

Special Issue

Samvād

 NDMA's Newsletter



INDIA'S FIRST DISASTER PLAN

- Ahmedabad Heat Action Plan
- Photo Feature: Earthquake Mock Exercise
- BRICS Meeting on Disaster Management
- Interview on Urban Floods



Do not suffer, plan before floods occur

Emergency Helpline No.
011-1078

BEFORE FLOODS

- Ignore rumours and stay calm. Avoid panic situations
- Keep your mobile phones charged and ON
- Know the route to the nearest safe shelters
- Listen to radio or watch television for the latest weather bulletins and flood warnings. Staying in touch with local officials is advisable. Follow instructions when asked to evacuate
- Keep strong ropes, a lantern, battery operated torches and extra batteries ready
- Keep the First Aid kit ready with extra medication for snake bite and diarrhea
- Keep your blood group information handy
- Keep umbrellas and bamboo sticks with you for protection from snakes
- Keep cattle untied to ensure their safety
- Keep a stock of fresh water, dry food, candles, matchbox, kerosene, etc. handy

DURING FLOODS

- Avoid entering flood waters. If you need to enter, then wear suitable footwear
- Stay away from sewerage line, gutters, drains, culverts, etc
- Stay away from electric poles and fallen power lines to avoid electrocution
- Do not let children remain on empty stomach
- Use bleaching powder and lime to disinfect the surroundings
- Eat freshly cooked or dry food. Always keep your food covered
- Drink boiled water or use chlorine tablets to purify water before drinking as advised by Health Dept

AFTER FLOODS

- Do not try to leave the safe shelter to go back home until the local officials declare normalcy.
- Do not allow children to play in or near flood waters
- Don't use any damaged electric goods, get it checked by an electrician before using it
- Watch out for broken electric poles, damaged bridges, broken glass, sharp objects and debris
- Volunteer to help people who may need assistance
- For any relief work call the emergency control room numbers provided below
- Don't use the toilet or tap water if the water lines or sewage pipes are damaged
- Do not eat food that has been in flood waters
- Use mosquito nets to prevent malaria

IF YOU NEED TO EVACUATE:

- Pack clothing, essential medication, valuables, personal papers, etc. in water proof bags to be taken to the safe shelter
- Raise furniture, appliances on beds and tables
- Put sandbags in the toilet bowl and cover all drain holes to prevent sewage back flow
- Turn off power and gas connection before leaving the house
- Move to a higher ground where people and animals can take shelter
- Do not enter deep, unknown waters

Issued in public interest by:

National Disaster Management Authority

NDMA Bhawan, A-1, Safdarjung Enclave, New Delhi - 110029

Follow us on:



For more information log on to: www.ndma.gov.in

Samvad

NDMA's Newsletter

September 2016**CHIEF EDITOR**
Mamta Kundra**MANAGING EDITOR**
Bhupinder Singh**Dy. CHIEF EDITOR**
Abhishek Shandilya**TEAM 'THE SAMVAD'**
Anshupriya
Hitesh Chandna**DESIGN & LAYOUT**
India Offset Press**Letters should be addressed to**
NDMA Bhawan, A-1, Safdarjung
Enclave, New Delhi-110029
Phone: 011-26701700**All rights reserved.****Any reproduction of this
publication's content, in whole or
in part, without written permission
is prohibited. Samvad does not
necessarily agree with the views of
the writers/contributors.****Publisher: National Disaster
Management Authority and Printer:**
India Offset Press, (An ISO Certified
Unit) A-1, Mayapuri Industrial Area,
Phase-1, New Delhi- 110064**Phone: 011-28116494, 28115486****Email: samvaad@ndma.gov.in****Message**Dear Readers,
Greetings.

It gives me immense pleasure to bring to you this issue of Samvad.

The year 2016 has been a milestone year as the National Disaster Management Authority has come out with the nation's first-ever National Disaster Management Plan. Unveiled by the Hon'ble Prime Minister, Shri Narendra Modi Ji, on June 1, this Plan clearly spells out the roles and responsibilities of all stakeholders for specific disasters. With the NDMP in place, India has also become one of the first countries in the world to align its National Disaster Plan with the Sendai Framework.

A collective response is better than individual response, and India is willing to stand shoulder to shoulder with other players in working towards a disaster resilient world. To this end, a meeting of the BRICS Ministers on Disaster Management was held at Udaipur in Rajasthan in August and an Asian Ministerial Conference on Disaster Risk Reduction will be held in New Delhi in November. Both the events are aimed at enhancing regional cooperation towards disaster risk resilience.

Flooding is a major cause of concern in India. In the recent past, we have noticed an increasing trend in instances of urban flooding. This issue focuses on various aspects of flooding, including urban flooding.

One way of improving the country's disaster resilience is by preparing the stakeholders and the communities for any eventuality. NDMA regularly conducts mock exercises at various locations for specific disasters across the country wherein it trains the local district administration and other stakeholders to respond swiftly in a planned manner.

We have tried to give Samvad a new look and feel. I hope you will find this experiment interesting, informative and enjoyable. We look forward to your feedback and suggestions.

Stay alert, stay safe!

R.K. Jain (IAS - Retd.)
Member, NDMA

Table of Contents

SNIPPETS 1-5

NDMA INITIATIVES

Mock Exercise on Earthquake Preparedness 6-7

PHC Security Staff Trained for CBRN Emergencies 8-9

SUCCESS STORY

Ahmedabad Heat Action Plan 10

Andhra Pradesh Beats the Heat 11

Collective Hope Bears Fruits in Arid Rajasthan 12-13

COVER STORY

India's First National Disaster Management Plan 14-17



SPECIAL FEATURE

BRICS Meeting on Disaster Management 18-21

Incident Response System 22-23

IN FOCUS

Flood Safety Awareness is Key 24-25



tête-à-tête

Dr. Kapil Gupta on Urban Floods 26-29

PHOTO FEATURE

Mock Exercise 30





EEW Meeting: Professor Ashok Kumar of IIT Roorkee making a presentation on a Regional EEW

Meeting on Earthquake Early Warning System

In the backdrop of the fact that Earthquakes cannot be predicted as is the case with other disasters, the National Disaster Management Authority (NDMA) met experts on May 4, 2016 to understand and evaluate existing technologies in Earthquake Early Warning (EEW) Systems. EEW uses sensors to detect any movement in the Earth and alerts people (and other systems) when an Earthquake of high intensity is just about to hit their location.

Professor Ashok Kumar, IIT Roorkee made a presentation on a Regional EEW that is being operated in Uttarakhand by IIT Roorkee. Seismologist Dr. Arun Bapat explained the operating principle behind regional EEW and its effectiveness.

The meeting was attended by officials from Ministry of Home Affairs, Ministry of Earth Sciences, Government of Haryana, Government of Uttarakhand, Department of Science & Technology, Structural Engineering Research Institute, Chennai and Technology Information

Forecasting and Assessment Council (TIFAC).

Video conference on Heat Wave preparedness

The National Disaster Management Authority (NDMA) conducted a review meeting of the heat wave prone States on May 13, 2016 to ensure effective preparedness and mitigation measures. Shri R.K. Jain, Member, NDMA, who chaired the review, emphasized that loss of lives due to a heat wave should be significantly reduced. He requested the participating States to ensure that people are made aware of the simple ways of mitigating and managing heat waves.

A detailed review of the preparedness of the States in terms of having a heat wave action plan, providing shelters, drinking water, change in work timings to avoid peak heat impact for labourers, medical treatment, etc. were discussed. The States were also apprised of the seasonal alerts and heat wave warnings by the Indian Meteorological



Heat Wave Preparedness Videocon : Shri R.K. Jain, Member, NDMA (left) reviewing the preparedness of heat wave prone States

Department that are being issued five days in advance for the first time.

The participating States viz. Andhra Pradesh, Bihar, Chhattisgarh, Delhi, Gujarat, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Telangana, Uttar Pradesh and West Bengal were asked to share their Action Plans along with a summary of the initiatives that they had taken to mitigate the impact of heat waves. The States were also advised to prepare an exclusive database of deaths and losses due to heat waves.

NDMA meets TSPs to discuss their role in disasters

In a meeting with Telecom Service Providers (TSP) on May 19, the National Disaster Management Authority (NDMA) called for their pro-active participation in mitigating losses during disasters. Underlining the importance of communication networks, NDMA said it requires proactive involvement of all stakeholders, including telecom service providers, in disaster management.

Shri R.K. Jain, Member, NDMA, who chaired the meeting, informed that telecom service providers would now be included in NDMA's forecasting and pre-disaster information sharing system. This would enable forecasts and pre-disaster warnings to reach them, and thus the public, at the

earliest. They would be included as essential service providers/key stakeholders in the State and District Disaster Management Plans and would also be invited to participate in the mock exercises carried out by NDMA.

Lt. Gen. N.C. Marwah (Retd.) and Dr. D.N. Sharma, Members, NDMA; senior officials of NDMA; representatives of Association of Unified Telecom Service Providers of India (AUSPI) and Cellular Operators Association of India (COAI) as well as various telecom service providers attended the meeting.

National Disaster Management Services (NDMS) Pilot Project

The National Disaster Management Authority (NDMA) has taken up a pilot project for connecting the Control Rooms of the Ministry of Home Affairs (MHA), NDMA, headquarters of the National Disaster Response Force (NDRF), all the States and Union Territories as well as 81 hazard-prone districts. The project, National Disaster Management Services (NDMS), aims to provide failsafe communication infrastructure and technical support for Emergency Operation Centres (EOCs) in the case of a disaster.

The project will use advanced technology such as Very Small Aperture Terminal (VSAT), voice calls, Internet, email, video, satellite

phones and High Frequency Radios, among others, to connect the 120 Control Rooms.

The project, sanctioned in January this year, will cost approximately Rs. 19.54 crore.

Lakshdweep's Minicoy Island to get Evacuation Centre soon

An evacuation-cum-community centre will be constructed at the Minicoy Island, Lakshadweep at an estimated cost of approximately Rs. 3.09 crore. The Centre, to be constructed within two years, will be funded out of the Prime Minister National Relief Fund (PMNRF).

A Memorandum of Understanding (MoU) between the National Disaster Management Authority (NDMA) and the Lakshadweep administration is being finalised. Meanwhile, a Technical Advisory Committee with experts from IIT-Kharagpur and Structural Engineering Research Centre (SERC), Chennai has already been formed to assess the proposal of the Public Works Department of Lakshadweep.

Roadmap for urban flood mitigation

The National Disaster Management Authority (NDMA) conducted a two-day workshop on 'Urban Flood Mitigation - Lessons Learnt and Roadmap for Future' on February 12 and 13, 2016 in New Delhi. Important aspects of urban flood mitigation and management, including urban land use planning, early warning systems and real time rainfall/cyclone monitoring, flood forecasting and reservoir management, urban flooding in the context of changing climate and drainage issues, were discussed.

An Expert Group was constituted in March, 2016, under the chairmanship of Shri Kamal Kishore, Member, NDMA, for preparing a roadmap for urban flood mitigation.

The group first met on April 12, 2016. During the second meeting



Urban flood meeting: TARU Leading Edge Pvt. Ltd. Chairman G.K. Bhat talking about the 'Surat Model of urban flood early warning system'

of the expert group, held on May 13, 2016, TARU Leading Edge Pvt. Ltd. chairman G.K. Bhat made a presentation on the 'Surat model of urban flood early warning system'. He said it was important to understand how people react at the time of flooding. He further opined that lessons learnt from the past should be documented.

The meeting emphasized upon the need to involve Telecom Service Providers, who can play a key role in disseminating information before, during and after a disaster. It further stressed upon the need to review and strengthen communication channels so that communication failures at the time of flooding, as was seen in the case of Chennai last year, were minimized.

A 10-point advisory for immediate attention on urban flood preparedness and mitigation was also sent to flood-prone States/UTs as decided by the Committee so that they may take timely and effective mitigation measures.

Towards a GIS and Geo Database in NDMA

A project for establishing a Geographical Information System (GIS) service and creating a Geo Database in the National Disaster Management Authority (NDMA) was



Teachers' training: Teachers participating in a workshop on school safety in Gurgaon, Haryana

sanctioned in January, 2016 at a cost of Rs. 3.30 crore. The project is to be completed in 24 months. A dedicated work space for GIS services has already been created on the first floor of the NDMA Bhawan. Dedicated hardware for the server, workstations and the software for ArcGIS (a GIS for working with maps and other geographical information) have also been installed.

Workshop on school safety

The National Disaster Management Authority (NDMA) conducted a workshop on school safety on May 13, 2016 at the State Council of Education and Training (SCERT) in Gurgaon, Haryana. A total of 250 participants, including principals and teachers from various

schools in Faridabad and Gurgaon participated in the workshop.

Pilot project on handling radiological emergencies launched

The National Disaster Management Authority (NDMA) has launched a pilot project to train police and National Disaster Response Force (NDRF) personnel on managing radiological emergencies at public places. The project aims to extensively train select officers who will then prepare other personnel to handle such emergencies. Radiation detectors and radiation measuring instruments will be installed in police patrol vehicles under the project. Moreover, police stations will be provided radiation safety kits.

The first batch of 39 officers were trained by faculty from the Bhabha Atomic Research Centre (BARC). The comprehensive training session included lectures, seminars, field exercises as well as hands-on training and was organised at NDRF's 5th Battalion location in Pune from May 16, 2016 to May 28, 2016.

Assisting landslide-prone States in Capacity Building

The Landslide Risk Mitigation Scheme, approved under the 12th Five Year Plan (2012-17), was envisaged to provide central assistance to vulnerable States by starting pilot projects in each State and building up their capacity to



Pilot Project on MRDS: Police and NDRF personnel attending a training session on Mobile Radiation Detection System

take up other Landslide Mitigation Projects. The National Disaster Management Authority (NDMA) has prepared a Detailed Project Report (DPR) template and shared it with the vulnerable States and Union Territories. It has also invited DPRs from these States confirming that they would share the cost of the pilot project - up to 20 per cent for North East/Himalayan States and 50 per cent for other States.

Assam, Mizoram, Nagaland, Uttarakhand, Sikkim, Himachal Pradesh and Goa have already shared their DPRs, which are being evaluated by experts.

National Cyclone Risk Mitigation Project: An assessment

The success of this flagship programme of the National Disaster Management Authority (NDMA) became well evident when Cyclone Phailin struck India in 2013 but failed to do any major damage as early warning and timely evacuation saved

hundreds of thousands of lives. The National Cyclone Risk Mitigation Project, launched to address the cyclone risk in the country, covered Andhra Pradesh and Odisha in its first phase at a cost of Rs. 2331.71 crore.

By the end of this year, state-of-the-art Early Warning Dissemination Systems (EWDS) will be installed covering 15 coastal districts of the aforementioned States to ensure that advanced warnings reach even the last person on time. More than 14 lakh vulnerable people in Andhra Pradesh and Odisha have benefitted by the construction of 255 cyclone shelters, 770 kilometres of roads, 20 bridges and 22 kilometres of saline embankment. Various other infrastructure development projects for cyclone risk mitigation are underway. They would be completed by October next year.

Cyclone shelters, once completed, are handed over to the Shelter Management Committee headed by a local official/Sarpanch/Self Help

Group with active participation of the coastal community. These centres serve as schools, anganwadis, Panchayat offices, etc. during normal times.

Web-based Composite Risk Atlases for 13 coastal States and Union Territories are also being developed. These atlases will help in estimating the risk and thus, in planning mitigation and response measures. A Post Disaster Need Assessment (PDNA) study has also been taken up to develop standardised PDNA tools and integrate India's PDNA system according to these tools.

The second phase of NCRMP that started in July 2015, caters to Goa, Gujarat, Karnataka, Kerala, Maharashtra and West Bengal. This phase will be completed by March, 2020 and will cost Rs. 2361.25 crore.

The work of underground cabling to protect power lines during cyclones would also be undertaken in this phase.



Major cities to get their Earthquake Disaster Risk Index (ERDI)

Select cities in Seismic zones IV and V will soon get their Earthquake Disaster Risk Index (EDRI). EDRI is a composite index that allows direct comparison of the relative overall earthquake disaster risk of cities worldwide, and describes the relative contributions of various factors to that overall risk (R.A. Davison in June 1997 for John A. Blume Earthquake Engineering Center at Stanford University) The National Disaster Management Authority (NDMA) has awarded this project to the International Institute of Information Technology (IIIT), Hyderabad.

The Rs. 45.87 lakh project, initiated in April, 2016 will be completed within 18 months. A Steering Committee and a Technical Committee have been formed to review the implementation of the project.

Upgraded Earthquake Hazard Maps and Atlases

Building Materials & Technology Promotion Council has prepared upgraded hazard maps and atlases for the country, all the States and Union Territories as well as the districts. These maps and atlases, approved by the Survey of India, have already been printed and will soon be dispatched to the concerned authorities.

Project on Capacity Building for Trauma Life Support

With an aim to enhance the trauma handling capacity in the country, the National Disaster Management Authority (NDMA) jointly with AIIMS Trauma Centre conducted a three-day ATLS-ATCN (Advanced Trauma Life Support-Acute Trauma Care for Nurses) programme from June 9 to June 11, 2016 at the AIIMS Trauma Centre. The NDMA has already successfully conducted three pilot projects on ATLS-ATCN.

A total of 17 doctors and 11 nurses of the Uttar Pradesh Government participated in the programme.

The programme included lectures on Basic as well as Advanced Trauma Management followed by sessions in the multiple skills lab and at simulatory stations. Here, the participants got a real time overview of managing principles of a trauma victim and hands-on training in performing interventions and procedures.

It is important to boost India's trauma capacity given the increasing number of road accidents and disasters, both natural and man-made.

A series of 12 such programmes are scheduled to be completed by the end of this year. Health care professionals from various States will participate in this programme.

Disaster Management Training Capsule conducted

The National Disaster Management Authority (NDMA) conducted a three-day training capsule for Associated National Cadet Corps Officers (ANOs), Civil Defence and Nehru Yuva Kendra Sangathan (NYKS) at 11 locations of National

Disaster Response Force (NDRF) across the country. More than 270 people participated in the training programme.

IRS training held in Uttarakhand

The National Disaster Management Authority (NDMA) conducted a State-level training programme on the Incident Response System (IRS) in the seven vulnerable districts of Uttarakhand from April 4 to April 25, 2016. This training will enable the State Government to form Incident Response Teams involving all nodal officers and Emergency Support Functionaries (ESF) at various levels. It will help the field-level teams to respond to any disaster in a systematic manner.

Disaster awareness training for NCC Cadets

The National Disaster Management Authority (NDMA) coordinated a Disaster Awareness Training Programme for 500 National Cadet Corps cadets at various NCC camp locations across Delhi on May 31, 2016.

The training was given through District Disaster Management Authorities and Delhi Fires Services. □



IRS Training: A State-level training on the Incident Response System



Mock Exercise on Earthquake Preparedness

– Anshupriya

Damaged residential apartments, shopping malls, school buildings and hospitals – Faridabad woke up to survivors and dead trapped under the rubble after a devastating earthquake rocked it on May 19 this year. With a razed Mini Secretariat also reporting a massive gas leak, the nerve of city administration was rendered useless too.

Down but not out, concerned officials and volunteers assembled within half an hour at the Sports Complex near the wreck of a Mini Secretariat. Incident Commanders were identified and rescue teams formed under them. Essential resources such as doctors, healthcare staff, vehicles, fuel, earth movers, National Disaster Response Force (NDRF) teams, Civil Defence volunteers and Home Guards were included in each team. As the communication networks were damaged, wireless sets were also distributed so that the teams could stay in touch with the Emergency

Operation Centre. They were then dispatched to their respective locations, viz. The Mini Secretariat - Faridabad, a hospital, a high-rise residential complex, a shopping mall and a school.

All the concerned agencies such as Traffic control, Fire Fighting department, Ambulances, Police and Civil defence came together for the rescue operation. Using various techniques, people buried under the rubble were rescued, given preliminary first aid and sent to hospitals. “We are using bands of different colours for earmarking the patients – yellow for the injured, red for the severely injured and black for the dead. We are giving basic first aid and referring patients to hospitals depending on the severity of the injury,” said Dr. Pathikrit, who was manning a medical post at one of the devastated sites.

The aforementioned scenario is, thankfully, not an actual one. It is a description of a mock exercise

performed in Faridabad for earthquake preparedness. The imaginary earthquake was Faridabad’s way of confronting the disaster. Situated as it is in the seismic zone IV, Faridabad is prone to high intensity earthquakes. An earthquake measuring above 6.0 on the Richter Scale can cause major catastrophe both in terms of lives and infrastructure.

The activities were a part of the mock exercise conducted by the National Disaster Management Authority (NDMA) in collaboration with the district administration. Aimed at assessing the preparedness and response mechanism of all Government agencies of the district in the event of a high intensity earthquake, the exercise tried to create a scenario close to reality. By reducing the fear and anxiety of the unknown, mock exercises help contain a panic situation during a disaster as the participants have already lived through the simulated reality and

know exactly how to save themselves and help others when a real disaster occurs. These drills also help in spreading awareness about the Do's and Don'ts and basic preparedness, mitigation and prevention measures for any disaster.

Mr. Mahabir Prasad, SDM Faridabad, who acted as an Incident Commander for one of the teams, said such exercises play a vital role in enhancing preparedness and response, especially for earthquakes as they strike without warning.

Describing his experience of watching the exercise as enriching, liftman Shri Ranjit Singh opined that security guards, liftmen and even the common man should be given such trainings regularly.

NDMA's Maj. Gen. V.K. Datta (Retd.), who led the exercise, monitored the entire operation closely. In the post-exercise analysis, all the Incident Commanders, defence



Rescue Efforts: Security personnel carrying an injured person

personnel and other participants discussed the challenges they faced during the exercise. While suggesting improvements to ensure better response in the event of a disaster, Gen. Datta said that coordination among various agencies is the key in any post-disaster response. He emphasized that pre-planning is important, and such mock exercises

bring out the nuances of a real operation. "They help in filling gaps, ensuring better communication and thus improving coordination among various agencies," he added.

NDMA has conducted more than 500 mock exercises on various disasters throughout the country to improve preparedness and response mechanisms. □



Administering First Aid: Healthcare professionals attending to the injured during the mock exercise

Parliament security staff trained by NDMA to handle CBRN emergencies

– Hitesh Chandna



Welcome Note: Dr D.N. Sharma, Member, NDMA, addressing the participants during the PHC security staff training programme

The National Disaster Management Authority (NDMA) conducted a five-day comprehensive training programme for security staff of the Parliament House Complex (PHC) from May 23 to May 27, 2016. The specialized training programme was aimed at preparing the security staff to handle Chemical, Biological, Radiological, Nuclear (CBRN) threats on recommendations from Joint Parliamentary Committee. This time the module was conducted for five days in place of the earlier programme of three day format. It was attended by 44 Parliament House security personnel.

Shri R.K. Jain and Dr. D.N. Sharma, Members, NDMA, motivated the participants to take keen interest in the course while addressing the inaugural session.

Chemical, Biological, Radiological, Nuclear (CBRN) terrorism has become a reality and we need to be prepared

for the same. Each facet of CBRN has different characteristics and thus, different response mechanisms are needed to handle them, said Shri B.

Pradhan, Joint Secretary, Capacity Building and Training, NDMA. He added that adverse impacts of CBRN disasters can be minimized with comprehensive planning, preparedness and a prompt and effective emergency response.

Trained National Disaster Response Force (NDRF) team demonstrated the response mechanism of all stakeholders by conducting a mock drill in a simulated chemical terrorism scenario at 8th Battalion base in Ghaziabad. The drill highlighted the importance of using Personal Protective Equipment while handling CBRN eventualities. To deal with cases of CBRN threats holistically, the participants were also taught about the psychological impact of CBRN terrorism and how to manage it. The theoretical lectures were followed by practical sessions.

Dr. Saurabh Dalal, NDMA Consultant for Medical Preparedness and Biological Disasters, and



Trained healthcare professionals demonstrating basic life support techniques to the participants



Trained NDRF personnel demonstrating the response mechanism during a CBRN mock drill

Course Coordinator, highlighted the importance of combining technology and training to counter emergencies. He emphasized on the importance of hands-on training on medical preparedness for security personnel to help them deal with any CBRN eventuality.

Increasing global threat

Briefing the participants about the hazardous effects of various chemicals, Mr. Amit Tuteja, NDMA Consultant for Chemical Disasters, talked about the increasing global threat of chemical eventualities and ways to counter such threats.

Experts from AIIMS Trauma Centre and Delhi Fire Services also demonstrated the working of a HazMat (Hazardous Materials) vehicle. These vehicles are especially equipped to deal with spills of hazardous material. Basic life support, triage and casualty carrying techniques were also demonstrated to the participants.

“This hands-on experience has improved my understanding of CBRN

disasters in a very effective manner. The training session has cleared all my doubts and I feel I am now better equipped to save myself and others during CBRN emergencies,” said Shri Rajinder Deep, a participant.

The sensitization programme is the 16th in a series that first began in 2010. The programme aims to train around 2,000 security personnel deployed at the Parliament House Complex. □

Chemical, Biological, Radiological, Nuclear (CBRN) terrorism has become a reality and we need to be prepared for the same. Each facet of CBRN has different characteristics and thus, different response mechanisms are needed to handle them. Adverse impacts of CBRN disasters can be minimized with comprehensive planning, preparedness and a prompt and effective emergency response.



On Display: Participants being introduced to equipment used in handling CBRN emergencies

Ahmedabad Heat Action Plan

– Dr. Dileep Mavalankar
Director, Indian Institute of Public Health, Gandhinagar



Quenching their thirst: People stopping by at a drinking water kiosk

Indian summers are known not just for their mangoes but also for the extreme hot weather. In Rajasthan, during peak summer season in May, temperatures touching the 50 degrees Celsius mark is a usual occurrence. This period also brings severe heat wave conditions in many other parts of the country.

Heat waves may result in dehydration, heat exhaustion, stress and even a fatal heat stroke. While it may affect anyone, children, elderly, people suffering from chronic diseases

and daily wage earners form the most vulnerable segment of population. Though it is difficult to pin down the actual number of heat-related deaths, many such deaths are reported from across the country every year.

Most of the time, only very obvious cases of death due to direct heat stroke or exertional heat stroke, in which the affected person dies within a few hours, are reported as a heat wave related death. When a person's body temperature reaches 104 degrees or above, it can lead to brain damage and death. Such cases of deaths are often reported among those who are exposed to sunlight for long hours.

The more common form is indirect heat stroke or non-exertional heat stroke, which majorly affects the elderly or those suffering from chronic diseases. Death may occur within 24-48 hours after the stroke and are not counted as heat wave related deaths due to ignorance.

Ahmedabad suffered a major heat wave during 2010 which resulted in a number of deaths. It was realized then that people will be better prepared to deal with a heat wave only

if they are informed about its arrival well in advance. This entailed that an Early Warning System for timely information and a battle plan to deal with the onslaught of heat wave were prepared.

Ahmedabad rose up to the challenge and became the first city in South Asia to develop its Heat Action Plan in 2013. The city's Municipal Corporation partnered with various organizations such as the Indian Institute of Public Health, Gandhinagar and the U.S.-based Natural Resources Defense Council, to adapt global best practices on early warning systems and heat adaptation techniques to the city's context. Georgia Institute of Technology's CFAN group provided a seven-day forecast to the Ahmedabad Municipal Corporation. A comprehensive action plan to deal with the extreme heat wave conditions in Ahmedabad, it focused on better preparedness, awareness, inter-agency coordination, information-sharing and capacity building among health care professionals. It yielded positive results in substantially bringing down mortality during the heat waves in 2014 and 2015.

Ahmedabad's Heat Action Plan is an example of how better preparedness can help in mitigating the effects of a heat wave. With the Indian Meteorological Department now providing a five-day heat forecast during summers, similar Heat Action Plans may be developed for other cities across the country. It will go a long way in saving thousands of lives. □

What is Heat Wave?

Heat Wave is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the summer season. Heat Waves typically occur between March and June, and in some rare cases even extend till July. The extreme temperatures and resultant atmospheric conditions adversely affect people living in such regions as they cause physiological stress, sometimes resulting in death.



Showcasing the Ahmedabad HAP

Armed with an action plan, Andhra Pradesh beats the heat

– Smt. P. Tulasi Rani
Special Commissioner, SDMA, Andhra Pradesh



Heat waves are not new to India. April and May are known to be brutal with soaring temperatures. While the temperatures kept rising and breaking past records, the number of lives claimed by the heat wave, however, took a plunge this year - as Andhra Pradesh, one of the worst-affected States, had armed itself with an Action Plan to beat the heat.

The Andhra Pradesh Heat Wave Action Plan, 2016, drafted after studying Heat wave Action Plans of other States, cities and best practices worldwide, identified vulnerable areas and population groups and devised a strategy for effective inter-agency coordination and integrated response. It also clearly defined the roles and responsibilities of each stakeholder, thus minimizing chances of ambiguity.

With an early onset of summer setting the stage for the heat wave prevention marathon, mitigation measures were started as early as March. The State's Disaster Management Department issues daily weather bulletins with information on prevailing weather conditions and forecast for the next

24 to 48 hours. These bulletins are shared with all the District Collectors and other stakeholders so that they can plan mitigation activities in advance.

Communication campaigns to spread awareness on heat-related illnesses, prevention tips and basic do's and don'ts are aggressively run across various media platforms. Hoardings, pamphlets, hand-outs and advertisements in local languages

The Andhra Pradesh Heat Wave Action Plan, 2016 was drafted after studying Heat wave Action Plans of other States, cities and best practices worldwide.

are used to maximize the reach of awareness programmes. District Collectors regularly interact with concerned officials, local Self Help Groups (SHGs) as well as the media to increase awareness. Many Primary Health Centres are also running awareness camps on heat stroke.

Simple mitigation measures, such as advisories asking people to stay indoors during peak heat

wave hours and prohibiting work at MGNREGS (Mahatma Gandhi Rural Employment Guarantee Scheme) sites between 12 noon and 3 PM, proved to be of great help. Each MGNREGS worker is being given an amount other than the fixed wage for buying safe drinking water and buttermilk. It helps in preventing cases of dehydration among daily labourers. This brings down the number of people seeking medical help. Around 9,000 shades and shelters have been erected at work sites and working hours adjusted according to the convenience of the workers.

More than 18,000 *chalivendrams* (water and buttermilk kiosks) are run across the State, at strategic public places (along roadsides, near bus stations, railway stations and busy market places). Panchayats and municipalities were actively involved in earmarking the locations for these *chalivendrams*. Stocks of emergency medicines for treatment of heat-induced illnesses and ORS packets are reviewed and replenished regularly for free distribution across the State. Each District Collector has been provided with an emergency fund of Rs. 3 crore for carrying out mitigation measures.

Healthcare professionals, paramedic staff and field workers have been trained to recognise early symptoms of sun-stroke and provide immediate treatment. Hospitals and health centres are running 24x7 to provide timely medical help. About 44,000 medical camps were conducted throughout the State. Doctors have been given strict instructions not to delay referrals and to swiftly recognise heat wave deaths.

We can't stop the heat wave but we can surely reduce human casualties with better preparedness and timely intervention. The comprehensive Action Plan and collective efforts of various Departments and Agencies contributed to a diminution in the severity of the impact of heat wave in 2016 in Andhra Pradesh. □



Collective hope bears fruits in arid Rajasthan

– Kirit Parmar

Programme Coordinator, Unnati

Ghewar Ram and Gauri Devi, who live in the hostile desert of western Rajasthan, own just a one and a half bigha plot of land. They used to migrate in search of livelihood every time a drought struck. Not any more. With the help of Unnati, a Non Governmental Organisation, they have adopted horti-pasture techniques. The family first planted local species such as ber, goonda, karonda and lemon, created a rain water harvesting tank and a boundary for the farm to prevent stray animals from destroying the crop. Next year, Gauri Devi introduced guvar on her farm as a part of intercropping. By the end of the second year, the farm turned profitable. While her family has to put about two extra hours of work on the farm, inter-cropping has benefitted them immensely in terms of fodder, fruits, vegetables and other produce. The family has been able

to earn Rs. 20,000 by selling nearly 300 kilograms of ber. Ghewar Ram is jubilant when he says that the income from the plot has increased ten times.

The pain and suffering of this drought-prone region is a part of its folklore. ‘Saatkaal, sattaishamana, trisathkuriakacha; teen kaal, aisapadela, maapoot mile napacha’, goes a local saying. It means that out of every 100 years, only 27 years are good. There are seven years of drought, 63 years of severe drought and three years of so much distress that a mother and her children get separated. Traditional survival strategy revolves around effective water management, animal husbandry, mixed agriculture and collective will. ‘Das hove chaukhibakriyaan, eksaantaron oont, das hove khejdala, to kaalkaad doo koot’ – A family can survive a drought if it has ten goats, a camel and ten khejdi trees. (Khejdi is

a multipurpose legume with its parts used as food, fodder for the livestock, and raw material for constructing houses).

There is a growing evidence that climate change has led to an increase in the frequency and intensity of climate-related hazards. There has been an increase in the incidences of drought post-1961.

The highly erodible desert soil is deficient in nutrients, and has a high infiltration rate and a low moisture holding capacity. The Thar desert region receives an average annual rainfall between 100 and 300 mm. Agriculture is the primary occupation of 82 per cent of the population. Almost 80 per cent of agriculture is rain-fed. This means that small and marginal farmers, who constitute about 78 per cent of the farming community, depend on rain for irrigation and thus,

are the most vulnerable population segment.

One of the primary source of livelihood for these farmers is livestock and they traditionally relied on common community land and resources to maintain them. However, the Common Property Resources (CPRs), particularly the oran and gauchar (community grazing land) and nadi (village pond) which used to be managed by the community have been declining as bigger farmers move towards mechanization of agriculture coupled with individualized water supply. This means growing food and fodder insecurity, poverty and migration for the marginalized population.

While reviving these CPRs is of utmost importance for building resilience against drought, Unnati has been helping small and marginal farmers in western Rajasthan in developing horti-pasture plots and rain water harvesting tanks. It is also helping them in providing veterinary care to reduce animal morbidity and mortality, as well as prevention of malaria.

There was a strong belief that horticulture cannot be promoted in the desert ecology. However, with examples such as Ghewar Ram and Gauri Devi, villagers are now willing to try it out. The credit goes to experiments and trainings done by Central Arid Zone Research Institute (CAZRI) and other Kisan Vikas Kendras. They have provided expertise and training to the farmers on a continuous basis. They also provide an interface to the plot owners so that they can easily seek advice on plant varieties and combinations.



Reaping Rewards: A farmer tending to plants on his horti-pasture plot

Over the years, many volunteers have developed specialised skills and have started functioning as local resource persons extending voluntary support to farmers as well as local government functionaries on various aspects of horti-pasture system, grafting and choice of seeds. This has helped the disadvantaged farmers, especially women, in the initial years of switching to farming and livestock rearing techniques that make them resilient to droughts.

Horti-pasture starts giving dividends from the first year itself as is evident from the table given below.

Plantation and fencing increases soil fertility providing better yield from inter-cropping. It has led to the regeneration of 21 local grass and shrub varieties that are used as fodder for the livestock. Some are also used as vegetables by people. They also contribute to soil nutrients and prevent soil erosion.

Making rain water harvesting structures, horti-pasture plots, specialized animal care, fodder banks and malaria prevention and cure accessible to small and marginalized farmers has proved to be of great use in building resilience to drought in desert areas of Rajasthan. It improves the adaptation capacity of small and marginal farmers by improving their fodder and livelihood security.

Many village and block level functionaries of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) now want to include horti-pasture plot development in their annual plans. Green fencing and construction of water harvesting tanks have been approved under the MGNREGS in Rajasthan. This has helped horti-pasture system gain wider acceptance across the State with more and more small farmers switching to this form of agriculture. □

Table: Annual incomes from a horti-pasture plot

Income from	Year 1 (in Rs)	Year 2 (in Rs)	Year 3 (in Rs)	Year 4 (in Rs)	Year 5 (in Rs)	Total
Inter cropping	2,000	2,000	2,000	2,000	2,000	10,000
Crop fodder/ only fodder	1,000	1,000/ 2,000	1,000/ 3,000	1,000/ 4,000	1,000/ 5,000	5,000 – 14,000
Sale of fruit			2,000 – 5,000	6,000 – 15,000	10,000 – 20,000	18,000 – 40,000



India's First National Disaster Management Plan

A Leap Forward in strengthening Disaster Risk Governance

– Abhishek Shandilya

Renowned philosopher Confucius once said that, “a man who does not plan long ahead will find trouble at his door.” The ‘trouble’, in the context of disasters, may take lives in lump-sum, destroy livelihoods and shatter dreams. It exposes the fragility of human existence; that in a matter of minutes a natural disaster, such as an earthquake, may humble down the greatest of egos of those who think that we, as a species, are invincible and immune to nature’s fury. Nonetheless, the same nature, through evolutionary design, has provided us with the biggest tool to survive – the ability to anticipate and plan.

The Indian sub-continent is

a mosaic of cultural and natural diversity – and unfortunately, it is true with disasters as well. India is vulnerable to multiple natural and man-made disasters - and with a very large population spanning from the highest place on earth to the long sea-

On the first day of June, 2016, honourable Prime Minister Narendra Modi released India's first-ever National Disaster Management Plan (NDMP). It is not just a step ahead, but a big-leap-forward: With this, India became, perhaps, the first country in the world to integrate the 'Sendai Framework' in its National Plan to tackle disasters.

shores; and from the lands of acute scarcity to those that receive rainfall all the year round – the disaster risk is enormous. The enactment of a

comprehensive Disaster Management Act, 2005 by the Government of India and adoption of the National Policy on Disaster Management in 2009 were steps towards a systematic approach of tackling disasters: the focus shifted from a reaction oriented approach to that of pro-active engagement with calamities by reducing their risk. In technical terms, this is known as Disaster Risk Reduction (DRR). While these were necessary measures to give disaster reducing efforts much needed direction, still, basic questions of ‘Who-will-do-What-and-When’ needed to be clarified. India needed a Disaster Management Plan.

The global consensus on disaster management suggests that the measures of DRR be incorporated into the very fabric of governance. Particularly, the Sendai Framework for Disaster Risk Reduction, March

2015, has a significant take on these lines. The Framework aims to significantly reduce disaster risk and loss of lives, livelihoods and health of individuals, businesses, communities and countries. Also,

the Sustainable Development Goals 2015-30, September 2015, recognise the importance of DRR as integral to sustainable development. Apart from these, the Paris Agreement on Climate Change, December 2015, highlights

Salient Features of the Plan

1. First Plan prepared after the passing of the Act. First ever national plan
2. While the Act tells what the ministries and states should do, this plan will guide them as to how they should do it
3. Provides horizontal vertical integration
4. Covers all phases of disaster management – prevention, mitigation, response and recovery
5. Provides role clarity
6. Clearly spells out the roles and responsibilities of all levels of government right up to village level and Urban Local Body level in a clear matrix format
7. Sleek and comprehensive plan – just about 150 pages
8. Aligned with the Sendai Framework of Action
9. The plan has a regional approach which will help in regional planning not only for disaster management but also for development planning
10. All Hazard Approach (11 major hazards covered)
11. All stakeholder approach
12. Focus on the four priority areas of Sendai Framework
 - ◆ Understanding risk
 - ◆ Strengthening disaster risk governance
 - ◆ Investing in risk reduction
 - ◆ Preparedness and build back better
13. Focus on structural and non-structural mitigation measures
14. Inter-agency coordination given special focus
15. Identified regions that need special attention
16. This Plan will serve as a reference for all the stakeholders to identify and understand what they should do for risk reduction, with whom they should coordinate
17. Will help in preparation of ministry, state and district disaster management plans
18. Capacity building provided adequate attention for long-term sustainable disaster risk reduction
19. Local self governments have been provided a major role in risk reduction and mitigation
20. Focus on fostering a culture of disaster preparedness by education and communication to the communities

the link between climate change and increase in frequency of extreme weather incidents around the world. India not just needed a plan to tackle disasters at the utmost local levels, but also, align with the global approaches. Thus began the mammoth exercise of preparing a truly “Glocal” plan, with a vision to “make India disaster resilient, achieve substantial disaster risk reduction, and significantly decrease losses of life, livelihoods, and assets – economic, physical, social, cultural, and environmental – by maximizing the ability to cope with disasters at all levels of administration as well as among communities.”

On the afternoon of 1st June, 2016, the twitter account of Prime Minister Narendra Modi posted the following – “Released the National Disaster Management Plan. It focuses on disaster resilience & reducing damage during disasters. The comprehensiveness of this plan is noteworthy. It covers all phases of disaster management- prevention, mitigation, response & recovery. To prepare communities to cope with disasters, the plan emphasizes on a greater need for Information, Education & Communication activities. A regional approach has been adopted in the NDMP, which helps in disaster management & in development planning.”

One of the significant aspects of India’s National Disaster Management Plan is that it comprehensively incorporates the approach of the Sendai Framework. It broadly aligns itself to the goals and priorities spelled out in the Framework – becoming one of the first countries in the world to do so.

Congratulating the Indian Government on achieving this feat, Mr. Robert Glasser, head of the UN Office for Disaster Risk Reduction said, “On behalf of the UN Office for Disaster Risk Reduction, I would like to extend congratulations to the Indian



“ On behalf of the UN Office for Disaster Risk Reduction, I would like to extend congratulations to the Indian government for setting such a fine example to the rest of the world ”

**– Robert Glasser
Head, UN Office for DRR**

government for setting such a fine example to the rest of the world ...I am pleased to note that the plan is based on the Sendai Framework for Disaster Risk Reduction which was adopted last year by UN Member States as a global blueprint for reducing disaster losses. The Government of India is one of the first in the world to come out publically with a plan which seeks to implement the four priorities for action of the Sendai Framework..”

The National Plan is an excellent example of how to incorporate global best practices and make it implementable in the Indian context. The sheer size and variance of the country only made this task more challenging. While the plan is based on the four priority themes of the Sendai Framework, it spells out the roles and responsibilities of all levels of Government right up to Panchayat and Urban Local Body.

Shedding a text-heavy approach, it is sleek and comprehensive with just over 150 pages. It covers 11 major hazards that one or the other part of the country is vulnerable to, with special focus on involving communities and local bodies in a bid to foster a culture of disaster preparedness.

The Plan is designed in such a way that it can be implemented in a scalable manner in all phases of disaster management by clearly establishing the role of each Government agency before, during and after a disaster. Speaking about the merits of the plan, Mr. R.K. Jain, member, NDMA, said that, “[With this plan] we are now focusing on mainstreaming of

Disaster Risk Reduction (DRR). Every Ministry and every Department should mainstream disaster preparedness, disaster mitigation as a part of their development plan.”

For a successful operation, each agency should be clear about their tasks, roles and responsibilities; coordination becomes a major challenge. Mr. Jain further elaborated that, “The Plan is in the form of a table which clearly states the role of each stakeholder during different phases of the disaster management cycle... With this [plan], there will be absolute role clarity.”

William Shakespeare had said that, “One touch of nature makes the whole world kin.” Today, the world acknowledges the power of this ‘touch of nature’ and recognizes the importance of tackling climate change through collective endeavour of all the peoples of the world. With the NDMP in place, India has clearly shown its will and intention to not just be a part of this global family, but act as a torch bearer in this respect. □

NDMP is designed in such a way that it can be implemented in a scalable manner in all phases of disaster management by clearly establishing the role of each Government agency before, during and after a disaster.

Sendai Framework

The third United Nations World Conference for Disaster Risk Reduction was held in Sendai, Japan between March 14 and March 18, 2015. A successor to the Hyogo Framework for Action 2005-2010, adopted by the second United Nations World Conference for Disaster Risk Reduction held in Hyogo, Japan in 2005, the Sendai Framework is a voluntary, non-binding agreement adopted by 187 countries. This means that policy planners and others, engaged in disaster management in these countries, will plan and implement policies on disaster management based on this framework for the next 15 years.

During this time, the Framework aims to significantly reduce disaster risk and loss of lives, livelihoods and health of individuals, businesses, communities and countries. It hopes to achieve this goal by preventing new and reducing existing disaster risks by implementing comprehensive and inclusive measures at all levels.

The Framework identifies seven global targets:

- a) Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality rate in the decade 2020-2030 compared to the period 2005-2015;
- b) Substantially reduce the number of affected people globally by 2030, aiming to lower average global figure per 100,000 in the decade 2020 -2030 compared to the period 2005-2015;
- c) Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030;
- d) Substantially reduce disaster damage to critical infrastructure and disruption of basic services by 2030;
- e) Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;
- f) Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this Framework by 2030; and
- g) Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030.

To achieve these targets, the Framework identifies four priority areas for focused action.

- ◆ Understanding disaster risk,
- ◆ Strengthening disaster risk governance to manage disaster risk,
- ◆ Investing in disaster risk reduction for resilience and
- ◆ Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

Sendai was struck by a very high intensity earthquake and a tsunami in March, 2011. Counted among the costliest natural disasters across the world throughout history, it had caused widespread destruction and resulted in more than 15,000 deaths.

BRICS nations adopt Udaipur Declaration on Disaster Risk Management

BRICS is the coming together of five major emerging economies - Brazil, Russia, India, China and South Africa - comprising more than 40% of the world population. Starting essentially with economic issues of mutual interest, the agenda of BRICS meetings has considerably widened over the years to encompass topical global issues. It was, therefore, just a matter of time that the BRICS nations, signatories to the Paris Agreement on Climate Change and parties to the adoption of the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals (SDGs), address the issue of disaster risk reduction.

Recognizing the common challenge posed by natural and man-made disasters, BRICS countries identified disaster management as an important area of collaboration. They

also identified the need to promote cooperation in preventing and developing responses to emergency situations by signing the Ufa Declaration at the 7th BRICS Summit on 9th July, 2015. Taking it further, the Russian Federation convened the first meeting of the BRICS Ministers for Disaster Management at St. Petersburg in April, 2016. The meeting resulted in a declaration on cooperation and an associated action plan for a three-year period.

Under the leadership of Shri Kiren Rijiju, Minister of State for Home Affairs and UNISDR Champion for DRR, India convened the second meeting of BRICS Ministers on Disaster Management at Udaipur in Rajasthan to take the agenda forward. Key government functionaries working in the area of Disaster Management, including

senior officials and technical experts from member countries, participated in the event.

The evident shift of BRICS nations from a relief-centric to a holistic approach to disasters highlights the importance of forecasting and early warning systems in dealing with disasters both at an institutional as well as the community level. The two-day meeting too focused on similar themes: a) Flood Risk Management; and b) Forecasting of Extreme Weather Events in the context of Changing Climate.

Inaugurating the meet, Shri Rijiju said India was willing to stand shoulder to shoulder with other BRICS nations and explore all possible areas of collaboration. He added that DRR was a high priority area for Prime Minister Shri Narendra Modi. It is time that we realize that “Tomorrow’s risk is being





built today” and move away from “a static understanding of risk.”

Speaking at the opening session, Addl. Principal Secretary to PM, Dr. P.K. Mishra, noted that we must integrate Disaster Risk Reduction as the back bone of Good Governance.

South African Minister, His Excellency Des Van Rooyen, suggested that it was important to introduce cost-effective and life-saving measures for reducing losses and effective recovery after a disaster.

Mr. Oleg Manuilo, Director of Russia's Civil Defence, said reducing socio-economic losses was the purpose behind disaster management. He

further said that effective forecasting is bringing about a change in disaster risk management.

Mr. Pang Chenmin, Director-General of the Department of Disaster Relief of China, highlighted the importance of technology and research in key areas of disaster management. He also emphasized upon knowledge sharing among member countries.

Brazil's National Secretary for Civil Defense, Mr. Wesley De Almeida Felinto said that he was hopeful that the meet will result in a solid outcome on collaboration among BRICS nations.

Discussions during the three technical sessions clearly established that disasters pose common challenges to all the member countries. It became equally clear that a collaborative approach towards disasters will help each member be better prepared to deal with disasters.

The roadmap to this collaboration was adopted by the member countries in the form of the Udaipur Declaration that resolved to set up a dedicated Joint Task Force for Disaster Risk Management for regular dialogue, exchange, mutual support and collaboration among BRICS Countries. Shri Rijiju termed it a milestone in collaboration and cooperation among BRICS countries in the field of disaster management. The roadmap for implementation of the Joint Action Plan, which was agreed upon at St. Petersburg in Russia, for BRICS emergency services was also finalised. Successful implementation of these agreements will result in reduced economic losses due to disasters in BRICS nations, helping them divert resources to build better and inclusive economies and environments, a step at a time towards attaining Sustainable Development Goals on time.

TECHNICAL SESSIONS

- a) **Challenges for Disaster Risk Management**
 - (i) Mainstreaming DRR in key development sectors
 - (ii) Capacity building at local level
 - (iii) Strengthening of response mechanism
- b) **Forecasting and early warning on floods and extreme weather events**
 - (i) Key early warning challenges
 - (ii) Highlights of recent scientific and technical developments
 - (iii) Lessons learnt for ensuring last mile connectivity/community level action on early warning
- c) **Disaster risk in a changing climate**
 - (i) Emerging disaster risks as a result of climate change
 - (ii) DRM practices evolving in view of emerging disaster risks in a changing climate.



BRICS IN PICS





IRS: Strengthening Administrative Response at Field Level

– B.B. Gadnayak
Consultant, IRS, NDMA



Incident Response System (IRS) in 2010.

What is IRS?

Incident Response System, as the name suggests, is an effective mechanism to systematically respond to an incident. By clearly attributing roles and responsibilities to each stakeholder, it aims at reducing confusion and chaos while responding to a disaster.

The IRS clearly enumerates the immediate tasks that need to be performed once a disaster strikes. It identifies, designates and trains officers, from the State to the block level, to perform specific roles in case of specific disasters. Each stakeholder is made aware of his role and would become active in case of a disaster. This deconstructs a very complex response mechanism resulting in a swift and streamlined response.

IRS identifies a 'Responsible Officer (RO)' to lead the command as overall in charge of the incident response management. He may, however, delegate responsibilities to an Incident Commander (IC), who manages the incident through Incident Response Teams (IRT). The rest of the IRS organization is divided into Command Staff and General Staff.

The Command Staff reports directly to the IC and assists him in discharging his functions. Senior officials of the State Government are earmarked as ICs.

The General staff is further divided into Operations, Planning and Logistics. Operations Section is responsible for directing the actions to meet incident objectives. It activates functional groups,

History/Background

The way India deals with disasters is changing. The change is gradual but steadfast. The focus has shifted from relief and rescue after a calamity to a holistic, pro-active and technology driven strategy involving all stakeholders, thus fostering a culture of prevention, preparedness and mitigation.

To fill the gaps in our existing overall response mechanism to any disaster, well-structured and standardized approaches that could be successfully implemented irrespective of size, location, type or complexity of a disaster across the country were needed. Even the National Policy on Disaster Management, 2009, termed disaster management a continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary for capacity building, preparedness and response.

Apart from developing indigenous practices, India also looked for adaptable best global practices to improve disaster risk resilience. To that end, it was found

that a system developed by the United States Forest Service, for controlling a forest fire in California in 1977 could be adapted to the Indian context. The implementation of this Incident Command System (ICS) by other countries was examined and it was then integrated with India's disaster management plans.

Representatives from the three ICS piloting States (Assam, Gujarat and Andhra Pradesh), six Administrative Training Institutions (who had been imparting ICS training in the country), the Ministry of Home Affairs (MHA), Lal Bahadur Shastri National Academy of Administration (LBSNAA), National Institute of Disaster Management (NIDM), United States Agency for International Development (USAID) and other experts met in April 2008 to discuss the roadmap for integrating the ICS into India's fabric. Several follow-up meetings and regional consultation workshops later, a set of guidelines were prepared. These guidelines were then reviewed by various stakeholders and after incorporating suggestions, the National Disaster Management Authority (NDMA) came out with the



An IRS training session in progress

such as transportation, depending upon the severity of the situation. Planning Section collects and evaluates information, maintains resources, and prepares the Incident Action Plan (IAP). It also proposes additional resources as well as their withdrawal. Logistics Section takes care of facilities, services, materials, equipment and other resources to support the incident response.

While the RO activates the IRTs in case there is an Early Warning for a disaster, local IRTs contact RO for

support, if required, in case a disaster strikes without warning.

In case a situation demands air support, a nodal officer (NO) is designated to coordinate between the various stakeholders. The structure of the IRS is given in the figure below.

The roles of Non Governmental Organisations (NGOs), Community Based Organisations (CBOs), Panchayati Raj Institutions (PRIs), volunteers and community representatives are also integrated

into the response structure. A versatile mechanism, it lends itself to use not only during disasters but also during incidents such as that related to terrorism (counter-insurgency), law and order situations, bomb blasts, hijacking, air accidents, mine disasters, forest fires, oil field fires and oil spills, and several others.

While the RO activates the IRTs in case there is an Early Warning for a disaster, local IRTs contact RO for support, if required, in case a disaster strikes without warning.

IRS, thus, is a participatory, multi-disciplinary and multi-departmental approach that can be successfully implemented irrespective of size, location, type and complexity of a disaster in India. It also helps the NDMA in assessing and improving the preparedness of the States for dealing with disasters by monitoring and guiding them in achieving multi-agency coordination with a unified command and improving capacity building and response mechanisms. □

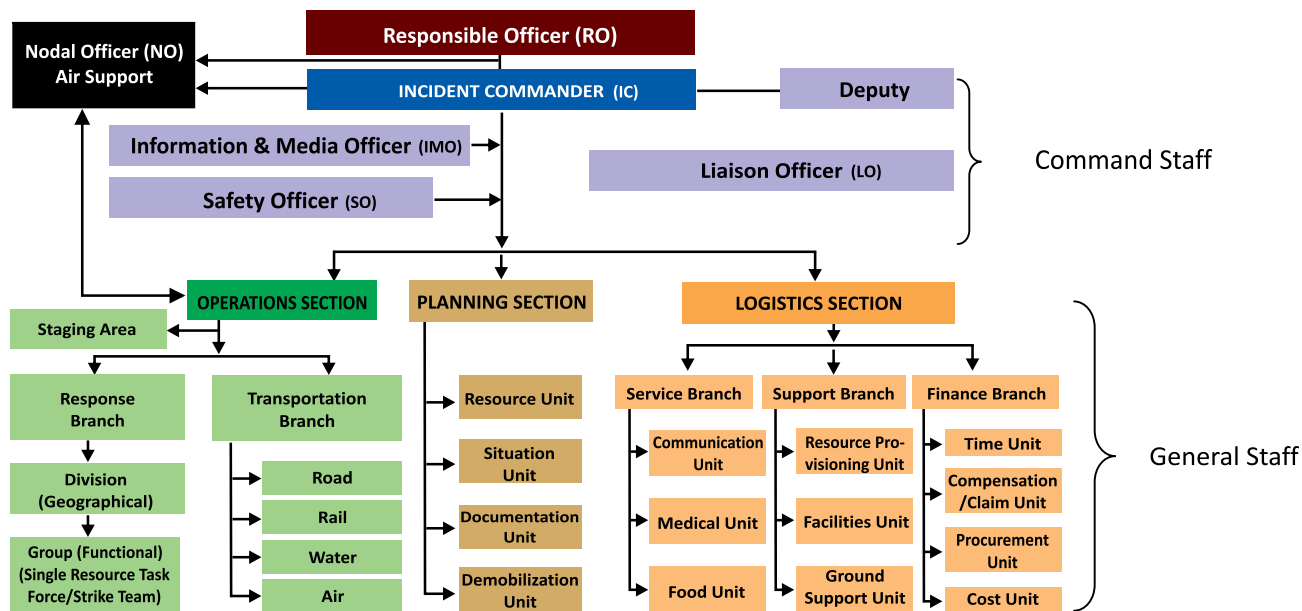


Fig. Structure of the Incident Response System



FLOOD SAFETY: AWARENESS IS KEY

– Anshupriya

The year was 2008. The River Kosi had breached its embankment, changed its course and caused massive flooding in north Bihar. Villages were submerged under water for weeks together and even when the water receded, issues of livelihoods and rehabilitation remained. The flood had swept away houses and hopes. Families were torn apart. ‘Anuj Paswan, a strapping young lad of 21, wants to find his seven missing family members – his parents, sister and four brothers. But, he does not know where to look for them’, said a report in The Hindustan Times on September 4, 2008. Similar stories of despair and hopelessness were strewn across the affected districts even as those affected fought a grim battle for survival. It surely was one of most destructive floods the mostly rural and less developed State had seen in recent times.

In 2015, an unprecedented

rainfall took Chennai and its residents by surprise. The water could not find its way through the city’s drainage system and led to flooding. People were stranded on rooftops or upper storeys even as the ground floors were submerged, especially in the low-lying areas of the city. Residents claimed

One of the biggest reasons for these floods is a huge amount of rainfall spread over a relatively short span of time during the monsoon season.

not to have seen anything like this before. For days together, harrowing stories of the devastation caused by the waters kept floating.

In India, on an average every year,

75 lakh hectares of land is affected, 1600 lives are lost and damages to crops, houses and public utilities stand at Rs. 1805 crore. Besides, the frequency of a major flood is more than once in five years.

One of the biggest reasons for these floods is a huge amount of rainfall spread over a relatively short span of time during the monsoon season. Excessive rain brings more and more water to the rivers and their tributaries, causing them to overflow. This year’s India Meteorological Department (IMD) forecast predicted a more than the average rainfall for the country. While the bountiful spell will be good news for a parched country battling a drought, it will also bring with it chances of a flood.

While we can’t shy away from floods, we definitely can prepare for a flood so that recovery costs less in terms of time, money and stress.

In India, on an average every year, 75 lakh hectares of land is affected, 1600 lives are lost and damages to crops, houses and public utilities stand at Rs. 1805 crore.

The first step is to know your house and your area well. Don't build on the floodplains. If you already have a house there, elevating and reinforcing it is important. Stoves, furnaces, water heaters, electrical panels should be placed at a height so that minor flooding does not do any damage. You should construct floodwalls and install 'check valves' in your sewer traps to stop floodwaters from easily entering your home and for preventing floodwater from backing up into the drains of your home, respectively. Use waterproof compounds to seal the walls in your basement to avoid seepage. Investing a little extra today will actually help you save a lot more when the flood

comes. The price of mental peace that it will give you then is incalculable.

Look for higher ground and the route to safe shelters around your area. Don't wait for an official warning, just move to higher ground immediately in case you sense the possibility of flash flooding. And even if your area is not really susceptible to flooding, stay alert and monitor local radio and TV channels for information. Evacuate your home immediately if local authorities ask you to do so. Instead of panicking at having left behind your valuables, pack essential medication, personal documents, identity cards and clothing in water proof bags along with an emergency kit beforehand. If you have ignored installing 'check valves' in your sewer traps, use sand bags to cover the toilet bowls and drain holes. Turn off power and gas connection when you evacuate. Avoid walking or driving through floodwaters.

When local officials declare normalcy and you come back home, get an electrician to check all your electrical goods before using them. Check the water lines and sewage pipes for any damage before using

toilet or tap water. Use mosquito nets to prevent malaria.

If you come back to a damaged or destroyed house, approach local authorities for assistance. Keep your identity and property documents handy to receive immediate help.

Offer help to those in need whenever you can. Tell others what you know. Small steps that you take towards making your homes and communities flood resilient go a long way in helping the vulnerable tide over a flood better. □

What should my flood emergency kit contain?

A first aid box with extra medication for snake bites and diarrhoea, strong ropes, a lantern, a battery operated torch and extra batteries. A stock of fresh water, dry food, candles, matchbox and kerosene should also be kept handy.





In conversation with : Dr. Kapil Gupta on Urban Floods

– Abhishek Shandilya

In July, 2005 Mumbai, the financial capital of the country, came to a standstill. Heavy rains clogged the city which was not prepared to deal with such a heavy downpour. More than a decade later, in 2015, the story was repeated in Chennai. Various other cities such as Kolkata, Srinagar and Surat witnessed a similar situation. Although unplanned construction, scattered garbage and debris dumps, and changing climatic patterns are some of the identified common causes of Urban Floods, it is essential to understand the phenomenon and prepare oneself to deal with it.

Samvad spoke with Dr. Kapil Gupta, who is a Professor at IIT Bombay and an urban flood management expert.

Q. What is an urban flood? How is it different from rural flood or any other flood?

A. The term urban flood consists of two parts - ‘urban’ and ‘flood’. According to the Census of India,

2011, an urban area is defined as (a) all statutory places with a municipality, a corporation, a cantonment board or a notified town area committee, etc.; or (b) all other places satisfying all three conditions: i) a minimum population of 5,000; ii) at least 75 per cent of male working population engaged in non-agricultural pursuits; and iii) a density of population of at least 400 per sq. km.

Flood is defined as “an overflow of a large body of water over areas not usually inundated”. Thus, flooding in urban areas is caused by intense and/or prolonged rainfall, which overwhelms the capacity of the drainage system. Our cities are densely populated, and an urban flood affects a large number of people in a very small area.

Major Losses

In addition, an urban flood results in inundation and damage to vital infrastructure, and disruption to roads and services, thereby affecting all walks of life. It often leads to major

economic losses which have both local and global implications. Outbreak of diseases is yet another hazard after a major urban flood.

The extent of flooding in a rural flood may be quite large and there may be agricultural losses but the number of people affected is much lower in comparison to urban areas. Moreover, the flood peaks in urban areas are about two-eight times and flood volume is about six times when compared with the rural floods.

Q. What causes urban flooding?

A. Urban flooding is caused by three main factors – meteorological, hydrological and human factors. Meteorological factors include heavy rainfall, cyclonic storms and thunderstorms. Hydrological factors include presence or absence of overbank flow channel networks and occurrence of high tides impeding the drainage. Human factors include land use changes, surface sealing due

to urbanization (which increases runoff), occupation of flood plains and obstruction of flood flows, urban heat island effect (which has increased the rainfall in and around urban areas), sudden release of water from dams located upstream of citizen towns and the failure to release water from dams resulting in backwater effect. The indiscriminate disposal of solid waste into urban water drains and channels is a major impediment to water flow during the monsoon season.

Q. There are multiple agencies which claim authority over waste disposal systems. Is there a system in place currently where different agencies work together and mitigate the risk?

A. The Municipal Corporation of Greater Mumbai deputed a Chief Engineer exclusively in charge of solid waste management. The solid waste department ensures that solid waste is collected and transported to the solid waste disposal site. Other cities may think of adopting a similar administrative structure so that their solid waste is swiftly and effectively transferred to the solid waste disposal site.

Q. Which parts of the country are more prone to urban flooding?

A. All our cities are vulnerable to flooding. Most of them have now reached a saturation point in terms of population growth and accommodation, and the developmental activities have now shifted to low-lying areas and areas next to the riverbanks. Thunderstorms and heavy rainfall can occur anywhere. So, whenever a city experiences a large amount of rainfall within a short time, there are chances it gets flooded. For example, in 2012, Jaipur received 170 mm of rainfall in just two hours; similarly, Chennai was severely affected due to heavy rainfall

in December, 2015. So, in my opinion, in today's times, all cities are equally vulnerable to flooding - be it coastal cities, inland cities, hilly cities, cities on the banks of major rivers or near dams/reservoirs.

Q. Talking about infrastructural improvement for mitigating the risk, what are the major infrastructural improvements that should be brought about in urban planning at various levels?

A. To avoid urban flooding, several infrastructural improvements are required. Firstly, the existing drainage path should be well demarcated. There should be no encroachments on the natural drainage channel of the city. Secondly, a large number of bridges, flyovers and metro projects are being constructed with their supporting columns located in the existing drainage channels. This can be avoided using proper engineering designs, such as cantilever construction. Construction of water storage tanks at the rooftop, intermediate, ground or underground levels also helps in minimizing the risk of urban flooding.

Storage or holding ponds should also be provided at judiciously selected locations to store water during heavy rainfall so that it does not cause downstream flooding. Once the rain subsides, the water can be released gradually. Various cities, across the world, have constructed porous pavements. These allow the water to gradually infiltrate into the underlying soil thereby maintaining the pre-development sub-soil water conditions.

It has also been observed that roads are surfaced and resurfaced several times, thus increasing their level above the plinth-level. The Indian Roads Congress has recommended that whenever a road is resurfaced, the existing layer be scraped first and then

the new layer be laid. This shall ensure that the plinth level and the road level remain where they were prior to the resurfacing.

Q. Will the instances of urban flooding increase in the future if the current trends continue?

A. If we take appropriate measures, we can ensure that the flood incidences remain within tolerable limits. The Intergovernmental Panel on Climate Change (IPCC) has indicated that in future, there could be an increase in instances of heavy rainfall in shorter spans of time. This means that our existing drainage systems have to be redesigned to accommodate the increased flow-levels. This can

“ The indiscriminate disposal of solid waste into urban water drains and channels is a major impediment to water flow during the monsoon season. ”

be done either by resizing the drains or by judiciously integrating the best management practices into the drainage infrastructure.

Q. What is that first basic issue that needs to be addressed at the individual, community and authoritative levels?

A. Each one of us should realize that disasters like floods and earthquakes can happen anytime. Just like we take life insurance and motor vehicle insurance, we should also insure our belongings against natural disasters and be prepared for such an eventuality. Obviously, if we know the flood risk map of our city, then we can avoid living in the low-lying areas. Where this is not possible, people should construct houses on stilts.

At the community level,

people should spread awareness and be ready to respond to a flood as a community. Schools have a greater role to play - as children need to be sensitized not only about floods but other disasters as well.

At the city level, the authorities should ensure that the building by-laws are followed both in spirit and practice at the ground level. People should also cooperate with municipal authorities.

Q. Talking about the extent of damage, what is the ratio between the investment needed to avoid an Urban Flood and the actual cost of damage incurred because there was no investment?

A. The amount of investment is generally a fraction of the total damages. International studies have shown that the investment needed, in terms of following laws, constructing proper infrastructure, establishing and enforcing mitigation measures, is only about seven per cent of the total cost

of damage that would have occurred if the above measures were not put in place. In that sense, it is prudent to invest in preventive and mitigation measures rather than incurring huge damages afterwards.

Q. What should affected people do immediately after they receive a flood warning?

A. Affected people should immediately evacuate to an identified evacuation centre. Or if such a centre does not exist, they should go to their neighbours staying in higher levels. They should take their important things such as documents and valuables in a polythene / water – proof bag, which they should have packed beforehand.

Q. What important preparations can people living in risk-prone urban centres make in advance to tackle an urban flood?

A. People should take simple measures such as installing the gas connection, water heater, and electric

panels high above the ground to brace themselves against flooding incidents. They should also put check valves in sewer traps to prevent floodwater from backing up into the drain. They should also seal the walls in their basements to avoid seepage.

Q. What precautions should one take after the flood water recedes?

A. After the flood water recedes, the threat of epidemics such as malaria, chikungunya and dengue spread by mosquitoes, and leptospirosis caused due to mixing of rat's urine with water looms large. Water should not be allowed to stagnate to prevent breeding of mosquitoes. People should consume boiled water or, if possible, bottled water to prevent water-borne diseases and gastroenteritis.

Q. Is it possible to forecast an imminent urban flood? Please explain the equipment and methodology involved.



A. With the currently available instrumentation technology and information on the Internet, it is quite easy to forecast an urban flood and issue early warnings. For example, Mumbai Municipal Corporation has installed 60 automatic weather stations for recording the rainfall every 15 minutes. This information is disseminated through the GMDMA (Greater Mumbai Disaster Management Authority) web portal in real-time during the monsoon. Water level measurements can be made on the receiving river or drain using ultrasonic water level metres.

How it Works

The methodology is to look at the satellite maps for movement of weather systems and simultaneously monitor the Indian Meteorological Department's 'Nowcasting' forecasts. Looking at the satellite, one can estimate when heavy rainfall is likely to take place. Once the rainfall takes place, the automatic weather station records the rainfall and simultaneously, the flow gauges record the water level. From the moment the water falls on the rain gauge to the time it reaches the water body of the affected area, there is a delay of some time. Hence, we have some lead time to inform the people living in the downstream area that the river levels are likely to rise. During the heavy rainfall in Mumbai in 2013, people had 20 minutes to evacuate with their belongings.

Q. What response mechanism should be put in place for help to reach affected people on time?

A. The local community is the first responder in case of most disasters. The second line of responders is the city municipal corporation or the urban local bodies. In Mumbai, the fire and rescue services are within the purview of the Municipal Corporation of Greater Mumbai and they can reach the affected areas within 15-

30 minutes. Other cities can adopt a similar model for help to reach the affected people within a reasonable time.

Q. What is 'Nowcasting'? How can it be useful in managing urban floods?

A. It refers to real-time weather updates. Earlier, the Indian Meteorological Department (IMD) used to issue warnings twice a day, at 8:30 am in the morning and 5:30 pm in the evening.

'Nowcasting' is a more frequent issuing of alerts. Currently, IMD is presently issuing nowcasting alerts every three hours for the public and every 30 minutes for the aviation industry. Municipal Corporation of Greater Mumbai issues nowcasting alerts for floods every 15 minutes on its website during the rainy season.

Q. India experienced a major urban flood in 2005 in Mumbai and then we heard of Srinagar, Kolkata, Surat and most recently, Chennai last year. What is the major takeaway from these instances?

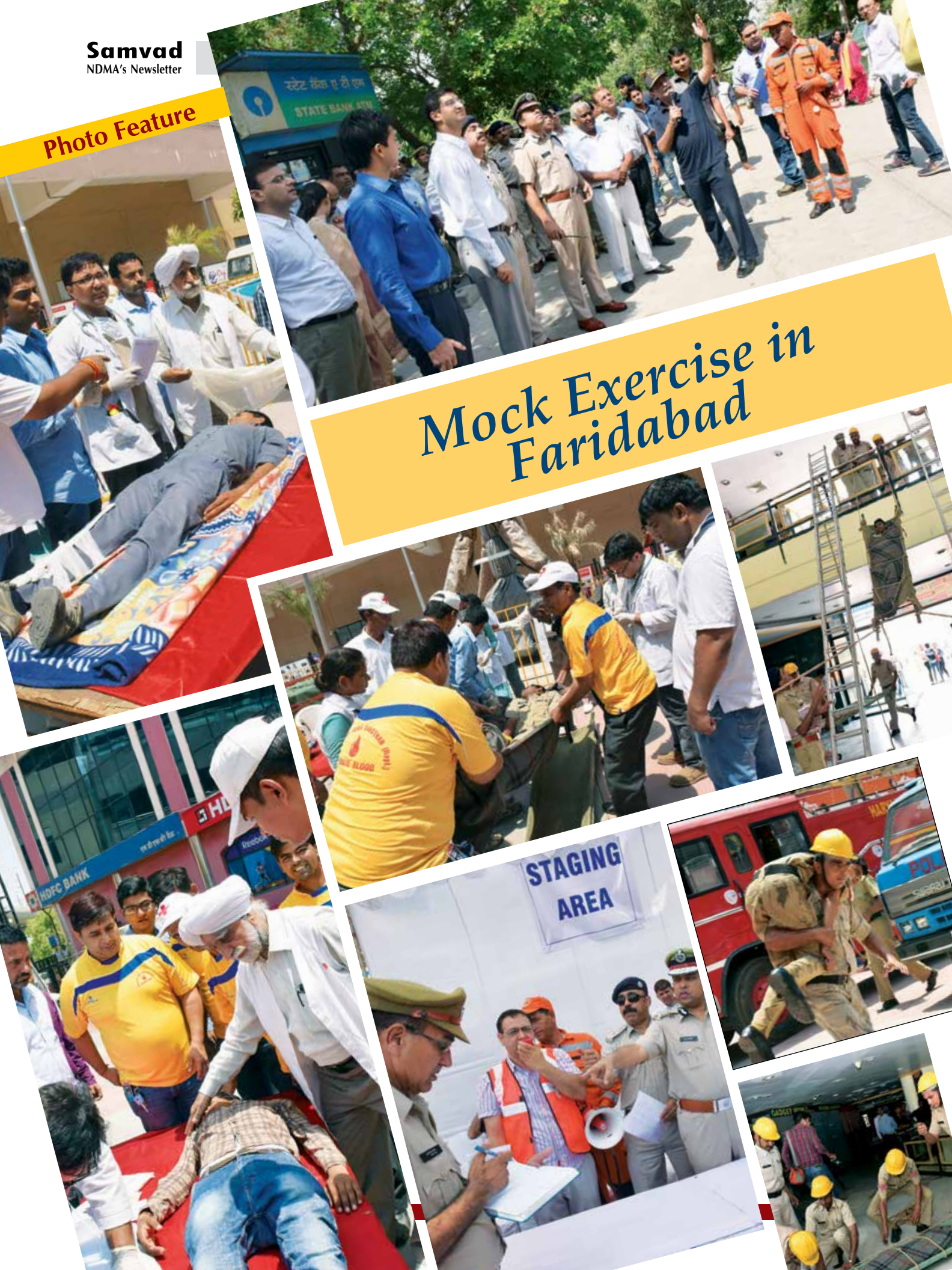
“ International studies have shown that the investment needed, in terms of following laws, constructing proper infrastructure, establishing and enforcing mitigation measures, is only about seven per cent of the total cost of damage that would have occurred if the above measures were not put in place. ”

A. The major takeaway is that no city is safe from flood disasters. Heavy rainfall can occur in any city any time. City authorities and residents should identify flood prone areas and be prepared to tackle flooding. They should take measures to ensure that when heavy rainfall occurs, the drainage systems are unclogged and adequate so that flooding does not occur in the vulnerable areas. Through proper planning and retrofitting of best management practices, we can make our cities more flood resilient. □



Photo Feature

Mock Exercise in Faridabad



Do's and Don'ts

Landslide Do's

- ✓ Prepare tour to hilly region according to information given by weather department or news channel.
- ✓ Move away from landslide path or downstream valleys quickly without wasting time.
- ✓ Keep drains clean.
- ✓ Inspect drains for - litter, leaves, plastic bags, rubble etc.
- ✓ Keep the weep holes open.
- ✓ Grow more trees that can hold the soil through roots.
- ✓ Identify areas of rock fall and subsidence of buildings, cracks that indicate landslides and move to safer areas. Even muddy river waters indicate landslides upstream.
- ✓ Notice such signals and contact the nearest Tehsil or District Head Quarters.
- ✓ Ensure that toe of slope is not cut, remains protected, don't uproot trees unless re-vegetation is planned.
- ✓ Listen for unusual sounds such as trees cracking or boulders knocking together.
- ✓ Stay alert, awake and active (3As) during landslide.
- ✓ Locate and go to shelters.
- ✓ Try to stay with your family and companions.
- ✓ Check for injured and trapped persons.
- ✓ Mark path of tracking so that you can't be lost in middle of the forest.
- ✓ Know how to give signs or how to communicate during emergency time to flying helicopters and rescue team.

Landslide Don'ts

- x Try to avoid construction and staying in vulnerable areas.
- x Do not panic and lose energy by crying.
- x Do not touch or walk over loose material and electrical wiring or poles.
- x Do not build houses near steep slopes and near drainage path.
- x Do not drink contaminated water directly from rivers, springs, wells but rain water, if collected directly, without is fine.
- x Do not move an injured person without rendering first aid unless the casualty is in immediate danger.





Asian Ministerial Conference on Disaster Risk Reduction 2016 New Delhi, India

Vigyan Bhawan 2-5 November, 2016



National Disaster Management Authority

NDMA Bhawan, A-1, Safdarjung Enclave,
New Delhi - 110029

Telephone: +91-11-26701700

Control Room: +91-11-26701728

Helpline Number: 011-1078

Fax: +91-11-26701729

www.ndma.gov.in

To,

