

LIGHTNING RESILIENCE IN INDIA



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Lightning and thunderstorms, in recent times, have emerged as one of the most challenging hazards in India. However, despite rapid rise in lightning occurrences, the impacts have been contained, courtesy proactive steps taken by National Disaster Management Authority (NDMA), Government of India.

Globally, there has been a rise in lightning strikes and it has increased significantly. There has been rise in intensity, frequency and dimensions of the flashes. Its adverse impact has been felt globally and more than 26000 people succumb to lightning strikes globally. The WMO Report on Status of Climate for year 2022 and 2023 records the damages/ mortality due to the thunderstorms and lightning at 48% and 62% respectively, a rise of 14% within one year. Significantly Indian accounts for 7-8% of the casualty.

The rise in lightning and thunderstorms is mainly attributed to global warming. The research by University of Columbia projects, with 1 degree rise in temperature, 12% rise in lightning in USA. The research and studies in India by CROPC AND IMD have shown a rise in lightning from April 2019 to March 2024 by 57%. In India, with 1 degree rise in temperature, the rise in lightning has been from 7% to 18%. Other reasons attributed are environmental degradation, rampant emission, pollution leading to a rise in aerosol levels, depletion of water bodies, deforestation, urbanization, fast industrialization and creation of heat islands.

India's initiatives to address Lightning

India has addressed lightning proactively. NDMA has been at the forefront. The Indian approach is two pronged, First- Adopt proper scientific solutions and implement among community and second – Climate action to reduce the occurrence of extreme events.

NDMA has addressed lightning holistically. At the initial stage only, expert committee was formed and wide spread consultations with stakeholders were undertaken. In Year 2019 NDMA issued guidelines for preparation of action plan on prevention and management against lightning and thunderstorms which is the base document to formulate State and local level Lightning action plan. NDMA has also laid down protocol for dissemination of Lightning EW and Common Alert Protocol (CAP) has been commissioned in 2023. A mobile application SACHET has been launched to alert people about impending lightning strikes. It also linked to India's Emergency Response Single emergency Number 112 for instant response. These policy documents are highly useful and facilitating end to end address to lightning hazard.

Scientific solutions in India by [Ministry of Earth Sciences](#) have remarkable feats in terms of state of Art lightning Early Warning systems. India has three lightning detection networks, network of Doppler Weather Radars (DWRs), satellite based LIMs followed by Global 1x1 km model. Based on multiple inputs IMD, the mandated agency issues lightning forecasts in three modes . These are 1. Lightning outlook from 5 days to 24 hours, 2. Nowcast and 3. Damini Mobile app in 12 India regional languages. The Lightning Alert Mobile application Damini can be downloaded from play store or App store.

It is pertinent to mention significant contribution from Department of Space. [National Remote Sensing Centre, ISRO](#) is providing lightning detection services.

Research and Development in fulminology is picking up. But there is a need of High voltage (HV) Lightning testing labs, both lab and open field based. Non-availability of HV lab leads to unspecified LPDs, thus compromising the safety of rural masses that is farmers, cattle grazers, fishermen and labourers.

Community Based Intervention- Lightning Resilient India Campaign

India has community based strong interventions – Lightning Resilient India Campaign – a joint initiative by CROPC and IMD, duly supported by NDMA. It has large number of stakeholders which includes SDMAs and NGOs/ CSOs. The academic collaborations and field level pre-season awareness ensure proper compliance to lightning safety Do’s and Don’ts. India has 96% damages in rural India as still 70% population is rural with agriculture as main profession. The deaths is mainly due to unsafe livelihood or housing conditions. The losses in rural area are 96% and it has a seasonality based on monsoon and their livelihood. Most of the casualties are of farmers, cattle grazers, tribal, fishermen or labourers. The same has been depicted below in figure 1. :-

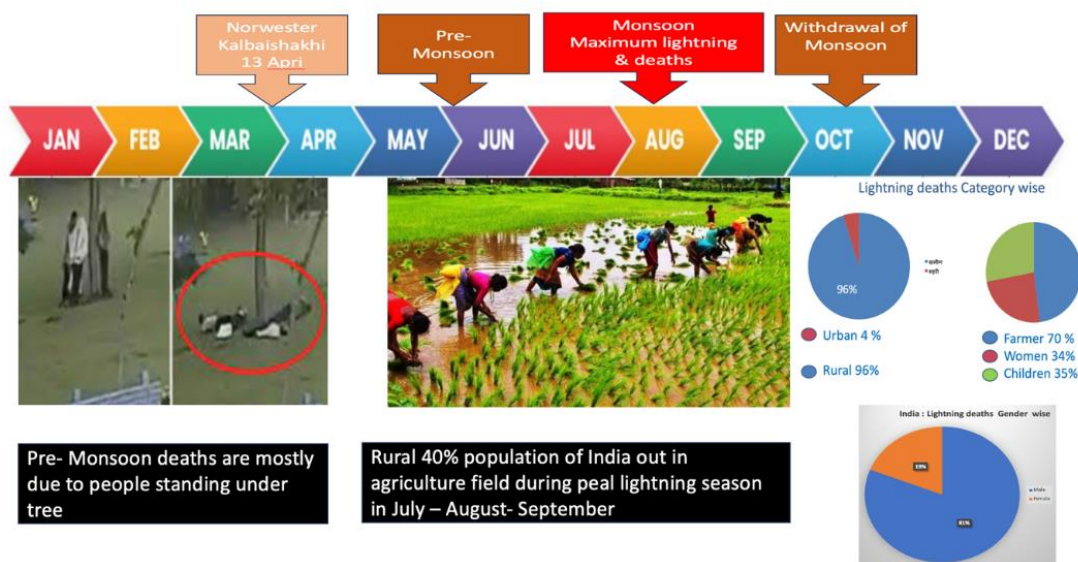


Figure 1 : Lightning Casualties Pattern in India

Public awareness, just pre-lightning season plays a vital role. The simple Do’s and Don’ts on lightning safety needs are being publicized among rural masses through multiple sources. The Gram Panchayats have been involved in sensitizing people to ensure their preparedness against lightning.

To address the lightning hazard, India a Lightning Resilient Framework has been adopted. It can be customized to local conditions and seasonality. The suggested Lightning Resilience Framework is given in Figure 2 below: -

Lightning Resilience Framework : Action Plan

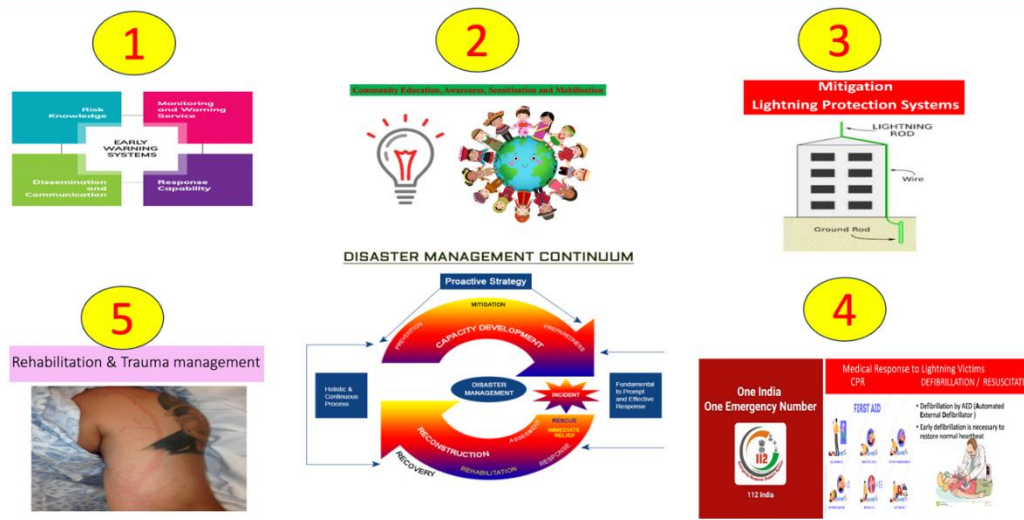


Figure 1 : Lightning Resilience Framework

The results of India's initiative are visible. During last five years from 2019 to 2024, despite 57% rise in lightning occurrences, the deaths have reduced by more than 22%, as per the Annual lightning Report 2023-2024 published by India Meteorological Department (IMD) and Climate Resilient Observation- Systems Promotion Council (CROPC) under Lightning Resilient India Campaign. There are districts which have showcased near zero lightning casualty in Odisha, Bihar, Jharkhand, West Bengal, Assam. State like Andhra Pradesh has shown more than 60% reduction in casualty.

Way forward

Lightning Risk management by India is progressively show casing result-oriented solutions at grass root level. The same was presented at GP 2019 by UNDRR and also shared with SAARC and G-20 countries. It is a role model for other countries to emulate.