A Protocol
for
Early Warning Dissemination
on
Thunderstorm and Lightning

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National Disaster Management Authority
Government of India

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Early Warning Dissemination on Thunderstorm and Lightning

1. Introduction

Thunderstorm and lightning have emerged as major weather hazards in recent years and have affected different parts of the country. Lightning and Thunderstorms are extremely short term phenomenon. The lightning strikes are instantaneous and it hits within flash of seconds. Thus, it gives very little time to an individual react. These severe weather events cause extensive structural damages, destruction of crops, uprooting of trees and casualties. Every year about 2,500 people die due to thunderstorm and lightning every year. Most of the deaths happen in rural areas and in open spaces or in agricultural fields. There is a need to develop an effective early warning dissemination protocol to minimize the loss of life.

2. Early Warning and Dissemination

a) Early Warning and Forecast -

The India Meteorological Department (IMD) of the Ministry of Earth Sciences issues four types of forecasts on thunderstorm and associated weather conditions such as lightning, strong gusty winds and hail at medium-range (1 to 5 days), short-range (24 hours) and very short-range or now-cast scale (3 hrs). The forecasts closest to the events are most accurate and location specific. These location specific now-casts, which are generated and transmitted at every 3 hour intervals, utilize the latest observations of the events from the Indian and Global observatory and Meteorological satellites, Doppler Weather Radar network and the data from the Lightning detector network of the Indian Air Force and Indian Institute of Tropical Meteorology (IITM). The alerts are specific to important towns and district headquarters throughout India and are also issued for all districts of India. They contain information of the time of occurrence of severe weather event, as well as likely impact.

As now-casts are valid for the next two to three hours, it gives only a limited lead-time for dissemination. These location specific now-casts, are provided to Relief Commissioners, State Control Rooms, District Collectors, Disaster Management units, media personnel, various non- Governmental organizations, All India Radio and the affected sectors of the general public through SMS, whatsApp, IMD website and e-mail etc. These authorities then further disseminate these forecasts in near real-time, through their own state and sector specific warning network even more widely. Closer to the occurrence of the event, the Ministry of Earth Sciences communicates warnings directly to the general public through the DAMINI mobile app and the RAIN ALARM mobile app about 30-40 minutes in advance of the event. Warning for lightning occurrence is also provided up to three hours in advance through other mobile apps like MAUSAM, UMANG and MEGHDOOT. There is provision for auto-notification to a user from the DAMINI, MAUSAM and MEGHDOOT apps.

To be effective and complete, an Early Warning System should comprise seven possible indicators:

(i) Risk knowledge of the public and capacity building – Lightning risk Education, awareness and training about the hazard, its impact and safety Do's and Don'ts be made a part of seasonal curriculum specially pre-monsoon and monsoon period in all schools, government programmes/schemes and community based interventions, fixed Standard Operating Procedures (SoP) for Response mechanism along with coordination of various sectors for effective action etc.

(ii) As Lightning being a seasonal event during Kalbaishakhi and pre/terminal monsoon, additional manpower/volunteers may be re-enforced from Aapda Mitra, Civil Defense etc.

(iii) Monitoring and warning service - Responsibility and accountability must be assigned for monitoring and warning services.

(iv) Visualization of Early Warning - It needs to be improved with simple to understand and comply. Damini app can be improved with polygons and push through messages in local languages.

(v) De-escalation of Early Warning is critical and it should be ensured

(vi) Dissemination and Communication of Lightning warning signal should be specified similar to fire or sirens. The standardization of lightning warning and its sensitization is important for instant response.

(vii) Collection of feedback information regarding occurrence and actual impact of the severe weather event from the general public (through crowdsourcing), Village, District, State level disaster authorities and maintenance of a unified real-time updating of Unified Disaster database.

b) Institutional Mechanism for Dissemination of Early Warning below District level

(i) There is a need of written institutional mechanism by notification from DDMA earmarking responsibility and accountability of BDOs, panchayat level functionaries and CSOs/NGOs in ensuring dissemination and its compliance.

(ii) An Incident Response System (IRS) for Block and below level needs to be notified making functionaries responsible, accountable and monitored.

(iii) Fund- The state government/district administration may keep suitable fund for dissemination.

c) Target Group and location along with Communication Protocol

Target group and geographical hotspots need to be identified for dissemination of early warning. A communication mechanism needs to be worked out to reach them in real time. There are three categories of people:-

(i) People with communication device and responsive

(ii) People with communication device but non responsive being involved in work or other reasons

(iii) People without any communication device- They are farmers, cattle grazers, children playing in orchard or ponds, fishermen and hunters. A physical means of intervention be worked out and placed in advance.

d) Early Warning Message

To deliver early warning message to the last person in near real time, the following should be kept in mind:

(i) The warning messages should contain safety directions to be followed; for e.g.; the nowcasting messages for severe thunderstorm/lighting may ask the public to take a safe shelter or move indoors in the wake of an inevitable disaster;

(ii) The message should be short, clear, in simple local language and action-oriented;

(iii) Flash messages / tickers / 'breaking news' to be displayed on the local TV news channels;

(iv) Radio announcements through public and private broadcasters;

(v) Flash messages / SMS, WhatsApp group to the users by the mobile operators in the affected areas;

(vi) In case of rural areas and small towns, an early warning may be issued by the local authorities using channelized WhatsApp group, loudspeakers, sirens, etc.; and

(vii) Social Media, including group messaging services, should be extensively used.

e) Communication Strategy and Drafting of Key Do's and Don'ts

(i) The communication strategy should be based on insights of the local population considering the nature of the–

a. Linkages as to why IEC on Do's and Don'ts are important
b. When is this IEC campaign to be launch and Where?

f) Early Warning Dissemination

(i) Operationalization of Early warning – Lightning being a short term phenomena and since the warning is available for approximately an hour, "Golden Lightning Warning Hour (GLWH)" needs to be capitalized by its instant operationalization. This is recommended to be done adopting following means:

a. Activation of IRS at District and below level
b. Dissemination of Early Warning through SMS
c. Synchronize with EOCs/ SDMAs at state and below level

d. Educate government functionaries, CSOs and community by generating interests and popularizing Early Warning
e. Create network of volunteers specially weather enthusiasts and bloggers
f. Display at public places like offices, schools, markets, outdoor work/ construction places, religious places, play fields, stadia.
g. Mainstreaming Lightning among NDRF, SDRFs, NGOs and CSOs
h. Dissemination to last mile
    - Media- TV, AIR, FM Radio, community radio
    - Smart phones- *Damini* App
    - Community watch man
    - Miking
i. Crowdsourcing early warning
j. Validation and mobilization of resources at last mile
k. Research and development in Early warning dissemination

(ii) Multiple media such as TV/ Radio (including FM radio)/ Social Media/local media/SMS and IVR message may be used for publicizing the early warning and IEC material.

(iii) Special Radio talks and TV shows may be organised by state and IMD Officials during the season. IEC material should be publicized to eradicate the myth through Folk/music programme at public places like market, playground, religious places, fishing harbours etc.

(iv) WhatsApp has emerged as a very effective and fast medium of communication. State Health and Disaster Management Departments may form WhatsApp groups of specific states/districts/blocks/cluster of villages for dissemination of messages with following broad flow scheme.

a) State level groups may have the minister/s, Chief Secretary, Secretaries & other officers of concerned departments, DMs & District Health Officers of all the districts and Red Cross and state functionaries of Indian Medical Association (IMA).

b) The DMs & District Health Officers may have district specific groups with officials of all concerned departments of the districts, Municipal corporations/Committees, IMD, Red Cross, IMS, NGOs & hospitals at the district level and officials of all concerned departments of the tehsils/talukas/blocks in the district.

c) Tehsils/talukas/block level groups may have officials of all concerned departments of the tehsils/talukas/blocks, Gram Pradhans/Panchayat Secretaries, doctors of primary, secondary & private hospitals and NGOs, Red Cross, IMA and other active/progressive individuals in the block, Village level self-help groups, village level women societies such as Anganwadis etc.

3. Nodal Agency

India Meteorological Department (IMD), Ministry of Earth Sciences, is the nodal agency for prediction and issue of forecast and warning of the thunderstorm & lighting activity in India. Responsibility of DDMAs, Blocks and Panchayts for dissemoinating Early Warning are being spelt out.

4. Role and Responsibility Matrix

A proper IRS should be notified for the undermentioned matrix assigning responsibility along with geographical areas covering complete areas , communication system and intervention mechanism.

Level	Agency	Action
National	**Nodal agency: IMD**	• Issue area-specific warnings/ alerts and weather forecasts
	Ministry of IB (PIB, AIR, Doordarshan)	• Dissemination of specific information to the public through print/ electronic and social media
	Department of Telecommunications	• Implements Common Alert Protocol (CAP) to disseminate early warning message, whenever available • Facilitate Pushing of SMS by telecom service operators to all active mobile connections in the identified area as per IMD early warning/forecast
	Ministry of Power	• Dissemination of specific warning message to concerned power generation, transmission, distribution and supply offices
	Ministry of Home Affairs (MHA)	• Send specific warning message through the control room to all concerned central Ministries/ Departments/ State(s) for action
	Ministry of Agriculture and Farmers' Welfare (MoA&FW)	• Disseminate specific information to its concerned sub-ordinate departments and State(s)

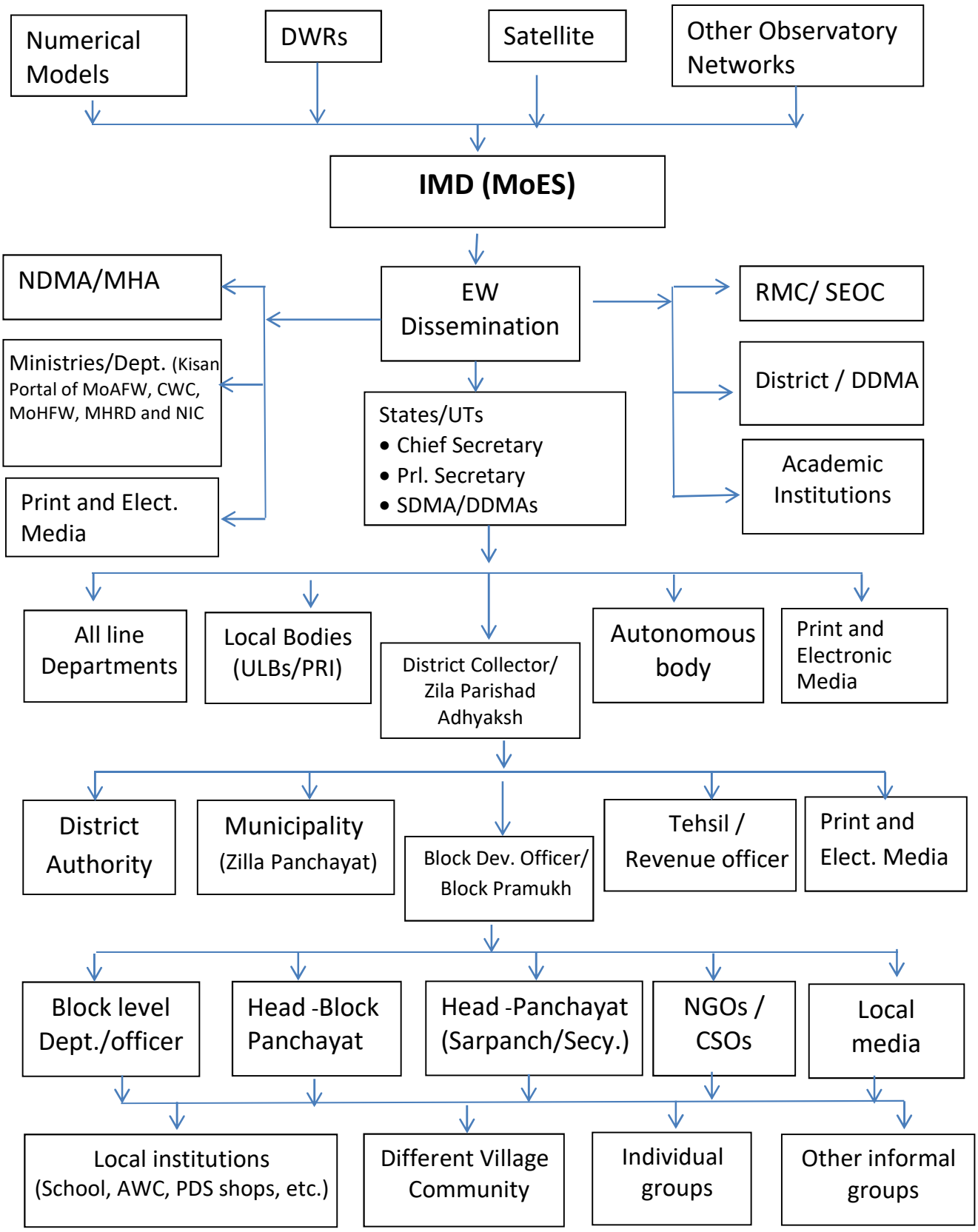
State	State Governments/ SDMAs/COR/IPR and all concerned Departments, NGOs/ Civil Society	• Disseminate information received from the IMD to the public through print/electronic/social and other mass media at the local level. • Create a network of community-based early warning dissemination systems • Establish State-level monitoring and warning dissemination system to supplement warning(s) from the IMD • Disseminate warning to District and regions • Ensure push SMS by telecom service operators to all active mobile connections in the affected area. • Activate the district administrations along with line departments as soon as a specific warning is received
District	District Collector/ DDMA/ District President, NGOs/ Civil Society	• Disseminate information received from the IMD and state specific warning to the public through print/electronic/social and other mass media at the local level. • Ensure push SMS by telecom service operators to all active mobile connections in the affected area. • To ensure cutting off of power supply and its restoration • Activate the all concerned departments, if specific warning is received • Ensure early warning information to reach at last mile through SMS, Whatsapp group at different level. • Disseminate Dos' and Don'ts and other IEC material in local language • NGOs/Active people may be involved in dissemination of early warning/ forecast at village level and also conducting workshop/ seminars/ media briefs in different village/ cities.
Tehsil/ Block	BDO/ Tehsildar/ Block Pramukh NGOs/ Civil Society	• Circulate early warning information to all sub-ordinate officers and Panchayati Raj representatives through SMS, WhatsApp group. • Share information to all schools, PHCs, CHCs, Agri-clinics, etc.

Panchayat	Sarpanch/ Panchayat Secretary, Patwari, Teacher/ Medical Officer, NGOs/ Civil Society	• Share early warning information to reach at community through SMS, WhatsApp, group, loudspeaker etc. • Create awareness through IEC in school, *Anganwadi*, village meeting PDS shop, MNREGA workers • Display IEC material and share to different groups/ community and individuals
Village	Ward Panch/ Teacher / ASHA /and other institutions	• Share early warning information to villagers and community • Distribute IEC materials
	NGOs/ Civil Society	• Discussion in various meetings • NGOs/ Active people may be involved in dissemination of early warning/ forecast at village level.

5. Conclusion

Early warning dissemination protocol helps to reduce vulnerability and mortality for thunderstorm and lighting. To comply the protocol, proper institutionalisation, notification of IRS system, assigning accountability and co-opting of other volntary organisations and NGOs and community is required. The protocol also draws early warning/alerts communication and dissemination strategy along with public awareness, community outreach and Information Education Communication (IEC) at various levels, so that timely information reaches officials as well as the general public to reduce the impact of extreme weather incidents. Pre-season consultations should be held at the State, District and local level every year before the commencement of the season. Before onset of lightning, aggressive community based communications and interventions should be in place. During the season, "Do's-and-Don'ts" should be available in local languages and disseminated through various media channels.

Early Warning Dissemination Flow



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