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Strengthening Resilience: Disaster Preparedness Strategies for Higher Education Institution

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Abstract

India has diverse geography and dense population and highly vulnerable to both natural and man-made disasters, significantly impacting its higher education institutions. This study examines the critical need for disaster preparedness in colleges and universities, which is a house to millions of students and faculty. It identifies key vulnerabilities, such as weak infrastructure, limited disaster education and lack of coordination with local authorities and proposes a framework to enhance resilience. By mapping disaster-prone campuses, strengthening infrastructure, integrating preparedness into curricula and fostering collaboration with communities, universities/colleges can mitigate risks and ensure continuity of education. The study emphasizes actionable recommendations to create safer academic communities capable of recovering from disasters effectively.

Keywords: Disaster Management, Educational Institutions, Resilience, Safety, Strategies

Introduction

Disasters can strike without warning, leaving behind destruction and devastation. The concept of disaster has been around for centuries, with its roots in the French word 'Desastre', which is the combination of articles 'des' and 'astre' meaning 'star'. In earlier days, a disaster was considered to occur due to some unfavourable star, but today, we understand disasters as sudden, catastrophic events that overwhelm local resources and cause immense suffering. A disaster can be defined as a "sudden misfortune or calamity" or "a natural or human-caused event that causes intensive negative impact on people, goods, services, and/or the environment, exceeding the affected community's capability to respond." Due to its unique geo-climate conditions, vast population and human-induced factors India is among the world's most 'disaster-prone' countries. Out of 36 States and Union Territories 27 are disaster prone. Almost 58% land is prone to earthquakes and 12% to cyclones. Similarly, 68% cultivable land is vulnerable to droughts. From 1970 to 2021, 1.3 lakh Indians lost their life due to disasters caused by extreme weather and climate change and in February, India's Minister of State for Home Affairs Nityanand Rai admitted in Lok Sabha that 2,936 people and 61,826 cattle lost their live in hydro-metrological disasters in India during 2024. Himachal Pradesh was the most impacted state with 408 deaths. Recently, 30 people killed and approximately 60 injured in a stampede at Kumbh Mela, Prayagraj (Uttar Pradesh). Disasters not only cause widespread disruption but also significantly impact education. Students are particularly affected as disasters disrupt campus activities, interrupt classes, and damage educational infrastructure. Over the past decades, disasters have frequently impacted university and college campuses, resulting in loss of life, injuries, financial losses, and disruptions to teaching, research, and public service. The damage to infrastructure and interruption of institutional missions lead to significant losses, including faculty and student departures, reduced research funding, and increased insurance premiums. For instance, the 1976 Tangshan earthquake in China resulted in loss of 2000 lives, including students who perished in collapsed dormitories. However, these losses could have been minimized or

avoided with thorough pre-disaster planning and mitigation measures. These losses could have been mitigated or reduced through proper pre-disaster planning and by identifying the vulnerabilities. The process involving activities that help us face disasters effectively is commonly known as 'disaster preparedness'. Even, the ancient Indian epic, the Mahabharata, offers a powerful lesson in disaster preparedness. The Pandava's narrow escape from the wax palace, a clever plot devised by the Kauravas, showcases the importance of anticipation, planning, and swift action in the face of danger. By being prepared and having a plan in place, the Pandavas were able to outsmart their enemies and save their lives. In modern times, disaster management has become a critical aspect of mitigating the impact of disasters. It involves preparation, response, and rehabilitation to minimize damage and loss. Effective disaster management requires a comprehensive approach, including risk analysis, preparedness strategies, warning systems, and emergency planning. This research paper explores the critical need for disaster preparedness in colleges and universities. By identifying vulnerabilities, developing frameworks for enhancement, and providing recommendations for mitigation and response, this study aims to contribute to the development of more resilient and sustainable campuses. The goal is to create a safer, more prepared academic community that can respond to disasters with confidence and resilience.

Objectives

- To Identify vulnerabilities and risks in colleges and universities
- To develop a framework for enhancing disaster preparedness.

Types of Disasters

Disasters can be categorized into two main types: Natural Disasters and Man-made Disasters.

Natural Disasters

Mother nature is not only a gift to mankind but sometimes become a reason of destruction and fury, by causing natural disasters. Natural disasters are catastrophic events with atmospheric, geological, and hydrological origins that can cause significant damage to the environment, infrastructure and human life.

Earthquakes: An earthquake is an unpredictable event causing intense ground shaking due to tectonic plate movements, potentially leading to significant casualties, injuries and property damage in populated areas.

Floods: Floods occur when water overflows its normal boundaries, submerging areas for varying durations. In India, over 40 million hectares of the 329 million hectares geographical area is flood-prone, leading to frequent floods that cause significant loss of life, damage to livelihoods, property, infrastructure and public utilities.

Cyclones: A cyclone is a powerful storm with strong winds and heavy rainfall that forms around a low-pressure area, causing destruction and flooding in coastal areas. It can uproot trees, damage buildings and wash away homes.

Landslides: Landslides are movement of rock, soil or debris down a slope, often triggered by heavy rainfall or earthquakes, which can block rivers. The Himalayas, the world's tallest mountains, are in India. They formed when the Indian plate crashed into the Eurasian plate. The Indian plate keeps moving north toward China at about 5 cm per year, putting constant pressure on the rocks. This makes them weak and crumbly, leading to landslides and earthquakes. Last year 20 people died in Shimla due to landslide.

Tsunamis: Large Ocean waves caused by earthquakes or volcanic eruptions, which can cause widespread destruction in coastal areas.

Heat and Cold Waves: Heat waves and cold waves are extreme temperature events. A heat wave is a prolonged period of abnormally high temperatures, typically during summer. On the other hand, a cold wave is a period of unusually low temperatures, often bringing severe cold conditions. Both can have significant impacts on health and daily life.

Droughts: A prolonged period of abnormally low rainfall, leading to a shortage of water is called drought. Drought is the most serious physical hazard to agriculture in nearly every part of the world. (Britannica).

Man-made Disasters

Man-made disasters are result of human actions or inactions, causing significant harm to people, property or the environment. These disasters can occur suddenly or unfold over time, often due to human error, negligence or intentional acts.

Nuclear and Radiological Emergencies: These are accidents involving nuclear or radioactive materials, which can cause widespread contamination and harm to human health. For instance, Chernobyl nuclear disaster, which occurred on April 26, 1986.

Biological Disasters: Biological disasters refer to outbreaks of diseases caused by biological agents, such as viruses or bacteria. Epidemics and Pandemics like, Swine flu and COVID-19 are examples of biological disasters.

Chemical Disasters: A chemical incident occurs when a toxic substance is released uncontrollably, posing risks to human health and the environment (WHO). For example, Bhopal Gas Tragedy in Madhya Pradesh.

Industrial Accidents: Industrial Accidents are the incidents in industrial settings, such as factories or plants, which can cause harm to workers and nearby communities.

Terrorism and Sabotage: Terrorism and wars are devastating events that bring immense suffering and destruction to communities and nations. They disrupt lives, cause loss of lives and shatter the sense of security among common

people. Whether it is the horrors of war or terrorism, the impact is felt across generations. The recent terror attack in Pahalgam, Kashmir, was a disaster that prompted 'Operation Sindoor'.

We can prevent many man-made disasters by following building codes, adhering to international agreements and prioritizing safety in industries. While natural disasters are inevitable, effective preparedness and response can minimize their impact. By working together, we can safeguard our progress, learn from nature and build a resilient future for generations to come.

Vulnerabilities of Colleges/Universities in India: Absence of Structured Data

According to the AISHE 2021-22 report, India has 1,168 universities and 45,473 colleges, with an enrolment of 4.33 crore students and 27 lakh faculty members. Given India's estimated population of 1.4 billion (based on Worldometer data), this student and faculty population constitutes approximately 3% of the total population. Ensuring the safety and security of this substantial demographic is of paramount importance and warrants significant attention. Many Indian states, including Uttar Pradesh, Madhya Pradesh, Rajasthan, Telangana and Andhra Pradesh region, are home to over 19,736 colleges and are prone to multiple natural disasters. These states face diverse hazards, such as cyclones, floods, and droughts, which can occur at different times and affect different areas within the same state. For instance, coastal Andhra Pradesh may experience cyclones and floods, while inland areas may face droughts in the same year. The Indian states of Tamil Nadu, Gujarat, Karnataka, West Bengal, and Maharashtra are not only hubs of higher education, with 15,860 colleges, but also regions that grapple with the harsh realities of multiple natural disasters. The impact of these disasters varies across the states, with West Bengal struggling with recurrent floods, Maharashtra facing droughts, and Gujarat being susceptible to earthquakes and cyclones. There is a significant gap in India regarding the availability of structured data on colleges and universities located in disaster-prone areas, including the number of students affected by such disasters. Consequently, the impact on students, such as forced migration, dropout rates, labour exploitation, and vulnerability to abuse, remains largely unquantified and unaddressed.

Marginalised Groups and Socio-Economic Vulnerabilities

Natural disasters have a great impact on educational attainment, especially for marginalized groups such as females, Other Backward Classes (OBCs), Scheduled Castes (SCs), and Muslim minorities. Students from varied socio-economic backgrounds, including those with limited resources, may lack access to personal safety measures or recovery post-disaster, leading to significant long-term losses in human capital, perpetuating cycles of poverty, inequality, and gender disparities. A large number of students from these groups, including 1.63 crore OBC, 66.23 lakh SC and 30.1 lakh minority students, being particularly vulnerable.

Infrastructure

Educational institutions in disaster-prone areas are often at risk due to poorly constructed and maintained infrastructure. This can lead to devastating consequences, including significant damage and prolonged disruptions to educational services. The earthquake-resistant construction and retrofitting buildings can ensure the safety of students and staff. For instance, the 2001 Bhuj earthquake in Gujarat, impacted the region's educational infrastructure, with 47 colleges and universities severely damaged and students forced to wait five months to resume classes. In contrast, Japan's robust infrastructure and disaster preparedness measures allowed classes to restart within just a week after a massive magnitude 9.0 earthquake in 2011, underlining the importance of prioritizing safety and resilience in educational infrastructure.

Under Developed Research and Higher Education

India's higher education and research in disaster management lags behind countries like the USA and UK, where specialized disaster-specific courses are common. Despite recent initiatives, such as the introduction of Disaster Management as a new subject in the UGC-NET (2024) and the launch of disaster management courses by some universities, there remains a significant gap. Regulatory bodies like UGC and AICTE have not adequately invested in courses that impart scientific knowledge and expertise in disaster management.

Limited Preparedness and Institutional Capacity

Students exhibit limited disaster preparedness and awareness due to inadequate exposure to practical training and disaster education, exacerbated by demographic variations in trust and engagement with disaster risk reduction efforts. Universities face challenges in disaster risk management due to limited budgets, resulting in inadequate investment in infrastructure and staff training. This insufficient preparedness, combined with institutional challenges such as inadequate communication systems, rapid enrolment growth, and lack of essential emergency supplies, increases student's vulnerability during disasters. Due to this Student's potential to contribute to disaster management remains untapped due to limited involvement.

Lack of Coordination

Colleges/Universities often struggle to prepare for disasters because they don't work closely enough with local governments, NGOs, and other organizations. This lack of coordination can leave them without the resources and expertise they need, making it harder to keep students and staff safe during emergencies. Without strong partnerships, institutions may not receive timely warnings, emergency supplies or support for recovery efforts. This isolation can worsen the impact of disasters, putting students and staff at greater risk.

Recommendations: Identifying disaster-prone universities/colleges

To better prepare for disasters, the Census of India and (National Sample Survey Organisation) NSSO, guided by the Ministry of Education, should regularly count and map universities and colleges across States and Union Territories. Using (District Information System for Education) DISE, we can track which campuses sit in single or multi-hazard zones. This helps local education officials plan ways to reduce risks, quickly reopen campuses within a week to support struggling communities, monitor students who might leave or drop out due to disasters, and provide mental health support for those dealing with trauma. It's about working together to keep our higher education communities safe and strong.

Strengthening University Infrastructure

To ensure continuity and safety, universities/colleges should invest in strengthening both physical and digital infrastructure. This includes retrofitting buildings to withstand extreme weather events and upgrading digital platforms to support remote learning and communication during crises. Universities/colleges can protect their students, staff and facilities while also ensuring that they can continue to operate effectively even in the time of disasters.

Preparing Students for Challenges

Universities/colleges can play a vital role in shaping a disaster-resilient future by incorporating disaster preparedness into their curriculum and training programs. This can be achieved through hands-on training like evacuation drills and first-aid workshops, as well as interdisciplinary courses that tackle real-world issues like climate change. Empowering students and staff with the knowledge and skills can make a lasting impact on their communities.

Better Coordination and Mapping

Universities/Colleges can enhance disaster preparedness by collaborating with local communities, local groups, government agencies and NGOs. These partnerships may help in gaining diverse knowledge, resources and expertise, enabling universities/colleges to create preparedness plans with local leaders that strengthen collective resilience. Also, digitised maps and satellite images published by the National Remote Sensing Agency (NRSA) and National Atlas & Thematic Mapping Organisation (NATMO) must be made available to officers at the district and block levels. Such collaboration may result in more effective disaster response and recovery.

Fix Accountability

For making universities/colleges safer and more resilient, leaders like Vice Chancellors and Principals must be held accountable for campus safety. They should collect and analyse data on student populations and conduct regular safety audits with the help of students, faculty and staff. They must create effective disaster management plans that ensure preparedness and demonstrate a commitment to protecting lives. This shared responsibility approach can make campuses safer and more resilient during disasters.

Conclusion

Trouble never sends a warning and doesn't discriminate. Disasters can strike anyone, anywhere, and India's colleges and universities are no exception. As universities/colleges are home to millions of students and faculty, it is very important to keep them safe when nature or human actions create chaos. India's diverse landscapes and socio-economic challenges make it highly prone to earthquakes, floods, pandemics, and more. This study highlights the weak spots, like fragile buildings and a lack of coordinated plans, but it also shows a clear way forward. By pinpointing campuses at risk, reinforcing infrastructure and teaching students/staff how to handle emergencies, we can build stronger, safer academic environment. It is not just about surviving a disaster, it is about recovering fast, keeping classes going, and saving lives. We must create a campus where students know exactly what to do during an earthquake, where buildings stand strong against floods and where universities team up with local leaders to protect everyone. This would not be simple. It will take hard work, funding and a shared commitment from university/college teachers, students and communities. Becoming mere spectators has cost us lives, broken dreams and ruined campuses. Adding disaster education to the curriculum and building emergency response teams will further strengthen preparedness. Like the Pandavas escaping the wax palace, we need to plan ahead and act wisely. Together, we can turn India's colleges and universities into safe havens and shining examples of resilience, ready to face any challenge with courage and unity.

References

1. Bhuthalingam, M. (1982). Children's Mahabharata (Punjabi). Ministry of Information and Broadcasting, Government of India.
2. Central Board of Secondary Education. (2003). Together Towards a Safer India: Education in Disaster Management (A textbook for class VIII Students).
3. Gibbs, L., Jehangir, H. B., Kwong, E. J. L., & Little, A. (2022). Universities and multiple disaster scenarios: A transformative framework for disaster resilient universities. International Journal of Disaster Risk Reduction, 78, 103132. https://doi.org/10.1016/j.ijdrr.2022.103132
4. Government of India, Ministry of Education. (2022). All India Survey on Higher Education 2021-22. https://cdnbbsr.s3waas.gov.in/s392049debbe566ca5782a3045cf300a3c/uploads/2024/02/20240719952688509.pdf
5. Hussain, Y. R., & Mukhopadhyay, P. (2024). Impact of natural disasters on educational attainment in India: A panel data analysis. Discover Sustainability, 5(1), Article 279. https://doi.org/10.1007/s43621-024-00498-7
6. Indira Gandhi National Open University. (2017). Unit-1 Meaning and classification of disasters (MPA-018 Disaster Management).
7. Jaradat, A., Mziu, H., & Ibrahim, J. (2015). Disaster preparedness in universities. International Journal of Computer Trends and Technology, 19(1), 1–5.
8. Manral, M. S. (2025, February 5). Natural disasters killed nearly 3,000 in 2024; Himachal worst hit with 408 deaths. The Indian Express. https://indianexpress.com/article/india/natural-disasters-killed-nearly-3000-in-2024-himachal-worst-hit-with-408-deaths-9142770/
9. National Disaster Management Authority. (2019, November). National Disaster Management Plan (Revised Edition). Ministry of Home Affairs, Government of India.
10. Paik, S., & Raghu Kumar, C. V. (2015). Natural disasters and impact on schools in India. Disaster - Response and Management, 3(1), 1–10.
11. Patel, R. K., Pamidimukkala, A., Kermanshachi, S., & Etminani-Ghasrodashti, R. (2023). Disaster preparedness and awareness among university students: A structural equation analysis. International Journal of Environmental Research and Public Health, 20(5), Article 4447. https://doi.org/10.3390/ijerph20054447
12. Press Trust of India. (2023, May 22). India lost over 1.3 lakh lives in disasters linked to extreme weather, climate change in 50 years: UN agency. The Economic Times. India lost over 1.3 lakh lives in disasters linked to extreme weather, climate change in 50 years: UN agency - The Economic Times
13. Singh, D. (2014, April). Disaster management education in India: Issues and challenges [Conference paper]. Entrepreneurship Development Institute of India, Ahmedabad, India.
14. Tkachuck, M. A. (2016). Natural disaster preparedness in college students: Implications for institutions of higher learning [Master's thesis, University of Mississippi]. eGrove. https://egrove.olemiss.edu/etd
15. United Nations International Strategy for Disaster Reduction. (2008). Disaster preparedness for effective response: Guidance and indicator package for implementing Priority Five of the Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. United Nations.