीचे पनाह लेना जानलेवा हो सकता है



यदि बाहर में कोई सुरक्षित जगह न मिले तो दर्शाये गये मुद्रा में अपने कान पर हाथ रख दोनो पैर एक साथ कर बैठ जाये। याद रहे इसे अंतिम उपाय के रूप में प्रयोग करें

### आकाशीय बिजली – आप जो जानना चाहते है

यदि आप बिजली चमकने के तुरन्त पास गड़गड़ाहट सुनते है तो आप खतरे में है  
**बाहर कोई भी जगह सुरक्षित नहीं है**  
बादल गरजने की आवाज सुनते ही तुरन्त किसी सुरक्षित आश्रय में चले जाए  
बादल गरजने की अंतिम आवाज सुनने के बाद कम से कम 30 मिनट तक सुरक्षित आश्रय में रहे।

### इमारतों व संरचनाओं पर वज्रपात के विभिन्न प्रभावों का चित्रण



झारखण्ड में वनस्पति के उच्च घनत्व के साथ, भवन और लोगों की सुरक्षा के लिए रिम अवर्गिंग भी आवश्यक है



बिजली या टेलीफोन के बाहरी तार व फोन पर वज्रपात होने से कंस्ट्रैट इमारत में प्रवेश कर सकता है



इमारत के ऊपर जगमगाहट फलक निर्भर चर संरचना की रक्षा कर सकता है। यह इमारत के अंदर रहने वाले मानव और उपकरणों की रक्षा नहीं कर सकता



पेड़ या संकीर्ण संरचनाओं के पास वज्रपात होने से जमीन की माध्यम से कंस्ट्रैट इमारत में प्रवेश कर सकता है

### सुरक्षा के उपाय – घर से बाहर रहने पर

जब बाहर कहीं फस जाये और सुरक्षित आश्रय न हो :

- उंचे स्थान, पेड़, पहाड़ आदि से बचे
- पानी से संबंधित गतिविधि से बचे जैसे नौका विहार, मछली पकड़ना, तैरना आदि
- पिकनिक स्थल, रेन शैलटर, बस स्टॉप व असुरक्षित खुली इमारतों से बचें
- कभी भी जमीन पर न लेटें
- बिजली का संचालन करने वाली वस्तुओं को कभी न छुएं

### सुरक्षा के उपाय – घर के अंदर रहने पर

- खिड़कियों से बिजली की चमक न देखे
- आंतरिक कमरे आमतौर पर बेहतर होते हैं
- बिजली के उपकरणों से दूर रहें जो आपको बिजली के सीधे संपर्क में रखते हैं
- तार वाले टेलीफोन का उपयोग न करें। सेल फोन व कोर्डलेस फोन का उपयोग सुरक्षित है
- सिंक, स्नान और नल का उपयोग से बचे
- दिवारों, खिड़कियों, दरवाजों और बरामदों से दूर रहें
- बिजली के उपकरण को अनप्लग कर दें। बाहर लगे एंटीना या केबल से टेलीविजन को डिस्कनेक्ट करना न भूलें

वज्रपात से पीड़ित व्यक्ति में



इलेक्ट्रिक करंट नहीं उठरता व उनको संभालना आसान होता है। यह जीव करे कि पीड़ित सांस ले रहा है व उसकी नाड़ी चल रही हो। मदद आने तक पीड़ित की निगरानी जारी रखे। ऐसे समय में हृदय घात ही मृत्यु का तत्काल कारण है। यदि आवश्यक हो तो कार्डियो पल्मोनरी रिससिटेशन शुरू करें।



# वज्रपात-से बचाव के उपाय

जब घने लहराते बादल व बूँद बाढ़ी के साथ तेज हवा चले तो वज्रपात हो सकता है।  
कुपया पतके मकान में तुरंत शरण लें।

वज्रपात, वर्षा, बूँदबाढ़ी या आंधी तूफान के दौरान पेड़ के नीचे खड़ा नही हो। वज्रपात, पेड़ के गिरने से भीत भी हो सकती है।



वज्रपात से बचने हेतु कुछ सरल सुझाव उपाय...

जब आप घर के भीतर हों :-

- बिजली से संघालित उपकरणों से दूर रहें, तार वाले टेलीफोन का उपयोग न करें।
- ऐसी वस्तुएं जो बिजली की सुचालक हैं, उनसे दूर रहें, धातु से बने पाईप, नल, फव्वारा, बॉम्बेस्टिन आदि के संपर्क से दूर रहें।
- कपड़े सुखाने के लिए तार का प्रयोग न करें जूट या सुत की रस्सी का प्रयोग करें।
- छिड़कियाँ, दरवाजे, बरामदे एवं छत से दूर रहें।

जब आप घर के बाहर हों :-

- ऊँचे वृक्ष बिजली को आकर्षित करते हैं, कुपया उनके नीचे न खड़े रहें। ऊँची इमारतों वाले क्षेत्र में आश्रय न लें। समूह में न खड़े रहें, बलिक अलग-अलग हो जाएँ।
- किसी पक्की मकान में आश्रय लेना बेहतर है। सफर के दौरान अपने वाहन में ही बने रहें। मजबूत छत वाले वाहन में रहें, खुली छत वाले वाहन की सवारी न करें।
- बारूद रखने पर धातु से बनी वस्तुओं का उपयोग न करें। बाईक, बिजली या टेलीफोन का खम्भा, तार की बाड़, मशीन आदि से दूर रहें।
- तालाब और जलाशयों से दूर रहें, यदि आप पानी के भीतर हैं अथवा किसी नाव में हैं तो तुरंत बाहर आ जाएँ।
- बारिश के समय धातु की डंडे वाले छतों का उपयोग न करें।

जब आप खेत, खलिहान में काम कर रहे हैं :-

- नीले खेतों में डल घसाले, रोपनी या अन्य कार्य कर रहे किसान तथा मजदूर या तालाब में कार्य रहे व्यक्ति तुरंत सूखे एवं सुरक्षित स्थान पर जाएँ।
- धातु से बने कुमि यंत्र, डंडा आदि से अपने को दूर कर लें।

किसी सुरक्षित स्थान में शरण ले पाने में असमर्थ हों :-

- जहाँ हैं वहीं रहें हो सके तो पैरों के नीचे सूखी चीजें जैसे- लकड़ी, प्लास्टिक, बीरा, या सूखे पत्ते रख लें।
- दोनों पैरों को आपस में सटा लें एवं दोनों हाथों को घुटनों पर रखकर अपने शिर को जमीन की तरफ यथासंभव झुका लें तथा शिर को जमीन से न छुआयें।

जब आप जंगल में हों :-

- बीने एवं घने पेड़ों की शरण में चले जाएँ।

वज्रपात का झटका लगने पर ये करें



- वज्रपात के झटका लगने पर जल्दतर के अनुसार व्यक्ति को CPR (कार्डियो पल्मोनरी रिससिटेशन) यानी कृत्रिम श्वास देनी चाहिए। तत्काल प्राथमिक चिकित्सा प्रदान करने की व्यवस्था करें।

वज्रपात - एक जानलेवा प्रहार

वज्रपात से प्रभावित व्यक्ति की सूचना अपने अंचलाधिकारी/जिले के जिला आपदा प्रबंधन पदाधिकारी अथवा उपायुक्त को तत्काल दें।

प्रत्येक द्वितीय तल से अधिक भवन, विद्यालय, सरकारी कार्यालयों में वज्रपात से बचाव के लिए तड़ित रोधक अवश्य लगायें।







# Lightning Resilient India Campaign

## वज्रपात सुरक्षित भारत अभियान



**When lightning roars Never stand under tree or outdoor**  
**जब बिजली करें गर्जना, पेड़ के नीचे कभी ना रहना**



# Lightning Resilient India Campaign

## वज्रपात सुरक्षित भारत अभियान



**DON'T TAKE  
SELFIE  
DURING  
LIGHTNING**

वज्रपात के दौरान  
सेल्फी नहीं लें।





Lightning Resilient India Campaign

वज्रपात सुरक्षित भारत अभियान

**WHEN LIGHTNING,  
STAY AWAY FROM**

**WINDOWS AND DOORS**

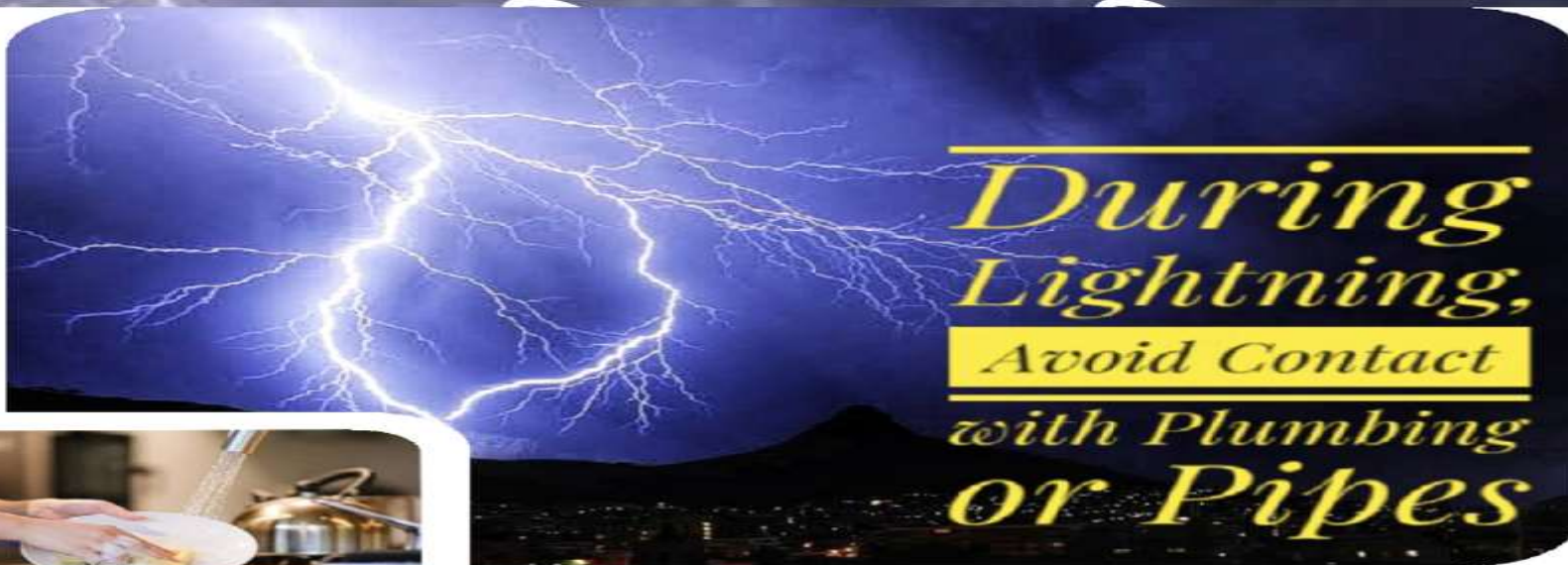
वज्रपात के दौरान बच्चों को खुला दरवाजे और खिड़कियों से दूर रखें



Prepared by Ms. Sangavi Kennedy, Intern, Tata Institute of Social Sciences, Mumbai for Climate Resilient Observing Systems Promotion Council CROP- IMD New Delhi



# Lightning Resilient India Campaign



Prepared for Lightning Resilient India Campaign  
by Ms. Sangavi Kennedy, Intern, Tata Institute of Social Sciences, Mumbai





# Lightning Resilient India Campaign



What is the Lightning Safety Position?



Put your **HEELS TOGETHER**

Put your **HANDS OVER YOUR EARS**  
to protect them from thunder

This position looks hard, but it could save your life. **Why?** Because with your heels together, if lightning hits the ground, it goes through the closest foot up to your heel and then transfers to the other foot and goes back to the ground again.

जब बिजली  
करें गर्जना  
तब पकके छत  
के नीचे ही रहना

# WHEN THUNDER ROARS GO INDOORS



Lightning Fatalities  
For Outdoor Sports



40%  
SOCCER



27%  
GOLF



17%  
RUNNING



10%  
BASEBALL



3%  
FOOTBALL



3%  
OTHER



[www.lightningsafeindia.com](http://www.lightningsafeindia.com)

[www.cropc.in](http://www.cropc.in)

Lightning Resilient India Campaign

step 1

Leave the field  
immediately



step 2

Seek shelter in an  
enclosed building or car

Wait 30 minutes after hearing  
thunder to return outside







# Lightning Resilient India Campaign

## वज्रपात सुरक्षित भारत अभियान





# Lightning Resilient India Campaign

## वज्रपात सुरक्षित भारत अभियान



**ENSURE PROPER LIGHTNING ARRESTER AT HOME, SCHOOL, HOSPITALS, COMMUNITY CENTERS**



# Way Forward

- **Reduce avoidable deaths due to lightning to zero**
- **Pursue with Government to notify lightning as disaster**
- **Launch National lightning Risk Management Programme**
- **Impact based innovative Early warning to community up to last man**
- **Ensure dissemination of EW to last mile**
- **Conduct of Lightning Safety training programmes for community, specially for vulnerable community like farmers, women, school children, cattle grazers, fishermen in rural, hills and tribal areas.**
- **Ensure Lightning risk audit as a culture**
- **Install lightning protection device in maximum infrastructures, temples etc.**
- **Promotion to Innovation, research and development**
- **Adopt Climate Change grass root level adaptation**

# Lightning Resilient India Programme





# Thank You

**Col Sanjay Srivastava**

**Convener, Lightning Resilient India Campaign 2019-2021**

**Email [sanjaysonisa@gmail.com](mailto:sanjaysonisa@gmail.com)**

**Mob 7631089049 or 7667860470**

**[www.cropc.org](http://www.cropc.org)**