

SEPTEMBER 2020



AAPDA SAMVAAD



GETTING A GRIP ON LANDSLIDES

Incident Response System (IRS) training and Table Top Exercise



To prepare stakeholders involved in disaster management, NDMA conducted an online IRS training & Table Top Exercise on Chemical (Industrial) disasters for the State of Goa on 8th September. Lt Gen Syed Ata Hasnain (Retd), Member, NDMA chaired the meeting.

On 9th September, Lt Gen Syed Ata Hasnain (Retd), Member, NDMA, chaired the online IRS Training and Table Top Exercise on earthquake for Tripura and on 10th September for the State of Meghalaya.

Lt Gen Syed Ata Hasnain (Retd), Member, NDMA chaired the meeting for an online IRS Training and Table Top Exercise on Earthquake for Nagaland.



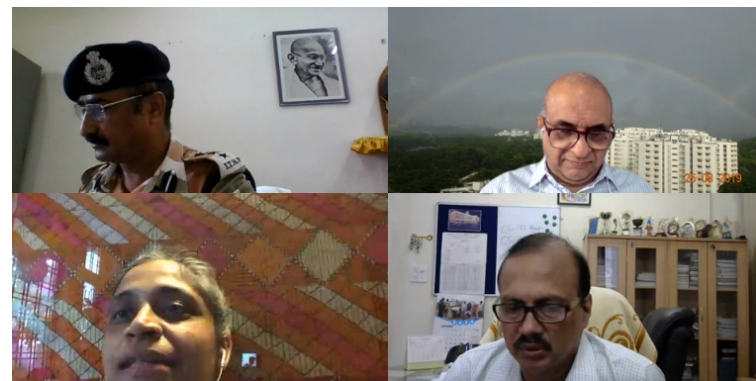
Aapda Mitra Project

On 17th September, Shri Rajendra Singh, Member, NDMA reviewed the progress of the implementation of Aapda Mitra project in Arunachal Pradesh, Jammu & Kashmir, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal. NDMA through its Aapda Mitra project trains community volunteers to deal with rescue and rehabilitation during a disaster.

Forest Fire

NDMA prepared a report on global best practices on Forest Fire Management and shared it with the Ministry of Environment, Forest & Climate Change on 4th September, to initiate necessary action to address forest fire issues in India. The report has been uploaded on NDMA's web-site for reference to all the stakeholders.

Glacial Lake Outburst Floods workshop



On 2nd September, a workshop was held in which technical presentations by NDMA, Indian and International experts were made with detailed deliberations for formulation of draft Guidelines and comprehensive GLOF mitigation projects by NDMA Task Force and SDC experts.

GETTING A GRIP ON LANDSLIDES

On their way to the Char Dham yatra to Badrinath for the first time, Mr. Verma (name changed) and his family were enjoying the cloudy weather on their route. Unfortunately, it began to rain heavily when they were halfway to their destination. They continued their journey with caution, but just a few minutes later got stuck in a 2-km-long jam. They could see from their car, with the little visibility the heavy rain permitted, that a massive piece of slope had slipped down and blocked the roadway.

A landslide is an uncontrollable downhill flow of rock, earth, debris; and is caused by heavy rainfall, earthquake etc. Landslides are among the major geological hazards that affect large parts of India about 12.6% of the landmass, excluding snow-covered areas. The Himalayas, the Northeastern hill ranges, the Western Ghats, the Nilgiris, the Eastern Ghats and the Vindhyans are heavily affected by landslides of a bewildering variety and pose chronic problems for the local communities.

Technology-Driven Solutions

There have been several tragedies attributed to landslides. In 1998, India witnessed the worst landslide which took more than 200 lives, and wiped out the village of Malpa in the Pithoragarh district of Uttarakhand. Almost 20 years later, as a result of massive rainfall, Kerala witnessed widespread landslides which resulted in heavy loss of life, property and environment. Recurring landslides demand that the problem therefore



needs to be tackled for mitigation and management, wherein hazard zones have to be identified and monitoring and early warning systems to be placed at selected sites.

Keeping in mind of the above, NDMA funded a



pilot project on 'Development of Low-Cost Landslide Monitoring Solutions.' This early-warning system, in collaboration with National Disaster Management Authority (NDMA), Defense Terrain Research Laboratory (DTRL) - Defense Research and Development Organisation (DRDO) is developed by Indian Institute of Technology (IIT) Mandi.

It is a low-cost landslide monitoring, warning, and prediction system, which has been field tested at a Gharpa hill and a number of other landslide sites across Himachal Pradesh and Uttarakhand. This system uses motion sensors to measure soil movements. Based upon the detected movement, the system is able to activate blinkers and hooters on the roadside wirelessly so that vehicular road traffic can be alerted. The blinkers and hooters come online for 10-15 seconds with lights and sound each time soil movement is recorded at the deployment site. In addition, the system also sends SMS messages about soil movements on mobile phones, where these messages can be used to alert disaster managers, local residents as well as policy makers.

While still being tested on a larger scale, the system has been able to generate messages about soil movements as well as severe weather advisories in advance. These predictions about soil movements and severe weather are developed via AI algorithms and machine learning models running in the cloud. Due to its low-cost and predictive abilities, this system provides immense possibilities for being used at other landslide-prone areas in India and promises reduction in losses caused by landslides in future.

Human Intervention

While landslides are considered naturally occurring disasters which may get triggered with the onset of earthquake, or continuous weathering and erosion of the slope; human-induced changes such as construction, mining and erosion have recently caused their upsurge.

At the individual level, there are ways to reduce the frequency of landslides, such as indulging in the habit of growing indigenous plants, whose roots help in keeping the soil together on slopes. It is best to avoid building houses at the base of slopes that are prone to landslides. The community should ensure that they don't indulge in the practice of informal settlements along the roadside.

While constructing on a slope, planned slope cutting along with implementing a design that suits the natural slope can go a long way in being safe from landslides. It is important to not obstruct natural streams or drainage paths during construction or in general as this can create blockage. One should also direct the surface water from land towards the natural gulleys enabling water to quickly drain away from the slope.

With the help of early warning systems and responsible citizen actions, it is possible to get a grip on landslides in India!



LT GEN SYED ATA HASNAIN (RETD), MEMBER, NDMA On Landslides

Recurring landslides in India bring forth the need to tackle the issue with utmost urgency. Aapda Samvaad spoke with Lt Gen Syed Ata Hasnain (Retd), Member, NDMA on the mitigation and management of landslides in India and how the threat of landslides can be reduced with a combined effort from communities and authorities.

How prone is India to landslides?

India is ecologically challenged by the phenomenon of landslides. According to the Geological Survey of India (GSI), about 12.6% of our land area is prone to landslides which translates to 24 States in India. The common perception is that most of this would be concentrated in the Himalayan belt, and looking at the risk mapping of landslide prone areas, the Himalayas do emerge as the most risk prone area. But, India has a fairly large percentage of area which is prone to landslides, such as in central India, the Vindhyas; the Western Ghats & Nilgiris, the Eastern Ghats and even the Andaman and Nicobar Islands.

How can we reduce the risk of landslides in India from the perspective of disaster management agencies?

Before the Disaster Management Act 2005 got enacted, the whole idea of disaster management in India was 'response centric.' But, since the last 15 years, India has adopted the international approach of disaster management which is mitigation and disaster risk reduction.

From the mitigation angle, a scientific approach has been adopted, particularly with multi-hazard risk mapping. In the domain of landslides, early-warning is still relatively less developed, however, the development of remote sensing and artificial intelligence are helping in this regard.

The important aspect in reducing the risk of landslides is the last-mile connectivity, which

means preparing the communities for landslides by giving them an early-warning and generating awareness with regards to the impending disaster.

What are the key initiatives by NDMA for mitigating the danger from landslides?

One of the hazards which is receiving the maximum attention after COVID-19 at the moment, is landslides. This is due to the ecologically fragile Himalayan region and other regions. It is very important for NDMA to always be on top of the situation and work towards mitigating the threat of landslides.

In this regard, NDMA had released the 'National Landslide Risk Management Strategy' in September, 2019. The strategy document is fulfilling the fifth target of Sendai Framework for Disaster Risk Reduction (2015-30) i.e., to substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.

The Strategy document addresses all the components of landslide disaster risk reduction





and management such as hazard mapping, monitoring and early warning system, awareness programmes, capacity building and training, regulations and policies, stabilization and mitigation of landslides etc.

NDMA has also launched pilot projects such as 'Landslide Risk Mitigation Scheme (LRMS)' to demonstrate benefits of landslide mitigation, provide financial and technical assistance to States of Sikkim, Mizoram, Nagaland and Uttarakhand for mitigation of site-specific landslides and to build their capacity.

What are the emerging technological trends to overcome the challenges of reducing the losses to landslides?

Artificial Intelligence (AI) is a contributing factor which is still evolving at the moment. Machine Learning and AI can give tremendous amounts of modelling. Using remote sensors, one can understand the most landslide risk prone areas, which helps one in the overall hazard mapping in the zones which are prone to landslides.

One pilot project conducted by NDMA in collaboration with IIT Mandi and Defense Terrain Research Laboratory (DTRL)-DRDO (New Delhi) is 'low-cost landslide monitoring solution.' Under this project, low cost sensors and other instruments for landslide monitoring through Micro- Electro-Mechanical Systems (MEMS) based sensors technology is developed with the

application of Artificial Intelligence, Machine Learning and Internet of Things (IoTs). Making use of modern day communication with machine modelling of hazard warnings is going to emerge in the near future.

How can communities and individuals contribute in reducing landslide risk?

One of the ways communities and individuals can contribute in reducing landslide risk is through awareness and preparedness. The best knowledge of any potential hazard always exists in the local community because there is a historical pass down of information. However, there is a need to create the inquisitiveness among the communities to be fully aware of the upcoming scientific methodologies by which early warnings are given. This can be done through different awareness platforms including social media.

NDMA through its Aapda Mitra programme, gives importance to building resilience among community members by training volunteers to be first responders during a disaster. The risk of landslides can also be reduced through mindful citizen actions, local interventions and methods. Along with that local authorities and bodies must also understand their role and responsibilities in the enforcement of regulations and codes in construction practices such as houses, roads and other infrastructure in hilly terrain with involvement of local communities.

Earthquake

The trouble of rubble

Living in a 15 year old house, Mr. Dhawan (name changed) rarely paid attention to the cracks in the ceiling and loose shelves on the walls. His neighbour told him to repair the damaged walls countless number of times, but Mr. Dhawan, who lived alone, had already adjusted to the broken-ness of his house. On the morning of 26 January 2001, when Mr. Dhawan was leaving his house in Bhuj to attend the Republic Day Celebrations in his society's park, a massive 7.9 magnitude earthquake struck. Luckily he had reached the park, dropped down and covered his head with his hands and stayed in the open space. While he was safe along with other people, he saw his house tumble down to pieces in front of his eyes. There was nothing left, only rubble. The sudden tremors, shaking or vibration of the

earth's surface is called an Earthquake. There are natural factors as well as some man made factors. Natural factors like disturbance in the earth's crust (uppermost layer of the earth) or movement of earth's plates shows up as an earthquake on the surface of the earth. Volcanic eruption, hitting of a meteor on the earth, or an underground explosion can also cause tremors.

Prior disaster experience is one key driver of preparedness and the 2001 Bhuj earthquake is a lesson in hand. To reduce the potential for human, material, or environmental losses caused by earthquakes, modern disaster management goes beyond post-disaster assistance and includes pre-disaster planning and preparedness activities, organizational planning, training, information management etc.

Preparing ahead!

Even after all the advancement in the technology sector, earthquakes still cannot be predicted, but the impact can certainly be minimized with proper preparation. For this purpose, consulting structural engineers and designing the infrastructure of our cities to be as earthquake-resistant can help in long term prevention from earthquakes. Damage to buildings is a serious cause of human injury and death during an earthquake. For old homes, it is advised to know whether it complies with the National Building Codes (NBC) to identify potential weaknesses. One should closely inspect their house and also their workplace to determine if there are structural dangers such as cracks on walls and ceilings and work towards repairing them. Fastening shelves securely to walls and placing heavy/large objects on lower shelves also helps in preventing damage during an earthquake.

When an earthquake does strike, remember the **Drop-Cover-Hold** technique. **Drop** on your hands



and knees, **Cover** your head and neck with your hand and seek shelter under a table or sidle up to the interior wall, away from tall objects that might topple. **Hold** onto the leg of a table or if you're outside continue to shield your head and neck with your arms.

Even after an earthquake subsides, one has to be careful of the aftermath including aftershocks. One shouldn't enter damaged buildings, and if stuck in rubble, make sure to protect the nose, mouth and eyes from dust. Make noise by whistling or tapping on a surface to get attention. When outside, one should be careful from hazards like fallen electrical lines, ruptured gas pipes etc.



Towards a quake-resilient future!

Frequent earthquakes have increased the importance of mainstreaming earthquake resistant infrastructure in India. Several codes on earthquake engineering have been produced in construction of quake resistant structures and regarding tests & measurements therewith by the Bureau of Indian Standards. Various mechanisms have been adopted while designing buildings which make them more earthquake resistant, such as bracing, base isolation, dampers etc, to enhance building vibration control. Vibration control is the reduction of desired building structural response to earthquake or wind forces on the structure.

One should also be aware of the necessary compliances and guidelines while making buildings. Awareness regarding prevention methods during an earthquake along with relief and reconstruction is a must for people.

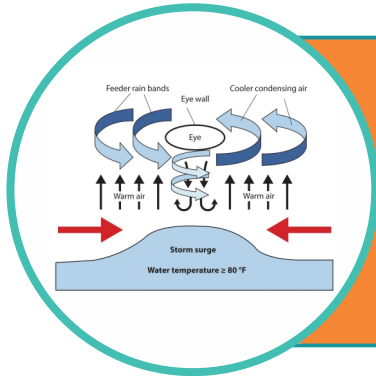
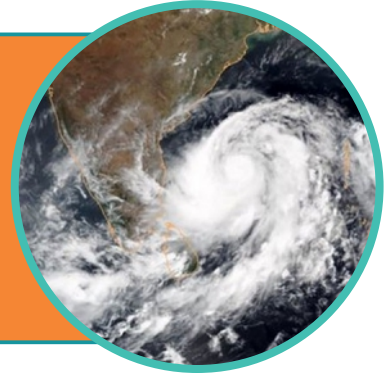
Continuous inspection and care of buildings is also critical in minimizing damage from earthquakes. An earthquake can strike anytime but it's upon ourselves to be prepared for tomorrow which can help to save our present. Precaution is better than cure that is why, to be little cautious today can help us to tackle the danger tomorrow.

THE FIVE FAQs- CYCLONE

1

What is a cyclone?

A cyclone is an extreme weather phenomenon caused by disturbances around a low pressure area over water bodies. Winds spiral around the centre of this low pressure area in a snake-like coil and gather speed. These winds rotate counterclockwise in the northern hemisphere and clockwise in the southern hemisphere.



What are the conditions in which a cyclone is formed?

A warm sea (a temperature in excess of 26 degrees Celsius to a depth of 60 m) with abundant and turbulent transfer of water vapour to the overlying atmosphere by evaporation. Also, atmospheric instability encourages formation of massive vertical cumulus clouds due to convection with condensation of rising air above the ocean surface.

2

3

How can one prepare for a cyclone?

Keeping mobile phones charged to ensure connectivity, checking verified sources of information for weather updates, keeping valuables and important documents in water-proof containers, along with preparing an emergency kit helps in preparing for a cyclone. It is also important to secure the house by carrying out repairs and ensuring that sharp objects are not loose.



What to do if one is outside during a cyclone?

If one gets stuck outside during a cyclone, they should seek safe shelter as soon as possible but ensure to not enter damaged buildings. They should also watch out for broken electric poles, wires and other sharp objects.

4

5

How can fishermen be safe from a cyclone?

A fisherman should be updated with the information regarding an impending cyclone from various communication channels such as radio or television. Keep their boats/rafts tied up in a safe place and not venture out in the sea.





No Carelessness until there is a Cure



Stay Protected from Corona



**Frequently wash
your hands with soap**



Maintain safe distance



Wear your mask properly



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