

Resilience Building through Disaster Risk Reduction

Vedika Kohli*

Abstract

A catastrophe is a serious disruption to a society's functioning that causes mortal, material, profitable, and environmental losses beyond a community's capability to manage. It results from the admixture of hazards, surroundings of exposure, and lack of volume or measures to lower the implicit negative results of threat. Hence, catastrophe control may be delineated as the arranging and administration of effects and the responsibility for handling all philanthropic angles of extremities so as to lessen the impact of failures. Disaster hazard reduction is the idea and practice of lowering accident pitfalls through orderly sweats to assay and survive determinants of accidents, containing through docked uncovering to hazards, extended exposure of community and property, intelligent administration of land and the surroundings, and enhanced readiness for inimical occurrences. DRR entails studying and directing hazards to weaken exposure to accidents. It covers conditioning which supports preparedness, forestallment and mitigation from an original to a global stage. The paper presents the idea of accident threat decline and pliantness construction. The paper also discusses accident administration in India in a terse manner, covering the fields in the admissible and institutional mechanisms, exposure sketches of India, and eclectic types of disasters. This overview includes a brief preface of the worldwide foundation on disaster threat reduction containing the Hyogo and Sendai frameworks, management of catastrophe remedy operations, disaster economics, want and trouble and exposure estimate. In addition, the paper also talks about worldwide cooperation on catastrophe operations. The plan of material conciliation is bestowed as a habit of answering some of the conflicts that can impact directing troubles.

Keywords: Disaster Risk Reduction, Yokohama, Hyogo and Sendai Framework, international cooperation on disaster management and 10 Point Agenda for Disaster Risk Reduction.

Introduction to Disaster

A disaster is a significant disturbance to the normal operations of a community that results in losses of people, property, money, and the environment that are too great for a society to handle on a broader scale. It is the outcome of a confluence of risk factors, vulnerable circumstances, and insufficient abilities or mitigation strategies. [1]

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Types of Disaster

I. On the basis of Source

- *Natural disasters:* Natural phenomena (geological, meteorological, or even biological) are the cause of it.

- *Anthropogenic disasters:* It occurs due to human intervention or negligence.

II. On the basis of Duration

- *Rapid Onset Disasters:* They are distinguished by the abrupt and intense force of the impact over a brief time.

- *Slow-Onset Disasters*: Known as “Creeping Emergencies,” slow-onset calamities can be predicted well in advance and take months or even years to emerge.

Objective: The paper also briefly discusses about disaster management in India, protecting the sub-jects together with legal and institutional mechanisms, India's vulnerability profile, and the numerous forms of disasters.

Methodology: This paper is exploratory and elucidating in nature. It will utilize optional starting points of the dossier from books, articles, e-sources, government sites, and so on.

Disaster Risk Reduction and Planning

Disaster reduction is the conception and practice of reducing the threat of disasters through methodical analysis and operation of disaster factors, including reducing exposure to hazards, reducing the vulnerability of people and property, making wise use of land and terrain, and perfecting disaster preparedness issues (Figure 1).

DRR involves assessing and managing pitfalls to reduce vulnerability to disasters. It addresses conditions that support preparedness, forestallment, and mitigation in all situations, from original to international.



Figure 1. Guiding Principles for implementing Disaster Risk Reduction.

(Source: Vision Magazine UNDRR, What is Disaster Risk Reduction?, <https://www.eird.org/americas/we/what-is-disaster-risk-reduction.html> UNESCO, Disaster Risk Reduction, <https://www.unesco.org/en/disaster-risk-reduction>)

Disaster Risk Reduction Framework

A *policy framework* must be defined and supported by institutional and legal frameworks that prioritize risk management. It is necessary to do risk assessment based on community adaptation and dangers. [2]

Risk Awareness: After the threat has been evaluated, the following stage is to inform the relevant parties and decision-makers so that the government and civil society can act accordingly.

Implementation of the plan: All stakeholders must be considered while enforcing the plan, which includes actions like terrain operation and municipal planning, among other things.

Early Warning Systems are essential to reducing risk since they use recognized institutions to provide accurate and timely information.

Use of Knowledge: All stakeholders must participate in the disaster threat operation with knowledge. Information sharing and readily available communication methods are essential.

The Prime Minister's ten-point plan for disaster risk reduction in India is shown in the accompanying image (Figure 2).

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|--|---|
| <p>1 All development sectors must imbibe the principle of disaster risk management</p> <p>3 Work towards risk coverage for all</p> <p>5 Encourage greater participation and leadership of women in Disaster Risk Management</p> <p>7 Invest in risk mapping globally</p> <p>9 Leverage technology to enhance the efficiency of our disaster risk management efforts</p> | <p>2 Develop a network of universities to work on disaster</p> <p>4 Utilise the opportunities provided by social media and mobile technologies</p> <p>6 Build on local capacity and initiative</p> <p>8 Ensure that the opportunity to learn from a disaster is not wasted</p> <p>10 Bring about a greater cohesion in International response to disasters</p> |
|--|---|

Figure 2. 10 Point Agenda for Disaster Risk Reduction.
 (Source: National Disaster Risk Reduction Framework)

Relief, Rehabilitation and Reconstruction

When an exigency or a fiasco influences a megacity or a locale, efforts are conducted initially to observe the injured, re-establish help and basic administrations, and, later, re-establish vocations and remake communities. Comparative efforts can be organized into three stages.

The Alleviation Stage

In the prompt destiny of the calamity, conditioning comparable as *chase & deliverance*, rapid-fire harm and needs evaluations, and the *arrangement of alleviation* and to begin with help are conducted. Transitory harbors are opened for those cleared out destitute as well as magnanimous backing is given to those influenced. [3]

The Restoration Stage

Restoration alludes to the conduct taken during a calamity to empower basic administrations to recharge performance, resuscitate beneficial conditioning, and support the cerebral and social well-being of the survivors.

In this stage, basic administrations and help are re-established, undoubtedly on a brief base, counting the street arrangement and other fundamental establishments counting islands, runways, moorings and copter wharf spots. It empowers the influenced populace to recharge more-or-less normal (pre-disaster) life designs. It could be viewed as a stage of transition between more significant, long-term development and quick alleviation (Figure 3).

Remaking Stage

It alludes to the *full rebuilding of all administrations and unique structures, the alleviation of harmed physical structures, the revivification of economy* and the reclamation of social and creative life. Remaking totally coordinates with long-term improvement plans, taking into account unborn calamity pitfalls and conceivable outcomes to decrease comparative pitfalls by joining pertinent measures. The long-term recuperation plans are related to recuperation and remaking conditioning on the one hand and institutionalising calamity operations in district administration on the other. [4]



Figure 3. NDMA Guidelines.

(Source: Vision Magazine)

Disaster Management in India

Legal and Institutional Framework in India

In India, the response to disasters has evolved from a reactive, activity-based system to a proactive, institutionalized framework that takes a comprehensive approach to reducing risks.

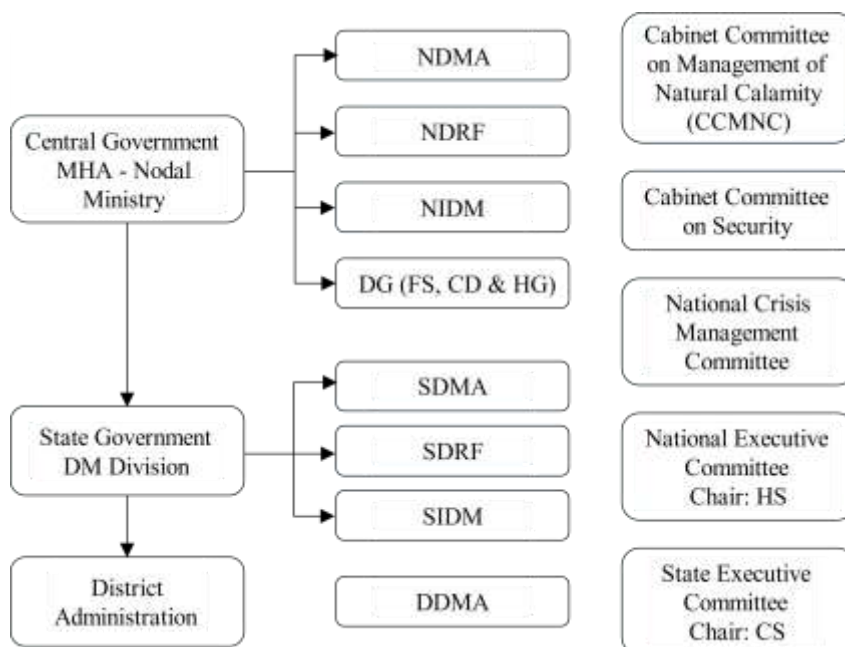


Figure 4. Legal-Institutional Framework DM Act 2005.

In the 1990s, the Ministry of Agriculture formed a “Disaster Management Cell” in response to the UN General Assembly’s proclamation of 1990 as the “International Decade for Natural Disaster Reduction” (IDNDR) (Figure 4).

After the Indian government passed the Disaster Management Act, 2005, a three-tiered organization comprising the National Disaster Management Authority (NDMA), State Disaster Management Authorities (SDMAs), and District Disaster Management Authorities (DDMAs) was envisioned.

The Ministry of Home Affairs (MHA) is in charge of overseeing disaster management at the federal level.

National Platform for Disaster Risk Reduction (NPDRR)

It is a multipartner, multidynamic organization for catastrophe management. Its leader is the Union Home Minister, while its individual members are the other ministers. The vice-chairpersons of the NPDRR are the vice-chairman of the National Disaster Management Authority and the state official in charge of disaster administration in the home ministry. [5]

Members

- Clergy members of UT and each state government.
- Leaders of the city halls in Bangalore, Hyderabad, Chennai, Mumbai, Delhi, Kolkata, and Kolkata.
- Four members of the Lok Sabha (chosen by speakers)
- Two Rajya Sabha members (designated by the chairman)
- Ten Metropolitan Neighborhood Bodies Administrators (chosen by the Ministry of Urban Development).

Functions

Additionally, it highlights collaboration between the federal and state administrations.

- It assesses how well the federal, state, and other pertinent authorities have implemented the disaster management policy, as well as to what extent.
- It examines the developments in the field of disaster management on a regular basis. Authority for National Disaster Management (NDMA)

Established by the DM Act of 2005, it is the top disaster management authority in India and is led by the Prime Minister. He is in charge of developing disaster management plans, policies, and procedures. NDMA rules help states and federal ministries and departments create appropriate disaster management strategies.

(Source: National Platform for Disaster Risk Reduction (NPDRR), Government of India, <https://npdrr.nidm.gov.in/>)

National Disaster Management Authority (NDMA)

NDMA Vision

“To build a safer and disaster resilient India by a holistic, pro-active, technology driven and sustainable development strategy that involves all stakeholders and fosters a culture of prevention, preparedness and mitigation.”

Functions

- It approves the National Plan and any plans made by the Indian government's Ministries or Departments in accordance with it.
- It lays out broad guidelines and instructions for the functioning of the National Institute of Disaster Management.[6]
- It takes whatever further actions it deems essential in order to prevent disasters, mitigate their effects, and increase capacity and readiness for handling imminent or actual disaster scenarios.
- NDMA has power to authorize departments or authorities to arrange emergency purchases for rescue and relief operations in the event of imminent disaster or accident.
- He controls the allocation and use of funds for retention and preparation resources.

(Source: National Disaster Management Authority, Government of India, <https://ndma.gov.in/>)

National Disaster Response Force (NDRF)

It is overseen by the Central Government to meet charges for exigency reaction, alleviation and recuperation. Essentially, the state catastrophe reaction store is likewise utilized on a state level, yet just to meet the consumptions for outfitting quick help to the debacle casualties. The NDRF provides additional Central assistance if the demand for funds for relief operations exceeds the SDRF account's funds. The 11th Finance Commission established the National Calamity Contingency Fund (NCCF), which later became part of the NDRF. (Source: National Disaster Response Force, <https://www.ndrf.gov.in/>)

Vulnerability Profile of India

India ranks among the ten nations with the highest risk of disaster. In India, calamities happen with serious chronicity, causing colossal death toll and property. India is the country most susceptible to natural catastrophes in terms of population displacement, per a 2017 United Nations Office for Disaster Risk Reduction (UNISDR) assessment. Due to its *unique geo-climatic and financial circumstances*, India is inclined to various natural and man-made calamities. [7] Thirteen of the nation's thirty-six states and associate areas are disaster-prone. *85% of the country is susceptible to one or more natural disasters*, and 57% of the country is located in a high seismic zone. Around 40 million hectares of the nation's property region is helpless against waterfalls, around 8% of the absolute expanse of land is helpless against hurricanes, and 68 percent of the area is defenseless to dry spell. The five distinct areas of the nation—the Himalayas, the plains, the hilly peninsula, and the coastal region—all face unique challenges. Then again, the Himalayan district is inclined to fiascos like tremors and avalanches; the fields are impacted by floods practically without fail. Failure and hunger are prevalent in the country's desert region, and the coastal area is susceptible to cyclones and storms. Notwithstanding normal factors, a few man-made molding comparable as adding populace pressure, natural decay, deforestation, informal turn of events, flawed farming practices and brushing, impromptu urbanization, development of enormous dams on stream channels, and so on, sped up influence and an expansion in the recurrence of debacles in the country. As of late, the Building Materials and Technology Promotion Council (BMPTC) released the India Vulnerability Atlas 2019 in its third edition. It contains outlines and tables for each state and association domain of India for the accompanying risks: tremors, wind, floods, avalanches, typhoons and recurrence of tempests. It likewise incorporates a lodging weakness file that shows the gamble of each lodging type. (Source: Vision Magazine)

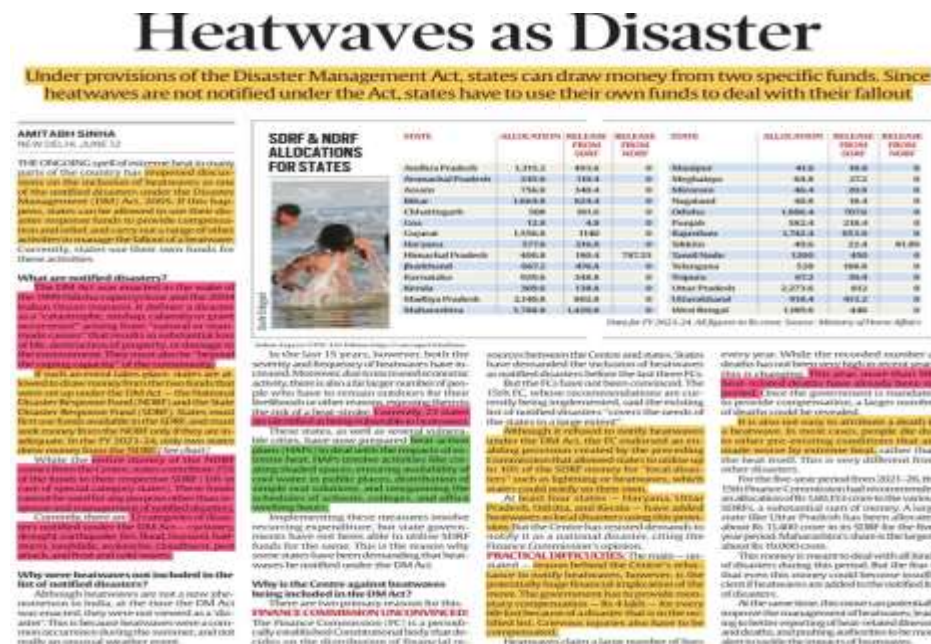


Figure 5. Heatwave as a disaster.
(Source: The Hindu)

Disaster Management Education

The National policy on Disaster Management 2009, affirmed by the Union Cabinet on October 22, 2009, proposed to present Disaster Management (DM) course in proficient specialized instruction. (Figures 5.) The educational module of graduate and postgraduate level courses in engineering, architecture, earth sciences, and medicine will be checked on by the competent specialists to incorporate modern information related to DM in their individual particular areas. At the National level, the Ministry of Human Resource Development is entrusted to energize the advancement of DM as a particular scholarly teach, in the colleges and establishing of specialized excellence.[8]

Disaster instruction is pointed at creating a culture of readiness and security other than actualizing school DM plans. Calamity administration as a subject in social sciences has been presented in the school educational program for Course VIII, IX, and X by the Service of Human Resource Development (HRD), through the Central Board of Secondary Education (CBSE) for engaging the more youthful era from the calamity preventive perspectives. This is being expanded to all schools through their Secondary Education Boards. State Governments will moreover guarantee the consideration of fiasco administration educational programs through State School Boards. The education content are so outlined as to teach skill-based preparing, mental flexibility, and qualities of administration. The role of the NCC and Boy Scouts is moreover being included in schools and colleges for catastrophe administration related work.

Formal DM courses (Figure 6) have been planned for assembly the request of the developing needs of specialists in the areas of Catastrophe Moderation, and readiness for the relieving the impacts of calamities. These teach are consistently walking forward to satisfy their mission to make a disaster-resilient India by creating and advancing a culture of anticipation and readiness at all levels.

Course	Institution/University
Certificate	K. C. Das Commerce College, Guwahati, Assam Nalanda Open University, Bihar Rajiv Gandhi University, Arunachal Pradesh University of Mumbai, Mumbai Vardhman Mahavir Open University, Rajasthan University of North Bengal, Bengal Madras University, Chennai Sikkim Manipal University, Sikkim Centre for Disaster Management (CDM), Rajasthan Yashwantrao Chavan Academy of Development Administration, Mumbai National Civil Defence College, Nagpur (Maharashtra) Asian Fire Engineering College (A.F.E.C), Nagpur (Maharashtra)
Postgraduate diploma	National Institute of Disaster Management (NIDM), New Delhi Indira Gandhi National Open University, New Delhi Indian Red Cross Society, New Delhi AURA Institutions, Delhi
Degree/postgraduate	Indian Institute of Ecology and Environment (IIEE), New Delhi Tata Institute of Social Sciences, Mumbai Indian Red Cross Society, New Delhi Disaster Management Institute, (DMI) Bhopal Guru Gobind Singh Indraprastha University, New Delhi

Figure 6. DM courses offered in various Institutions/Universities.

(Source: <https://pmc.ncbi.nlm.nih.gov/articles/PMC3696225/>)



Figure 7. The Disaster Management (Amendment) Bill, 2024.

Source: The Hindu

Forecasting better in India, come rain or shine

The monsoon season this year in India has been one of the worst in recent times, with recurrent flooding impacting most States. According to a 2021 study by the Council on Energy, Environment and Water (CEEW), approximately 40% of districts in India experience alternating climatic hazards, which means that flood-prone regions are also facing droughts during the dry season and vice-versa. Separately, an analysis of 40 years of rainfall data by CEEW shows that there has been an increase of up to 64% in heavy rainfall days during the monsoons over the last decade.

Extreme weather needs better forecasting

In this increasingly complex scenario, while nearly two-thirds of India's population are exposed to flood risks, only a third of the flood-prone population is covered by early warning systems. This is in stark contrast to cyclone early warning systems which cover all cyclone-prone areas in the country. It is evident that India must invest in enhancing weather forecasting and bringing technological innovation to the forefront, as a safety net, to address the growing extreme weather risks.

The 'Mission Mausam', that was approved in September 2024, broadly focuses on increasing India's weather observation network, improving weather forecasting models and investigating weather modification techniques. The mission will be implemented primarily by three institutes under the Ministry of Earth Sciences, namely the India Meteorological Department (IMD), the National Centre for Medium Range Weather Forecasting (NCMRWF) and the Indian Institute of Tropical Meteorology (IITM). The ₹2,000 crore initiative aims to augment the weather observation network using a variety of instruments while also improving forecasting models through an improved understanding of the physics of the atmosphere and the integration of machine-learning approaches.

To harness its potential, India must expand its



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With improvements, the 'Mausam Mission' will transform how weather information can help India become climate smart

forecasting capabilities in areas that face a high climate risk and make data widely available for developing use cases across sectors such as energy, agriculture and water. These are the key pathways 'Mission Mausam' should focus on.

Gaps in radar coverage, limited data access

First, prioritise installing weather observation platforms on India's western coast and in large urban centres facing high climate risks. India has 39 Doppler Weather Radars (DWRs) to monitor rainfall, with many covering a radius of 250 kilometres. These provide short-term forecasts, ranging from minutes to a few hours, of extreme rainfall events. Nine of these radars are located in the Himalayan States, eight along the eastern coast, and 17 located in various Indian cities. The remaining five are on the west coast. Recent studies indicate that cyclones are becoming more frequent and intense in the Arabian Sea. But, as said, only five radars monitor the entire west coast. Even key cities such as Ahmedabad (Gujarat), Bengaluru (Karnataka), and Jodhpur (Rajasthan), which have faced repeated flooding recently, do not have radars as yet. Therefore, 'Mission Mausam' should prioritise the installation of weather radars and other observational platforms in areas that have not been covered as yet and which face growing climate risks.

Second, make weather data openly available for researchers and entrepreneurs to develop use cases. Open access to weather data helps in the analysis of trends and in understanding the causes behind extreme weather events better. It also helps in the creation of localised early warning tools. For instance, the United States has made the data from its 160 DWRs openly available which has resulted in the creation of several analytical tools to support local governments. Similarly, the United Kingdom, France, and the European Union have made their weather forecasting data available on cloud for anyone to access. While the IMD shares data through its

data supply portal, restrictions remain on the volume of data provided.

Moreover, the data on the portal is not freely available to researchers from academic institutions and think tanks. Therefore, 'Mission Mausam' should establish infrastructure to distribute data generated by the new instruments, such as weather radars, wind profilers and radiometers, in the public domain. Moreover, the data from the weather forecasting models developed as part of the mission should also be placed in the public domain for researchers to validate and provide suggestions for improvement. This will foster innovation and localised decision-making.

Reaching out to users

Third, improve communication tools for weather warnings and enhance user capacity. The IMD disseminates weather information through multiple channels, which include web and mobile applications. Over the years, the web application has been significantly strengthened to the extent that it now provides district-wise weather warnings that range from an hour to the next four days of forecast. However, the user experience could be improved further. While the tool offers helpful warnings, providing users with guidance on how to interpret these warnings would enhance their experience. 'Mission Mausam' must focus on enhancing users' capacity to understand and act on warnings through informative videos, media, and guides.

'Mission Mausam' is a timely move by the Union government to make the country weather ready and climate smart through an expanded observational network and improved weather forecasting. With improvements, the mission can transform how weather information is shared and understood in India. This is critical at a time when extreme weather events are taking a heavy toll on lives and livelihoods.

The views expressed are personal

Figure 8. Forecasting better in India, come rain or shine.

Source: The Hindu

Resilient Schools and Disaster Risk Reduction Education

This course will present the learner to resilient schools and education. It points to fortify disaster risk management by giving satisfactory preparing on school security arranging and usage in the setting of the commitments of the 2030 Agenda and Systemic Risk. (Figure 8, 9) The aim of the online course is to fortify the readiness, moderation, recuperation and reaction capacities of the instruction division and communities to catastrophe dangers through calamity chance lessening instruction, school fiasco administration and secure learning facilities. The course will be comprised of eight modules, each running over two weeks. The online course is organized around the Comprehensive School Safety Framework (CSSF), and is separated in 8 modules pointing to give a wide-ranging diagram of the challenges and openings to secure flexible schools and instruction. Each module comprise of introductions, address notes, perusing list, and related assets (such as recordings, book index, reports, and consider cases among others). The course will be conveyed by eminent specialists in resilient schools and education.[9]

(Source: https://openlearning.unesco.org/courses/course-v1:UNESCO+UNESCO-03+2021_01/about)



Figure 9. UNESCO's Open Online Course on disaster risk reduction

Global Framework on Disaster Risk Reduction

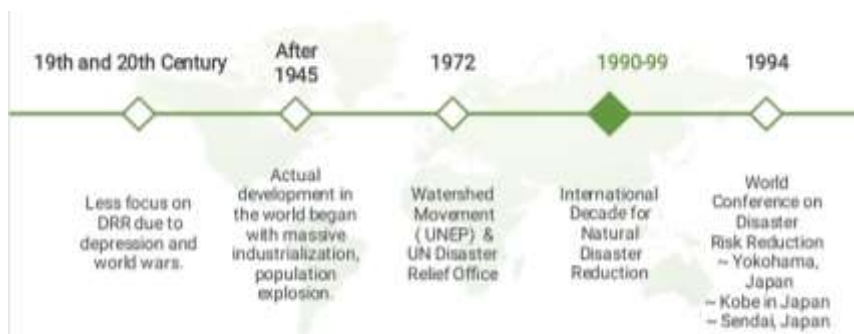


Figure 10. Timeline of Global Framework.

Yokohama Strategy for a Safer World

A paper known as the Yokohama Strategy for a Safer World offers recommendations for averting, preparing for, (Figure 10) and lessening the effects of natural disasters. Adopted at the 1994 World Conference on Natural Disaster Reduction in Yokohama, Japan, it was also ratified by the UN General Assembly the same year. The principal outcome of the mid-term assessment of the International Decade of Natural Disaster Reduction (IDNDR) evaluation was its Plan of Action.

The *key principles* of this strategy are as follows:

- Before satisfying and practical catastrophe reduction plans and procedures can be adopted, risk assessment is a prerequisite.
- Fiasco counteraction and readiness are of essential significance in decreasing the requirement for catastrophe alleviation.
- Catastrophe avoidance and readiness ought to be viewed as indispensable parts of advancement strategy and arranging at public, provincial, two-sided, multilateral and worldwide levels.
- In order to provide a solid basis for subsequent activities, it is essential to address the development and reinforcement of capacities to prevent, reduce, and mitigate disasters during the Decade.
- Early admonitions of approaching calamities and their powerful dispersal utilizing media communications, including broadcast administrations, are key variables to effective catastrophe avoidance and readiness.
- Preventive measures are best when they include investment at all levels, from the neighborhood local area through the public government to the territorial and global level.
- Vulnerability can be diminished by the use of legitimate plan and examples of improvement zeroed in on track gatherings, by suitable schooling and preparing of the entire local area.
- The worldwide local area acknowledges the need to share the vital innovation to forestall, lessen and relieve calamity; this ought to be made unreservedly accessible and sooner rather than later as a basic piece of specialized participation.
- Ecological security as a part of feasible improvement steady with destitution lightening is basic in the counteraction and relief of cataclysmic events.
- Every country's first responsibility is to protect its people, infrastructure, and other assets from the effects of natural disasters. The global local area ought to exhibit solid political assurance expected to activate sufficient and take advantage of existing assets, including monetary, logical and mechanical means, in the field of cataclysmic event decrease, remembering the requirements of the developing nations, especially the most least developed nations.

(Source: UNDRR, Yokohama Strategy and Plan of Action for a Safer World: guidelines for natural disaster prevention, preparedness and mitigation, 1994, <https://www.undrr.org/publication/yokohama-strategy-and-plan-action-safer-world-guidelines-natural-disaster-prevention>)

Hyogo Framework for Action (2005-2015)

Between 2005 and 2015, the Hyogo Framework for Action (HFA) served as the global framework for activities aimed at reducing the risk of disasters. The HFA was approved at the 2005 World Conference on Disaster Reduction, which was held in Kobe, Hyogo, Japan. By 2015, it aimed to significantly minimize losses from disasters, both in terms of human lives lost and in terms of the social, economic, and environmental resources of nations and communities. The first program to thoroughly describe, depict, and demonstrate all the variations and elements required to minimize harm was the Hyogo Framework (HFA).

The HFA, which ran from 2005-2015, set five specific priorities for action:

- Make sure that disaster risk reduction (DRR) has a solid institutional foundation for implementation and is prioritized both nationally and locally.
- Determine, evaluate, and track the risks of disasters and improve early warning
- At all levels, cultivate a culture of safety and resilience by applying knowledge, creativity, and education.

-
- Reduce the underlying risk factors
 - Boost emergency readiness for a successful response at all levels

(Source: Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. Extract from the final report of the World Conference on Disaster Reduction.(A/CONF.206/6))

Sendai Framework for Disaster Risk Reduction (2015–2030)

In order to lower disaster risk and losses during the following 15 years, UN member states adopted the Sendai Framework for Disaster Risk Reduction in 2015. The framework was approved during the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, and was endorsed by the UN General Assembly in June 2015. It is the first major agreement under the post-2015 development agenda. [10]

The framework has four action priorities and seven global targets to address the three pillars of catastrophe risk: hazard characteristics, vulnerability and capacity, and exposure to risks.

Goal: In order to stop new hazards and lower the probability of disaster, implement cost-effective, integrated, technological, legal, social, health, and institutional solutions. Additionally, by strengthening severity and enhancing response and recovery readiness, these actions will lessen hazard exposure and catastrophe susceptibility.

Four Precedences:

- i. Understanding disaster risk.
- ii. Strengthening catastrophe chance governance to manage disaster trouble.
- iii. Resilience by investing in catastrophe danger reduction.
- iv. Improving preparedness for disasters to enable efficient response and “Building Back Better” in terms of healing, restoration, and rebuilding.

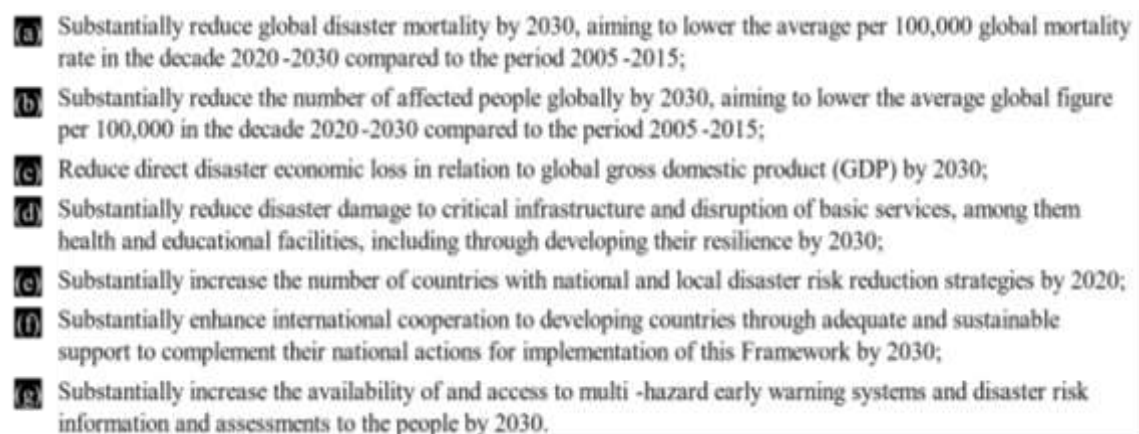
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- (a) Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020-2030 compared to the period 2005-2015;
 - (b) Substantially reduce the number of affected people globally by 2030, aiming to lower the 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, among them health and educational facilities, including through developing their resilience 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;
 - (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.

Figure 11. Seven global targets in the Sendai Framework.

(Source: Sendai Framework for Disaster Risk Reduction 2015-2030, 2015, <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030> National Disaster Management Authority, Government of India, Sendai Framework, <https://ndma.gov.in/Global/sendai-framework> What is the Sendai Framework for Disaster Risk Reduction?, <https://www.undrr.org/implementing-sendai-framework/what-sendai-framework>)

International Cooperation on Disaster Management

India participates in general drives on catastrophe the executives with effectiveness. India has ratified the Sendai Framework for Disaster Risk Reduction. (Figure 11) As one of the member nations in the United Nations International Strategy for Disaster Reduction (UNISDR), India works closely with the organization. India has agreements in place with several nations, both bilateral and multilateral, to cooperate in the area of disaster management. A few of these include the Joint Declaration of Intent (JDI) between Germany and India on cooperation in the field of catastrophe management, the SAARC Settlement on Quick Reaction to Cataclysmic Events, and the Understanding between India and Russia on collaboration in the field of emergency management. The Indian government works with several international organizations in the area of disaster management. The World Conference on Disaster Risk Reduction (WCDDR), the Global Platform for Disaster Risk Reduction (GPDRR), the ASEAN Regional Forum (ARF), the Global Facility for Disaster Reduction and Recovery (GFDRR), the Asian Ministerial Conference for Disaster Risk Reduction (AMCDRR), and the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) are a few of these.

(Source: Ministry of Home Affairs, International Cooperation on Disaster Management, 18 DEC, 2018, by PIB, Delhi <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1556471>)

Global Platform for Disaster Risk Reduction (GPDRR)

The primary international conference dedicated to the catastrophic risk reduction strategy is the Worldwide Stage. At the meeting, the worldwide advancement of the Sendai Structure for Disaster Risk Reduction (SFDRR) 2015-2030 was checked on. Its core function is to allow governments, NGOs, Scientists, and UN organisations to share experiences and formulate strategic steering for implementing the Global Compact on Disaster Reduction. To improve DRR, a whole-of-society approach is required. DRR should be the basis of development and financing plans, laws and programs to achieve the 2030 Development Goals.

Theme: From Risk to Resilience: Build stability and closeness to sustainable improvement for all in a world transformed by COVID-19.

(Source: Global Platform for Disaster Risk Reduction, <https://globalplatform.undrr.org/>)

Suva Expert Dialogue on Loss and Damage

This expert dialogue was decided at the COP23 conference in Bonn in response to requests from developing countries to include a separate item on loss and damage on the agenda. The goal of the dialogue is to promote the mobilisation and participation of experts and to increase support, including financial, technology, and capacity building, to address the losses and damages associated with the negative impacts of climate change.

(Source: United Nations Climate Change, Suva Expert Dialogue, 2018, <https://unfccc.int/topics/adaptation-and-resilience/workstreams/loss-and-damage-ld/executive-committee-of-the-warsaw-international-mechanism-for-loss-and-damage/workshops-meetings/suva-expert-dialogue>)

Warsaw International Mechanism on Loss and Damage

It was laid out in COP 19 under UNFCCC in 2013. It manages Environmental Change Effects (Misfortune and Harm Component), including outrageous occasions and slow beginning occasions, in weak non-industrial nations through-

- Gaining a deeper comprehension of comprehensive L&D threat operation strategies;
- Improving communication, cooperation, unity, and solidarity among relevant stakeholders;
- Upgrading activity and backing, including money, innovation and limit structure.
- Article 8 of the 2015 Paris Agreement, which highlights the “importance of preventing, minimizing, and addressing loss and damage associated with the adverse goods of climate change,” is another source of inspiration.”

(Source: United Nations Climate Change, Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts, <https://unfccc.int/topics/adaptation-and-resilience/workstreams/loss-and-damage/warsaw-international-mechanism>)

Coalition For Disaster Resilient Infrastructure (CDRI)

India led the formation of the Coalition for Disaster Resilient Infrastructure (commonly known as CDRI) following the Asian Ministerial Conference on Disaster Risk Reduction, which took place in New Delhi in 2016. The alliance will make progress toward creating normal standards in foundation, financial and consistance systems and put resources into Research and Development that will likewise decide backing from worldwide banks onwards.

Four expansive topical regions have been connected to crafted by the alliance. These incorporate

1. *Disaster Risk Assessment*: It would be helpful to have great, time-series information on once dangers patterns(e.g., wind speed, elevated flood tide circumstances) and the ability to dissect this information to prompt probabilistic danger appraisals that can direct interest in catastrophe versatile foundation.
2. *Design and crime norms*: The public fabric for design and construction norms must reflect a changing understanding of natural hazards and technological advancements in engineering.
3. *Funding new design and systems for covering traps*: Fiasco Chance Supporting procedure could incorporate spending plan hold funds and debacle danger move instruments like disastrous securities.
4. *Remaking and recuperation of designs after debacles*: The “ Build Back Better “ standard should be observed not just for the foundational layout of the construction yet in addition for the activity frameworks around it.

CONCLUSION

- *Coordination Catastrophe Hazard Diminishment into Advancement Plans*: Guarantee that calamity hazard lessening is inserted in national and state improvement approaches, particularly

in framework, urban arranging, and agriculture.

- *Strengthening Early Caution Frameworks:* In calamity administration arrangement planning, Early Caution Frameworks ought to be prioritized by joining the upgradation of early caution systems.
- *Leveraging progressed innovation* from Indian Space Research Organisation (ISRO), Indian Meteorological Department, and National Remote Sensing Agency (NRSA) can upgrade exactness and make these frameworks more available at the community level, guaranteeing opportune and compelling fiasco response.
- *Develop Fast Reaction Instruments:* Build up a national catastrophe reaction system that guarantees quick and facilitated activity amid crises, with a clear command structure and asset allocation.

Implement a *72-hour basic reaction arrange*, as practiced in nations like Japan, guaranteeing convenient protect operations and effective coordination.

- *Enhance NDMA's Specialist:* Upgrade NDMA's Specialist by filling empty positions and engaging the office with the fundamental powers.

This will guarantee way better coordination between central and state organizations, driving to a more cohesive and compelling fiasco administration framework.

- *Decentralization of Catastrophe Administration:* It is significant to upgrade responsiveness and adequacy. Enabling state and nearby specialists with more prominent independence and assets can guarantee speedier and more context-specific responses.
- *Support for Research and Development in Fiasco Administration:* Designate assets for inquire about in disaster risk management, centering on inventive advances like AI, Remote Sensing, etc.
- *Psychological Recovery:* There is a need for integrating psychological rehabilitation programs into catastrophe administration approaches to back the mental wellbeing of people who have misplaced cherished ones and property in disasters.
- *Dynamic Arrangement Adjustment:* Frequently overhaul fiasco administration approaches based on advancing dangers, innovative headways, and lessons learned from past disasters.

Shift the center *from receptive to proactive methodologies*, emphasizing catastrophe readiness, moderation, and building versatility.

REFERENCES

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1. Yokomatsu, M. & Hochrainer-Stigler, S., eds. (2020). Disaster Risk Reduction and Resilience. Singapore: Springer. ISBN 978-981-15-4319-7 10.1007/978-981-15-4320-3. VI, 236.
 2. UNISDR, Disaster Risk Reduction and Resilience In the 2030 Agenda for Sustainable Development, https://www.unisdr.org/files/46052_disasterriskreductioninthe2030_agend.pdf
 3. United Nations, Department of Economic and Social Affairs, Sustainable Development, UN International Strategy for Disaster Reduction (UNISDR), <https://sdgs.un.org/statements/un-international-strategy-disaster-reduction-unisdr-8377>
 4. Disaster Risk Reduction, Methods, Approaches and Practices, Editor - Rajib Shaw, Keio University, Shonan Fujisawa Campus, Fujisawa, Japan, Electronic ISSN- 2196-4114, <https://www.springer.com/series/11575>
 5. Handbook on Disaster Management Disaster Management Cell Regional Centre for Urban and Environmental Studies, Lucknow University <https://rcueslucknow.org/publication/TrainingModules/Dr.A.K.Singh/HandBookDisasterManagement.pdf>
 6. HANDBOOK FOR PREPARING DISASTER MANAGEMENT PLAN FOR ORGANISATIONS UNDER THE MINISTRY OF LABOUR & EMPLOYMENT National Institute of Disaster Management Ministry of Home Affairs, Government of India in collaboration with GOVERNMENT OF INDIA MINISTRY OF LABOUR & EMPLOYMENT. https://nidm.gov.in/PDF/Modules/Handbook%20Labour_NIDM24.pdf
 7. DISASTER MANAGEMENT M.Com 3rd Semester(2021) Author: Uday Singh DIRECTORATE OF DISTANCE & CONTINUING EDUCATION Utkal University, Bhubaneswar, Odisha, ISBN : 978-93-5338-045-8 https://ddceutkal.ac.in/Syllabus/MCOM/Disaster_Management.pdf
 8. The Hindu
 9. Vision Magazine
 10. The Indian Express