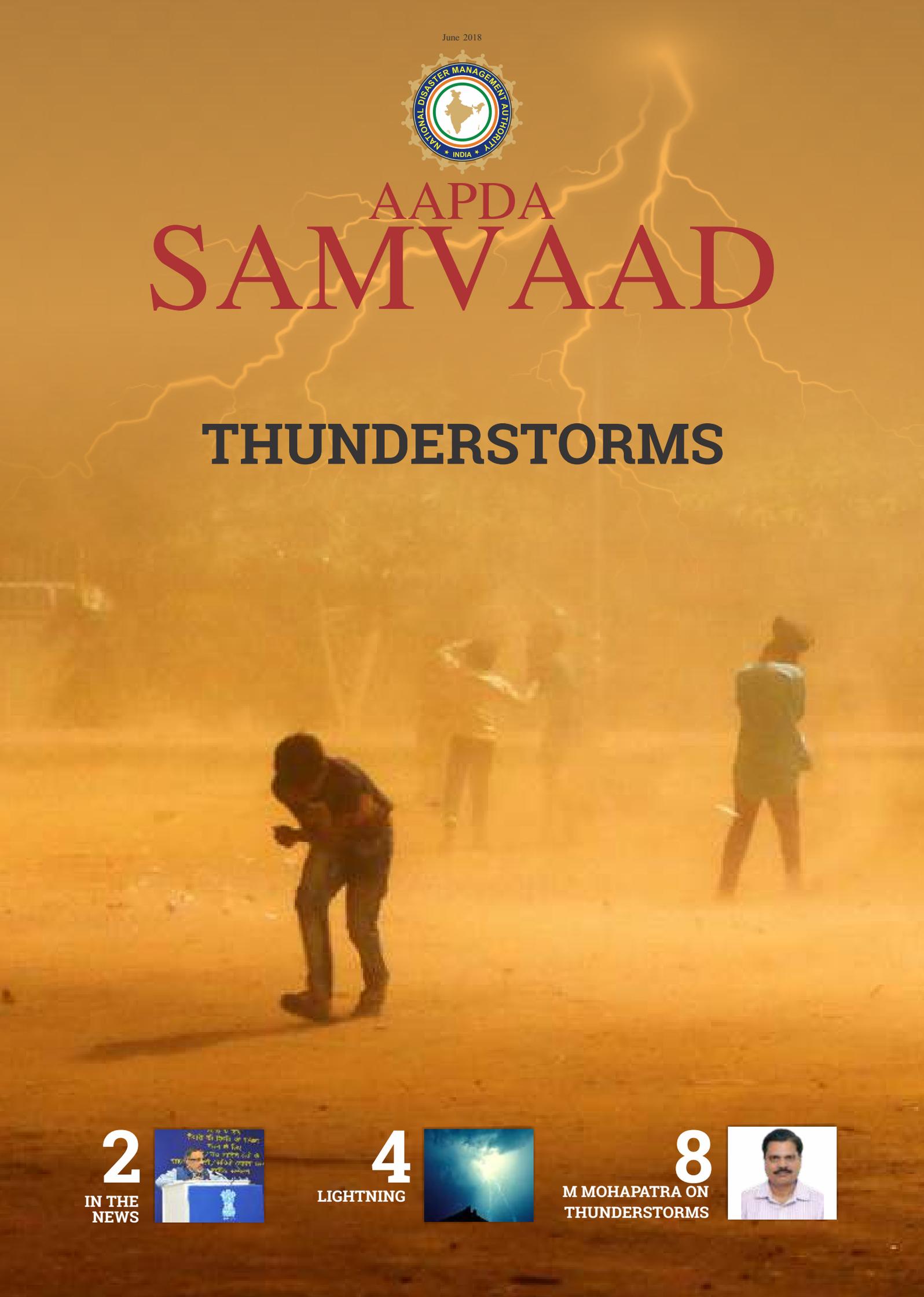




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Centre urges States to be better prepared

Union Home Secretary Shri Rajiv Gauba asked all concerned officials of Central and State governments to be better prepared so as to minimise the impact of disasters. He was speaking at the annual conference of relief commissioners/secretaries, which was held in New Delhi on May 18, 2018.

"We have to build our capacities through better weather forecast, conducting mock drills and improved resource management," he said. He also emphasised upon building capacities at the city and district levels and involving communities.

In his address, Shri R. K. Jain, Member, NDMA, said that the Centre and the States should continue with their coordinated efforts to minimise losses due to floods and cyclones.



The conference was attended by relief commissioners of State governments and Union Territories and officials of NDMA, National Disaster Response Force (NDRF), India Meteorological Department (IMD), Geological Survey of India (GSI), Ministry of Defence and Central Water Commission (CWC).

Meeting on Nipah virus outbreak

NDMA on May 23, 2018 conducted a meeting to review the status of Nipah virus outbreak reported from Kerala.

Representatives from Kerala apprised NDMA about the efforts that were made by the State Government in tackling and containing the outbreak. The State Government was constantly monitoring the situation in a proactive manner.

They also informed that experts from National Centre for Disease Control (NCDC), Ministry of Health and Family Welfare (MoHFW); All India Institute of Medical Sciences (AIIMS), New Delhi;



Safdarjung Hospital, Delhi and Department of Animal husbandry, Dairy and Fisheries (DADF) were already working with the State Government on the ground.

NDMA emphasised on the need to be prepared to take any necessary action at a short notice.

Representatives from NCDC, MoHFW, AIIMS, New Delhi, National Disaster Response Force (NDRF) and DADF attended the meeting.

Fire advisory council meeting

Lt. Gen. N. C. Marwah (Retd.), Member, NDMA, inaugurated the 39th standing fire advisory council meeting at the National Fire Service College in Nagpur, Maharashtra on May 24, 2018. The meeting was organised by the Directorate General Fire Service, civil defence and home guards, New Delhi.

State governments should encourage the modernisation of fire safety techniques, said Lt. Gen. Marwah. He also emphasised upon the proper implementation of national building code 2016, a set of guidelines for regulating the building construction activities.

He also urged citizens to take up basic disaster management training so that they act as first responders and reduce the impact in a disaster situation.



India at Understanding Risk Forum

At the fifth global Understanding Risk Forum, held from May 14-18, 2018, at Mexico City, Shri Kamal Kishore, Member, NDMA moderated a plenary session on 'Application of Artificial Intelligence in Disaster Risk Management'.

The session focused on challenges and opportunities presented by artificial intelligence and machine learning on issues related to disaster risk management.

It featured leading experts from the industry, including Nell Watson from Singularity University, Ahmad Wani from OneConcern, Stephen Winchell from US Intelligence Advanced Research Projects Activity (IARPA) and Melanie Warrick from Google.

Shri Kishore also represented India at the Consultative Group Meeting of the Global Facility for Disaster Risk Reduction. He also spoke on resilient infrastructure at yet another event at the Forum.

Training programme for CBRN emergencies

NDMA conducted a five-day basic training programme at the Sardar Vallabhbhai Patel International Airport from May 14-18, 2018. The training programme was aimed at enhancing the preparedness of Airport Emergency Handlers (AEHs) to respond to CBRN emergencies at the airports.

CBRN emergencies pertain to threats emanating due to Chemical, Biological, Radiological and Nuclear material.

The training programme was conducted in collaboration with the Airport Authority of India (AAI) and Institute of Nuclear Medicine & Allied Sciences (INMAS).

The programme consisted of lectures as well as field training, including live demonstrations of detection and decontamination including use of Personal Protective Equipment (PPE). Besides equipping the AEHs to handle CBRN emergencies, the training programme also enabled them to provide medical first aid and initial psycho-social support.



A total of 200 personnel were trained on various aspects of CBRN emergencies. This includes sensitization of 150 working level staff in a half day module.

Lectures on CBRN emergencies and IRS

NDMA conducted a lecture-training on 'Management of CBRN Emergencies in India' on May 16, 2018 at the Air Force Institute of Nuclear, Biological and Chemical Protection in New Delhi.

The lecture highlighted the existing and emerging threat dimensions of CBRN emergencies in India and the evaluation criteria to check preparedness of an organisation for a CBRN emergency.

The Authority also delivered a lecture on Incident Response System (IRS) at a workshop on Medical Management of CBRN Casualties at the headquarters of the Integrated Defence Staff in New Delhi on May 23, 2018.

IRS is an effective mechanism to systematically respond to an incident. By attributing roles and responsibilities to each stakeholder, it deconstructs a very complex response mechanism resulting in a swift and streamlined response.

It can be successfully implemented irrespective of size, location, type and complexity of a disaster in India. •



LIGHTNING

Lightning strikes are common in India during the monsoon season. As a majority of our population works outdoors, especially in the rural areas, lightning becomes a killer. More people die due to lightning than any other disaster with at least 2,000 deaths reported every year from across the country since 2005. On April 25, 2018, lightning lashed Andhra Pradesh more than 36,000 times in a 13-hour span.

Some striking facts about lightning from the Internet:

- Contrary to popular belief, lightning can strike the same location more than once.
- Palm trees can prevent lightning deaths. As lightning usually hits the tallest object, palm trees can work as lightning rods. Besides, these trees can also protect coastal areas from storms and cyclones.
- Lightning can destroy a tree it hits but it can also help plants grow. The extreme heat it generates aids the formation of Nitrogen oxides which combine with moisture in the air and lead to nitrate rich rainfall. This is essential for growth of plants.
- Thunder cannot occur without lightning. That's because thunder is the sound caused by rapid expansion of air around lightning.
- A single bolt is around 54,000 Fahrenheit or five times hotter than the surface of the sun.
- It can release enough energy to power a 100 watt bulb for 90 days.
- Lake Maracaibo in north-western Venezuela gets the highest number of lightning strikes.
- The fear of thunder and lightning is known as keraunophobia - kerauno is thunder/lightning and phobia is fear in Greek.
- The study of lightning is called Fulminology. Benjamin Franklin was a fulminologist (read about his kite flying experiment for the internet).

Caught in a storm outside ? Crouch to Survive a Lightning strike

Lightning likes to strike the tallest object around. Get as low as you can.

If your hair begins to stand on end or your skin starts to tingle, a lightning strike is imminent. However, lightning may strike without this warning.

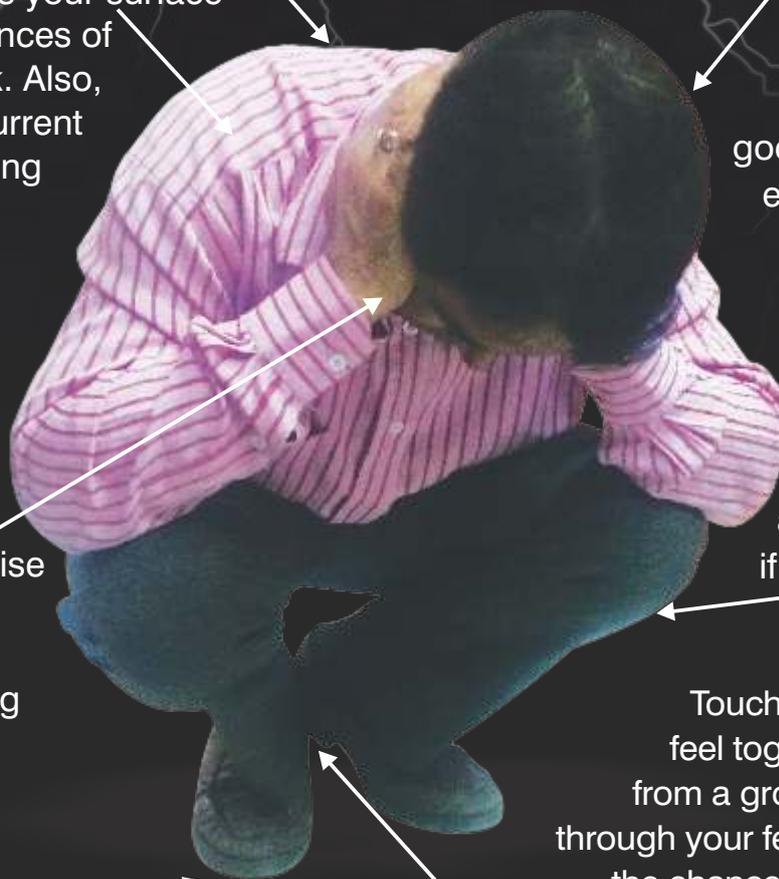
Do not lie down. This increases your surface area and chances of getting struck. Also, the electric current can move along the ground surface after striking at a point.

Do not touch good conductors of electricity such as metals, metallic pipes, electrical systems, TV, wires, cables, water, etc. as it can give you an electric shock if lightning strikes.

Put your hands over ears to minimise hearing loss from the accompanying thunder.

Touch the heels of your feet together. If electricity from a ground strike enters through your feet, this increases the chances of the electricity going in one foot and out the other, rather than into the rest of your body.

The only thing touching the ground should be the balls of your feet. Lesser your contact with the ground, lesser are the chances of current entering your body.





TAMING THUNDERSTORMS

During the summer months in north India, an occasional thunderstorm and rainfall may provide some respite from the intense heat. However, on the intervening night of May 2-3, 2018, a ferocious thunderstorm left a trail of death and destruction over large parts of this region. It claimed 150 lives and injured 365 persons. Uttar Pradesh and Rajasthan were the most affected with maximum damage reported from Agra.

In its bulletin on April 30, 2018, India Meteorological Department (IMD) predicted severe thunderstorm activity in the next three-four days. Short-range forecast, which provides weather outlook for the next three days, predicts a probability of thunderstorms over a wide area. As it can hint at the intensity but can't predict exact time and location, the bulletin did not point to Uttar Pradesh and Rajasthan.

“Thunderstorms cannot be predicted well in advance as they are very localised weather events and have an average lifecycle of about half to three hours,” said Dr. M. Mohapatra. Specific district-level warnings were issued once the time and location of the thunderstorm was accurately predicted in nowcasting, which gives updates for weather conditions likely to develop in the next three hours using radars, he added.

Despite the prediction and the warning, the thunderstorm turned lethal. Did we leave a gap? “The intensity of the thunderstorms on May 2, 2018 was unusually high. As the storm struck during the night; people were asleep when kuccha houses and tin sheds collapsed leading to deaths and injuries,” said Ms. Ajana, Review Office, Uttar Pradesh.

Meanwhile, the IMD, in its forecast on May 3, 2018, predicted more thunderstorms accompanied with squall in various regions in the days to come. There was no time to lose. The National Disaster Management Authority (NDMA) called a meeting of all stakeholders on May 4, 2018 to review the situation, enhance preparedness and ensure timely dissemination of early warnings. It was decided that IMD would share localised and specific warnings with the States, which would then be widely disseminated using various modes of communication such as SMSes, radio, Television and social media. The wide communication network of Doordarshan and All India Radio (AIR) would broadcast the warning messages within 15 minutes along with advisories to help people brace for the freak weather event.

Thunderstorms are localised weather events caused by heat, moisture in air, unstable atmosphere and a trigger. Always accompanied by thunder and lightning, usually with strong wind and heavy rain.

Average area over which a thunderstorm occurs 10-20 sq. km.

Average lifecycle of a thunderstorm 0.5-3.0 hours

NDMA also circulated simple Do's and Don'ts to follow before, during and after a thunderstorm/dust storms to the States. These were further converted into local languages and widely circulated among the public for greater awareness.

These efforts paid well when a dust storm hit the National Capital on May 7 and another bout of severe thunderstorms in various States on May 13, 2018. The IMD predicted the events right, the State Government acted on the warnings and people themselves took measures to ensure their safety. Despite the severity of the incident on May 13, 2018, the number of deaths and injuries were reduced by almost half.

NDMA again reviewed early warning and preparedness measures in two meetings on May 11 and May 14, 2018.

Collaborative efforts by NDMA, IMD, State Governments, Doordarshan, AIR and other stakeholders have improved our preparedness, warning and response mechanisms to thunderstorms and dust storms. •

Thunderstorms: How to help animals

- *Designate a safe area in or near your home to shelter your animals*
- *Keep your animals away from open water sources like ponds or rivers*
- *Keep your animals away from tractors and other metal farm equipments*
- *Don't let your animals congregate under trees*
- *Watch them closely and try to keep them under your direct control*



Dr. Mrityunjay Mohapatra



One thunderstorm after another kept hitting headlines the entire last month. To know more about them, Aapda Samvaad spoke with Dr. Mrityunjay Mohapatra, who is a senior scientist at the India Meteorological Department.



Q. Thunderstorms in May this year were very widespread and severe. Why?

The genesis of a thunderstorm is dependent on four factors - intense heating, moisture availability, instability in the atmosphere a trigger.

Lower level atmosphere and surface of earth should be hot. That is why thunderstorms activity is at its maximum during the summer season. Heating makes the parcel of air lighter and leads to low density of atmosphere.

If there is moisture, air becomes moist and hot, moist air is lighter than dry air and rises. As the air rises, it transfers heat from the surface of the earth to the upper levels of the atmosphere. The water vapour it contains begins to cool, releases heat, condenses and forms a cloud. The cloud eventually grows upward into areas where the temperature is below freezing and various types of ice particles can be created from freezing liquid drops.

Instability in the atmosphere is explained through lapse rate, which means change of temperature with height.

However, we don't get thunderstorms everyday

in the summer. Here, the 'trigger' comes into picture, which leads the air to move up rapidly. This triggering comes when there is a weather system. It may be a trough line, or a cyclonic circulation, or a Western Disturbance as it was this time around.

In May, frequent and intense western disturbance activity affected northwest India along with the development of associated cyclonic circulation over the region. As a result, there was more frequent and more intense thunderstorm and dust storm activity over northwest India.

Q. When do thunderstorms occur in India? Why?

Thunderstorms occur round the year in different parts of the country. However, its frequency and intensity is maximum during summer months (March to June) as the most important factor for occurrence of thunderstorms is the intense heating of the atmosphere at surface level. In addition to heating, the availability of moisture in lower levels over east and northeast India is also higher in April and May.

Q. Please explain the difference between thunderstorms, dust storms and squall?

Thunder storm: A storm characterised by the presence of lightning and thunder, formation of squall, strong updraft and downdraft, towering cumulonimbus associated with turbulence and icing, localised heavy rain and hailstorm.

Squall: A sudden increase of wind speed by at least 29 kmph with the speed rising to 40 kmph or more and lasting for at least one minute.

Dust storm: During the pre-monsoon season, the lowest atmospheric layers have very high temperature and relatively low moisture content, which makes the thunderstorms have high bases above the ground in the order of 3-4 km. As the ground remains dry over long periods, there is plenty of loose and fine dust available. These factors enable the severe thunderstorms of northwest India to generate dust storms. They are usually brief but can drastically reduce visibility and cause property damage and injuries.

Q. How does IMD forecast such incidents? How precise is this forecast?

Thunderstorm is a small-scale phenomenon and has a life cycle of up to only three hours. It has a dimension of up to 20 km to 30 km, and therefore, its detection is difficult. Automatic weather stations (AWS) provide some basic parameters such as wind speed, wind direction, temperature, pressure etc.

The second tool is a satellite, but it is watching from 36,000 km height. It takes about half an hour to capture the image and another half an hour to process the data. So, by the time someone sees the satellite imagery on IMD's website, it is already one hour late. Hence, a satellite cannot capture the initiation of thunderstorm unless it is a large-scale thunder activity.

The third tool is Doppler Weather Radar, which takes an observation every 10 minutes and can find out the occurrence of thunderstorms. Therefore, for better monitoring, we need a wider network of radars in the country.

To forecast thunderstorms, we utilise current weather observations from our observatories, automatic weather stations, satellite observation, and radars to define what is happening where in case of thunderstorms. Any observational instrument doesn't give a forecast. We have to develop expert tools to provide forecast based on these observations. And, for this, some statistical software is used that go for extrapolation. But statistical software has limitations.

We cannot predict occurrence and intensity of

thunderstorms from numerical models well in advance. At present, we have a global model with a resolution of 12 km and a regional model with resolution of 3 km. With these models, we can predict the area of occurrence broadly 3-5 days in advance.

Apart from these two models, there are some more models of other countries - a total of 10 models - that are taken into consideration every day at 10.30 AM by the IMD. All our forecasters across the country examine and discuss the output of these models through a video conference daily from 10.30 AM to 12 noon.

Based on consensus, we go for five days (120 hours) forecast. This is a general forecast issued four times in a day from our head office in Delhi and twice a day from our State offices. This forecast gives potential area for warning and is meant for preparedness and not immediate warning.

Q. How are immediate warnings issued then?

On the day of occurrence, when we find out about certain developments, we start nowcasting. Nowcasting is valid for the next two to three hours, thus it gives only a limited lead-time. This nowcast, which is at the district level, is provided to relief commissioners, state control rooms, district collectors, disaster management units etc. This alert is specific for a district.

The five-days forecast is for a meteorological subdivision. Nowcast is more specific and issued for a district with time of occurrence, intensity, wind speed etc. Nowcasting is issued any time when we are expecting a severe weather event.

Q. How are these warnings disseminated to the public?

At present, IMD does not issue nowcasting bulletin to the general public. However, in a recent meeting, it was decided by the NDMA that as soon as IMD issues any severe weather warning, it would be flashed to the mobile phone service providers so that it reaches the maximum number of people.

IMD, through its State-level offices, issues SMS-based alerts/warnings to All India Radio stations and Doordarshan for immediate broadcast/telecast to general public.

Besides, private TV channels and FM radio also communicate weather alerts and warnings to the common man.

Please visit NDMA's blog, www.ndmablog.in, for the detailed interview. •

DO'S AND DON'TS FOR THUNDERSTORMS/DUST STORMS

Before

- Prepare an emergency kit with essential items for safety and survival
- Secure your house; carry out repairs; don't leave sharp objects loose
- Secure outside objects that could blow away and cause damage
- Remove rotting trees/broken branches that could fall and cause injury or damage
- Listen to radio, watch TV or read newspapers for weather updates and warnings

During

- Keep a watch on local weather updates and warnings
- Try to stay indoors; stay off verandas
- Unplug all electrical equipment. Don't use corded telephones
- Don't touch plumbing and metal pipes. Do not use running water
- Stay away from structures with tin roofs/metal sheeting
- Don't take shelter near/under trees
- Stay put if you are inside a car/bus/covered vehicle
- Don't use metallic objects; stay away from power/telephone lines
- Get out of water – pools, lakes, small boats on water bodies – and take safe shelter immediately

After

- Stay away from storm-damaged areas
- Listen to local radio/TV stations for updated information or instructions on weather and traffic updates
- Help children, women, elderly and differently-abled
- Stay away from fallen trees/power lines and report them to nearest tehsil/district HQ immediately.



Address:

NDMA Bhawan

A-1, Safdarjung Enclave, New Delhi - 110029

Telephones : +91-11-26701700

Control Room : +91-11-26701728

Helpline Number : 011-1078

Fax : +91-11-26701729