

INTERNATIONAL JOURNAL FOR LEGAL RESEARCH AND ANALYSIS



Open Access, Refereed Journal Multi-Disciplinary
Peer Reviewed

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ISSN

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A 25-YEAR ANALYSIS OF LEGAL AND INSTITUTIONAL FRAMEWORKS IN ODISHA'S DISASTER MANAGEMENT POST-SUPER CYCLONE

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Abstract

Twenty-five years after the devastating Super Cyclone of 1999, Odisha has evolved into a national leader in disaster management, earning recognition for its response to major cyclones that hit Odisha post super cyclone. The Odisha State Disaster Management Authority (OSDMA) has been instrumental in implementing early warning systems, mass evacuations, and community-based preparedness strategies, leading to significant reductions in casualties during these disasters. However, while Odisha's progress in disaster preparedness has saved countless lives, challenges remain in addressing the long-term socio-economic impacts, particularly on vulnerable coastal communities. This paper aims to critically analyse Odisha's disaster management legal framework, policies, and schemes, examining their effectiveness in both immediate response and long-term recovery. Through case studies this paper assesses the strengths and gaps in Odisha's disaster management approach, especially in terms of securing livelihoods, rebuilding resilient infrastructure, and fostering community participation. Furthermore, it explores the need for integrating ecological solutions, such as enhancing green cover and implementing sustainable coastal protection measures, into disaster management strategies. By analysing these aspects, the paper seeks to provide insights into how Odisha can build a more holistic and sustainable disaster management framework that not only ensures zero casualties but also supports long-term recovery and resilience.

Key Words- Disaster Management, Odisha Super Cyclone, Legal Framework, Disaster Response, Disaster Management Challenges

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Introduction

The 1999 Super Cyclone marked a turning point for Odisha, starkly exposing the vulnerabilities of its coastal communities and the inadequacies in disaster preparedness at the time. In the wake of this devastating event, the state embarked on a transformative journey to enhance its disaster management frameworks, culminating in significant strides over the past 25 years.³ This article delves into the progress made in disaster management in Odisha, emphasizing the role of key legislative and institutional advancements, particularly the Disaster Management Act of 2005⁴ and the establishment of the Odisha State Disaster Management Authority (OSDMA)⁵.

Recognized for its outstanding work, OSDMA was honoured with the Subhas Chandra Bose Aapda Prabandhan Puraskar-2023 in the institutional category, reflecting its pivotal role in bolstering the state's disaster preparedness and response capabilities.⁶ The evolution of disaster management frameworks has been critical in addressing the new challenges posed by climate change and natural hazards. Key advancements include the development of comprehensive response structures, the enhancement of early warning systems, and the implementation of disaster risk reduction measures.

As emergencies grow in frequency and intensity, this study evaluates disaster management frameworks, focusing on compensation gaps, alternative livelihoods, and environmental resilience strategies. Insights from National Disaster Response Force (NDRF)⁷ and Odisha Disaster Rapid Action Force (ODRAF)⁸ responses highlight their effectiveness in addressing emerging challenges, while engaging communities is key to adaptive, sustainable disaster management. This study evaluates advancements and challenges in Odisha's disaster management frameworks to recommend policy improvements that enhance the state's disaster

³ Debabrat Patra, BN Durga, Aditi Roy & Anand Shankar Patra, *25 Years of Odisha Super Cyclone: A Study of Jagatsinghpur Shows Advances & the Way Ahead* (Oct. 28, 2023), available at <<https://www.downtoearth.org.in/natural-disasters/25-years-of-odisha-super-cyclone-a-study-of-jagatsinghpur-shows-advances-the-way-ahead-92218>>

⁴ The Disaster Management Act, 2005, No. 53 of 2005 (India).

⁵ Odisha State Disaster Management Authority, *Resolution No. 42317/R&DM* (Rev. & Disaster Mgmt. Dep't, Sept. 27, 2008).

⁶ Odisha Disaster Management Authority Wins Centre's Award, *TIMES OF INDIA* (Jan. 24, 2023), <https://timesofindia.indiatimes.com/city/bhubaneswar/state-disaster-management-authority-wins-centres-award/articleshow/97267197.cms> (last visited Sept. 9, 2024).

⁷ National Disaster Response Force, *MINISTRY OF HOME AFFAIRS*, <https://ndrf.gov.in/> (last visited Sept. 10, 2024).

⁸ Odisha Disaster Rapid Action Force, *ODISHA STATE DISASTER MANAGEMENT AUTHORITY*, <https://www.osdma.org/odraf.html> (last visited Sept. 10, 2024).

response and build resilient systems through legal, institutional, and community analysis.

Disastrous Aftermaths of Super Cyclone of 1999 (Mahabaty)

Death Toll:

The 1999 Super Cyclone, also known as the Paradip Cyclone, had a devastating impact on Odisha. The cyclone claimed the lives of approximately 10,000 people, making it one of the deadliest natural disasters in the region's history.⁹ The extensive loss of life was a result of the cyclone's ferocious winds, flooding, and the collapse of infrastructure.

Economic Damage:

The economic impact of the cyclone was profound and far-reaching. The super cyclone has set back the state's progress by nearly 20 years, with official estimates of the damage reaching ₹10,000 crore.¹⁰

Agricultural Losses:

The cyclone caused extensive damage to agricultural lands. According to a white paper released by the state government in 2000, around 13 lakh hectares of paddy crops were destroyed.¹¹ In addition, 1.76 lakh hectares of vegetables and 2.57 lakh hectares of other crops were lost. This massive loss of crops led to severe food shortages and economic hardship for farmers.

Fisheries:

The cyclone also had a catastrophic impact on the fishing industry. It destroyed 22,143 fishing nets and 9,085 boats, causing significant losses to the livelihoods of the fisherfolk community.¹² The destruction of these assets disrupted local fisheries and affected the income of many families dependent on this industry.

Livestock:

The cyclone resulted in substantial livestock losses. The government reported the loss of 3,15,886 cattle, 18,83,468 poultry, and 3,16,372 other small animals.¹³ The death of livestock not only caused immediate economic losses but also had long-term effects on the agricultural and dairy sectors.

⁹ActionAid India, Odisha Super Cyclone, <https://www.actionaidindia.org/emergency/odisha-super-cyclone/#:~:text=It%20caused%20the%20deaths%20of,small%20animals%20at%203%2C16%2C372> (last visited Sept. 8, 2024).

¹⁰ Down to Earth, Swept Apart, (Dec. 1, 2006), <https://www.downtoearth.org.in/environment/swept-apart-17030> (last visited Sept 6, 2024)

¹¹ Kishor C. Samal, Facing Sudden Impact: Experience of Orissa Super Cyclone of 1999, *Man & Development*, Dec. 2006.

¹² ActionAid India, *supra* note 9.

¹³ *Id*

Infrastructure:

The cyclone caused extensive damage to infrastructure, including roads, bridges, and buildings. The destruction of homes and public buildings left many people displaced and without shelter. The repair and reconstruction of infrastructure required significant financial resources and time.¹⁴

Social Disruptions:

The social impact of the cyclone was equally devastating. In the seven districts hardest hit by the disaster, more than 70% of houses were completely destroyed. While the majority of these were thatched homes, about 10-15% of homes with other types of roofing were also impacted. Additionally, around 11,000 schools suffered major damage or were entirely destroyed.¹⁵

Displacement:

The cyclone caused widespread displacement, with lakhs of people losing their homes. Many were forced to seek shelter in temporary relief camps or live with relatives.¹⁶ The displacement disrupted daily life and exacerbated the challenges faced by affected communities.

Community Impact:

Vulnerable groups, including Dalits, Bengali immigrants, women, children, and people with disabilities, were disproportionately affected. The cyclone's impact on these groups was severe due to their pre-existing socio-economic disadvantages.¹⁷ Recovery was particularly slow for these communities, who had limited access to resources and support.

Health and Well-being:

The destruction of infrastructure and the flooding of areas led to health crises, including outbreaks of diseases and a lack of access to medical facilities. The psychological impact of the disaster, including trauma and stress, affected many survivors.

Economic Hardship:

The destruction of crops, livestock, and fishing assets led to widespread economic hardship. Many families lost their primary sources of income and faced difficulty in meeting basic needs. The economic downturn affected not only the individuals directly impacted but also the broader community through reduced economic activity.

The 1999 Super Cyclone left a lasting imprint on Odisha, with extensive loss of life, significant

¹⁴ *Id*

¹⁵ Samal, *supra* note 11 at 93

¹⁶ *Id*

¹⁷ ActionAid India, *supra* note 12

economic damage, and profound social disruptions.¹⁸ The scale of the disaster highlighted the need for improved disaster management frameworks and resilience-building measures to better prepare for future emergencies.

Odisha's Socio-Legal Measures and Reforms After the Super Cyclone

After this disastrous cyclone Odisha became the pioneer in disaster management in India creating the Odisha State Disaster Management Authority (OSDMA) in 1999, which was well before the National Disaster Management Authority (NDMA) which came into existence in 2005. OSDMA adopted a groundbreaking approach that emphasized the involvement of local communities in disaster management, training grassroots organizations, self-help groups, and volunteers to effectively manage risk reduction and relief efforts.

Here are certain key points that were taken by the state of Odisha to get the situation back to the original:

- **Construction of Shelters and Infrastructure:** Over 800 multi-purpose cyclone shelters, evacuation roads, embankments, and disaster-resilient houses were built with support from multilateral agencies like the World Bank.¹⁹
- **Community Training:** Local communities, including gram panchayats, self-help groups, and over 100,000 volunteers, were trained in disaster risk reduction and management.²⁰
- **Biannual Mock Drills:** OSDMA conducts large-scale community-led mock drills every June and November, involving government departments, NGOs, and trained volunteers.²¹
- **Early Warning System:** Odisha implemented an early warning system that provides cyclone and tsunami alerts to nearly 1,200 coastal villages through sirens and mass messaging, supported by watchtowers in 120 coastal locations.²²

¹⁸ Margherita Fanchiotti, Jadu Dash, Emma L. Tompkins & Craig W. Hutton, The 1999 Super Cyclone in Odisha, India: A Systematic Review of Documented Losses, 51 Int'l J. Disaster Risk Reduction 101790 (Dec. 2020)

¹⁹ Samal, *supra* note 11 at 94

²⁰ Pradeep Jena & Auguste Tano Kouamé, Odisha's Turnaround in Disaster Management Has Lessons for the World, WORLD BANK (Nov. 3, 2023), <https://www.worldbank.org/en/news/opinion/2023/11/03/odisha-s-turnaround-in-disaster-management-has-lessons-for-the-world>. (last visited on sept. 13, 2024)

²¹ *Id*

²² Odisha State Disaster Management Authority, Early Warning and Communications System, <https://www.osdma.org/preparedness/early-warning-communications/ewds/#gsc.tab=0> (last visited Sept. 13, 2024).

- **Sneha Abhiyaan Campaign:** Launched to support vulnerable groups, including women, children, widows, orphans, the elderly, and individuals with disabilities, providing psychological and physical rehabilitation.²³
- **Humanitarian Aid and Collaboration:** After the Super Cyclone, humanitarian organizations like the Odisha Red Cross²⁴, Oxfam²⁵ and Bochasanwasi Akshar Purushottam Swaminarayan Sanstha (BAPS)²⁶ extended relief efforts beyond immediate recovery, launching long-term rehabilitation programs focused on housing, health services, and community development.
- **Scientific and Technological Approaches and Climate Change Adaptation:** OSDMA integrates scientific advancements like disaster risk modeling, hazard mapping, and early warning systems to enhance preparedness for evolving climate risks.²⁷ There is also an ongoing effort to address the increased frequency and intensity of cyclones, heat waves, droughts, and other climate-related events. Continuous improvement in disaster preparedness and infrastructure to protect against sea erosion and other emerging risks.²⁸

Evolution of National Disaster Management Legal Frameworks

Eventually the central Legal frameworks came in to existence which further enhanced the management capacity of the state and to combat the disaster more efficiently.

1. The Disaster Management Act of 2005

Enacted on December 23, 2005, the Disaster Management Act, 2005²⁹ provides a comprehensive framework for disaster management at national, state, and district levels. It establishes specialized agencies, financial mechanisms for disaster relief, and promotes stakeholder engagement³⁰ in prevention, readiness, and mitigation efforts. The Act also

²³ SNEHA Abhiyan, History, <https://snehaabhiyan.org/history.html> (last visited Sept. 18, 2024).

²⁴ International Federation of Red Cross and Red Crescent Societies, India: Orissa Cyclone Appeal No. 28/1999, Final Report 4 (2000).

²⁵ Gary Iveson, Orissa Cyclone: Reconstruction in Ganjam (July 7, 2000), <https://reliefweb.int/report/india/orissa-cyclone-reconstruction-ganjam> (last visited Sept.13, 2024)

²⁶ Bochasanwasi Shri Akshar Purushottam Swaminarayan Sanstha (BAPS), 1999 Cyclone Orissa, <https://www.baps.org/News/1999/1999-Cyclone-Orissa-2349.aspx> (last visited Sept. 18, 2024).

²⁷ Odisha Disaster Management Plan (2022), Energy Department, Government of Odisha, <https://energy.odisha.gov.in/sites/default/files/2022-05/DISASTER%20MANAGEMENT%20PLAN%20%20ENERGY%20DEPARTMENT%20GoO.pdf> (last visited Sept. 18, 2024).

²⁸ Avaya K. Nayak, Post Super Cyclone Orissa: An Overview, 2009 Orissa Review (2009).

²⁹ The Disaster Management Act, 2005, no.53 of 2005 (India)

³⁰ National Disaster Management Authority, <https://ndma.gov.in/about-us/introduction>(last visited Sept.13, 2024)

enforces penalties³¹ for violations and created the National Disaster Management Authority (NDMA), led by the Prime Minister, as the highest authority for disaster management in India.

2. National Disaster Management Authority (NDMA)-

The National Disaster Management Authority (NDMA)³² was initially created by an Executive Order on May 30, 2005, and formally established under the Disaster Management Act on September 27, 2006. As India's top disaster management body, chaired by the Prime Minister, the NDMA formulates policies and coordinates disaster response efforts across national, state, and local levels³³. Organized into five divisions—Policy & Plans, Mitigation, Operations & Communications, Information & Technology, and Administration & Finance³⁴. The NDMA aims to create a disaster-resilient nation through prevention, preparedness, and recovery strategies³⁵. It plays a vital role in launching early warning systems, coordinating with the National Disaster Response Force (NDRF), and fostering international partnerships³⁶.

Odisha State Disaster Management Authority (OSDMA) Programs and Policies for Disaster Management

1. Early Warning Systems

OSDMA³⁷ has implemented advanced early warning systems across the coastal regions of Odisha. These include cyclone and tsunami alert sirens to inform the population and facilitate timely evacuation, minimizing casualties and damages during disasters.

2. Training and Rescue Units

To improve disaster response, OSDMA has developed specialized rescue teams, including canine units. It also operates training institutes dedicated to disaster management, enhancing the skills of response teams, volunteers, and community leaders.

³¹ *Id*

³² NDMA, *supra* note 30

³³ National Disaster Management Authority, *Introduction*, <https://ndma.gov.in/about-us/introduction> (last visited Sept. 13, 2024).

³⁴ National Disaster Management Authority, *Introduction*, <https://ndma.gov.in/about-us/introduction> (last visited Sept. 13, 2024).

³⁵ National Disaster Management Authority, *NDMA Vision*, archived at <https://web.archive.org/web/20200614120000/https://ndma.gov.in> (archived June 14, 2020), (last visited on sept 14, 2024)

³⁶ National Disaster Management Authority, *Functions and Responsibilities*, archived at <https://web.archive.org/web/20200606120000/https://ndma.gov.in> (archived June 6, 2020), (last visited on sept. 14, 2024)

³⁷ *Supra* note at 5

3. Capacity Building and Community Empowerment

OSDMA actively promotes capacity-building programs for government officials, NGOs, and local communities. These initiatives aim to strengthen disaster preparedness, risk assessment, and the overall resilience of vulnerable populations, with particular emphasis on community-driven disaster management.

4. Institutional Coordination and Response Structure

In line with the National Disaster Management Act (NDM Act 2005), OSDMA has established a multi-tiered institutional structure for disaster management at the state, district, and village levels. This system ensures a coordinated response involving various agencies such as financial institutions, NGOs, and the UN. The disaster response structure is promptly activated when a disaster warning is issued or a disaster occurs.

5. Disaster Risk Reduction and Infrastructure Resilience

OSDMA integrates disaster risk reduction into infrastructure development by constructing cyclone shelters, disaster-resistant housing, embankments, and improved road networks to protect vulnerable communities and ensure long-term resilience.

6. Energy Sector Preparedness

The Department of Energy ensures the continuity of power to critical infrastructure like hospitals, water facilities, and communication networks during disasters, aligning its Disaster Management Plan with Odisha's broader disaster preparedness efforts to enhance resilience.

7. Social Rehabilitation Programs

Post the 1999 Super Cyclone, OSDMA launched long-term rehabilitation efforts like the "Sneha Abhiyaan"³⁸ to support widows, orphans, the elderly, and individuals with disabilities. These programs aim to ensure their psychological, social, and economic rehabilitation, helping them reintegrate into society.

8. Humanitarian Collaboration and Aid

OSDMA collaborates with NGOs and international organizations, including the Odisha Red Cross and Oxfam, to support immediate relief and long-term rehabilitation, focusing on shelter,

³⁸ SNEHA Abhiyan, *Objective*, <https://snehaabhiyan.org/objective.html> (last visited Sept. 19, 2024).

healthcare, and livelihood rebuilding.

9. Science, Technology, and Hazard Monitoring

OSDMA enhances its disaster management strategy by utilizing modern technologies like hazard mapping, risk modelling, and multi-hazard early warning systems, enabling accurate predictions and assessments for improved preparedness and timely response.

10. State Institute of Disaster Management (SIDM)

The Odisha State Disaster Management Authority (OSDMA) is developing the State Institute of Disaster Management (SIDM)³⁹ at Gotapatna, Bhubaneswar as part of the World Bank-funded Odisha Disaster Recovery Project. The institute will offer disaster management training, research, and capacity-building for stakeholders on its 17-acre campus, which includes sustainable infrastructure, specialized training zones, and an Emergency Response Centre, while aiming to integrate cutting-edge facilities with community engagement and scientific advancements.

This comprehensive overview reflects the multi-faceted approach of OSDMA to disaster management, blending cutting-edge infrastructure with community involvement, scientific advancements, and institutional coordination.

International Frameworks Shaping Odisha's Disaster Preparedness

The Sendai Framework for Disaster Risk Reduction (2015-2030)⁴⁰ has shaped India's disaster strategies, including Odisha's, by emphasizing disaster risk reduction over response. Its four priorities—risk understanding, governance, resilience investment, and preparedness—are integrated into India's policies, like the Disaster Management Act of 2005 and Odisha's risk-informed approach. Odisha has enhanced infrastructure, early warning systems, and community involvement, and integrated climate adaptation strategies such as mangrove plantations, aligning with the framework's focus on resilience and multi-hazard preparedness.

³⁹ Odisha State Disaster Management Authority (OSDMA), *State Institute of Disaster Management*, <https://www.osdma.org/capacity-building/state-institute-of-disaster-management/#gsc.tab=0> (last visited Sept. 19, 2024).

⁴⁰UNDRR, *Sendai Framework for Disaster Risk Reduction 2015-2030*, <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030> (last visited Sept. 19, 2024).

Case Study: Role of Odisha State Disaster Management Authority During Cyclones Post Super Cyclone

1. Cyclone Phailin (2013)⁴¹

A. Preparedness: -

- Implementation of early warning systems
- Mass evacuation of approximately 1 million individuals
- Utilization of newly constructed cyclone shelters

B. Response: -

- Significantly reduced loss of life compared to previous cyclones
- Efficient deployment of disaster response teams

C. Challenges: -

- Logistical difficulties in post-cyclone relief distribution
- Substantial damage to infrastructure and agricultural sectors

D. Lessons Learned: -

- Critical importance of timely evacuations
- Necessity for improved relief distribution mechanisms

2. Cyclone Hudhud (2014)⁴²

A. Preparedness: -

- Enhanced forecasting through collaboration with meteorological agencies
- Strategic pre-positioning of relief materials

B. Response: -

- Efficient evacuation of coastal regions
- Coordinated efforts between state and central agencies

C. Challenges: -

- Communication disruptions in severely affected areas
- Extended power outages impeding relief efforts

D. Lessons Learned: -

- Necessity for robust communication systems
- Importance of resilient power infrastructure

⁴¹ Gov't of India, *Cyclone Phailin in Odisha: Rapid Damage and Needs Assessment Report* (Dec. 2013).

⁴² *Cyclone Hudhud: 2 Killed in Odisha, 68,000 People Moved to Safer Places*, The Times of India (Oct. 12, 2014), <https://timesofindia.indiatimes.com> (last visited on sept 14, 2024).

3. Cyclone Titli (2018)⁴³

A. Preparedness: -

- Enhanced dissemination of early warnings
- Evacuation of vulnerable coastal populations

B. Response: -

- Swift mobilization of emergency services
- Prompt provision of immediate relief supplies

C. Challenges: -

- Insufficient preparedness in hilly regions
- Unanticipated flooding and landslides

D. Lessons Learned: -

- Requirement for comprehensive disaster planning across diverse topographies
- Significance of localized risk assessment

4. Cyclone Fani (2019)⁴⁴

A. Preparedness: -

- Largest pre-cyclone evacuation in India's history (1.2 million individuals)
- Extensive utilization of multi-channel early warning systems

B. Response: -

- Minimal loss of life despite the cyclone's intensity
- Rapid initiation of restoration efforts

C. Challenges: -

- Prolonged power outages in urban areas
- Extensive damage to infrastructure

D. Lessons Learned: -

- Effectiveness of large-scale evacuations
- Necessity for more resilient urban infrastructure

⁴³ India Meteorological Dep't, *Very Severe Cyclonic Storm "Titli" over Eastcentral Bay of Bengal (08–13 October 2018): A Report* (Jan. 2019), <https://www.imd.gov.in> (last visited on sept 14, 2024).

⁴⁴ Yagnya Valkya Misra, *The Environmental Devastation of Cyclone Fani*, *The Caravan* (Oct. 2, 2019), <https://www.caravanmagazine.in> (last visited on Sept.14,2024).

5. Cyclone Bulbul (2019)⁴⁵

A. Preparedness: -

- Timely dissemination of weather forecasts and warnings
- Preventive evacuation of coastal residents

B. Response: -

- Effective coordination among various government departments
- Prompt initiation of relief measures

C. Challenges: -

- Significant crop damage
- Delayed assessment and compensation processes for agricultural losses

D. Lessons Learned: -

- Importance of rapid crop damage assessment
- Necessity for streamlined compensation mechanisms

6. Cyclone Amphan (2020)⁴⁶

A. Preparedness: -

- Advanced forecasting and tracking
- Adaptation of evacuation plans to COVID-19 protocols

B. Response: -

- Successful evacuation despite pandemic-related complications
- Rapid deployment of relief teams

C. Challenges: -

- Balancing cyclone preparedness with COVID-19 safety measures
- Extensive damage to the Sundarbans ecosystem

D. Lessons Learned: -

- Necessity for disaster management plans to incorporate pandemic scenarios
- Importance of ecosystem protection in cyclone-prone areas

⁴⁵ Govt. of India, Ministry of Home Affairs, *Cyclone Bulbul 2019*, National Disaster Response Force, <https://ndrf.gov.in/operations/cyclone-bulbul-2019> (last visited Sept. 19, 2024).

⁴⁶ Govt. of India, Ministry of Home Affairs, *Super Cyclone "Amphan" 2020*, National Disaster Response Force, <https://www.ndrf.gov.in> (last visited Sept. 19, 2024).

7. Cyclone Yaas (2021)⁴⁷

A. Preparedness: -

- Enhanced coordination between state and central agencies
- Strategic pre-positioning of NDRF teams

B. Response: -

- Timely evacuation of low-lying areas
- Swift initiation of relief and restoration work

C. Challenges: -

- Extensive flooding in coastal areas
- Damage to embankments and drainage systems

D. Lessons Learned: -

- Necessity for improved flood management infrastructure
- Importance of maintaining and strengthening coastal embankments

8. Cyclone Gulab (2021)⁴⁸

A. Preparedness: -

- Accurate forecasting of landfall location
- Preventive evacuation of vulnerable populations

B. Response: -

- Minimal loss of life
- Rapid restoration of essential services

C. Challenges: -

- Difficulties in accessing remote areas for relief distribution
- Damage to road infrastructure impeding access

D. Lessons Learned: -

- Importance of developing alternative access routes to remote areas
- Necessity for more resilient road infrastructure in cyclone-prone regions

⁴⁷Govt of India, Ministry of Earth Scis., India Meteorological Dept., *Very Severe Cyclonic Storm, "YAAS" over Bay of Bengal (23rd – 28th May, 2021): A Report* (2021).

⁴⁸Hrusikesh Mohanty & Ashis Senapati, *Cyclone Gulab: Excess Rainfall, Landslides in Odisha; National Highways Blocked*, The New Indian Express (Sept. 27, 2021), <https://www.newindianexpress.com/last> visited on sept.14,2024)

9. Cyclone Jawad (2021)⁴⁹

A. Preparedness: -

- Activation of early warning systems
- Implementation of precautionary measures in coastal areas

B. Response: -

- Minimal impact due to cyclone weakening
- Rapid stand-down of emergency services

C. Challenges: -

- False alarms resulting from cyclone weakening before landfall
- Economic disruptions due to precautionary measures

D. Lessons Learned: -

- Necessity for more accurate intensity predictions
- Importance of balanced decision-making in cyclone preparedness

10. Cyclone Asani (2022)⁵⁰

A. Preparedness: -

- Advanced tracking and intensity predictions
- Implementation of precautionary measures in potentially affected areas

B. Response: -

- Minimal impact due to the cyclone's altered path
- Efficient stand-down of emergency preparations

C. Challenges: -

- Economic disruptions due to precautionary measures for a weakened cyclone
- Public skepticism resulting from reduced impact

D. Lessons Learned: -

- Importance of clear public communication regarding cyclone behaviour
- Necessity for flexible response strategies adaptable to changing cyclone patterns

⁴⁹ "From 1999 Super Cyclone to Jawad: Odisha's Tryst with 10 Cyclones in 22 Years." *News18.com*, December 4, 2021

⁵⁰The Hindu. "Cyclone Asani: Odisha Plans Evacuation." *The Hindu*, May 9, 2022. [https://www.thehindu.com/news/national/other-states/cyclone-asani-odisha-plans-\(last-visited-on-Sept-16-2024-evacuation/article65397264.ece](https://www.thehindu.com/news/national/other-states/cyclone-asani-odisha-plans-(last-visited-on-Sept-16-2024-evacuation/article65397264.ece).

11. Cyclone Mocha (2023)⁵¹

A. Preparedness: -

- Enhanced regional cooperation in cyclone tracking
- Implementation of precautionary measures in potentially affected areas of Odisha

B. Response: -

- Minimal impact on Odisha due to cyclone's path
- Effective monitoring and information sharing

C. Challenges: -

- Balancing preparedness efforts with actual risk
- Maintaining public vigilance for future cyclones

D. Lessons Learned: -

- Importance of regional cooperation in cyclone management
- Necessity for continuous public education on cyclone preparedness, even during less severe events.

Challenges in Legal and Policy Implementation

1. Central Government's Role:

Authority and Compliance:

The Disaster Management Act of 2005 established a comprehensive framework for disaster management in India. However, the role of the central government in enforcing compliance and issuing directives to states has been a point of contention. Questions have arisen about the central government's ability to effectively oversee and coordinate state-level disaster management efforts. This challenge is evident in instances where central directives may not align with local needs or are difficult to enforce, highlighting a need for clearer roles and mechanisms for coordination.

2. Litigation and Access to Legal Resources:

Democratic Participation vs. Legal Limitations:

While litigation provides a democratic avenue for addressing grievances, its effectiveness in disaster management can be limited by the legal framework and accessibility issues. Many affected individuals and communities may face difficulties accessing legal resources or navigating the complexities of disaster-related laws. This limitation underscores the need for

⁵¹ "Odisha Braces for Cyclone Mocha, Likely to Hit Around May 8," *Down to Earth*, May 4, 2023.

more accessible legal recourse and a more inclusive approach to addressing disaster impacts through legal means.

3. Compliance Regime:

Effectiveness of Provisions:

The success of disaster management laws hinges on a robust compliance regime with enforceable provisions. The absence of a stringent compliance framework can undermine the implementation of techno-legal and techno-financial measures. Effective disaster management requires clear enforcement mechanisms and binding consequences to ensure adherence to regulations and guidelines. Without these, there may be gaps in the execution of disaster preparedness, response, and recovery measures.

4. Strengthening Legal Frameworks for Disaster Management:

To address these challenges and enhance the resilience of communities to disasters, the following steps are recommended:

Clarify Central and State Roles:

Define and streamline the roles and responsibilities of central and state governments in disaster management to ensure effective coordination and compliance with disaster management protocols.

Improve Access to Legal Resources:

Enhance accessibility to legal resources and support for individuals and communities affected by disasters, ensuring that legal avenues for redress and participation are more inclusive and effective.

Develop a Robust Compliance Regime:

Establish a comprehensive compliance regime with clear enforcement mechanisms and consequences to ensure that disaster management laws and provisions are effectively implemented and adhered to.

By addressing these challenges, legal frameworks can be strengthened to better support disaster management efforts and improve community resilience.

Suggestions

Here are some recommendations for strengthening disaster management laws and their implementation:

- **Strengthen governance:** Strengthening governance is a key way to reduce disaster risk.

- **Build resilience:** Building resilience is an important way to prevent disasters. This requires clear plans and concepts for concrete measures to be implemented.
- **Incorporate climate change:** Climate change is intensifying weather events, so it's important to incorporate this into disaster management strategies.
- **Improve preparedness:** Preparedness is a key part of disaster management.
- **Provide education and training:** Education and training are important for planning and implementing disaster management strategies.
- **Reduce underlying risk factors:** Identify, assess, and monitor disaster risks, and use knowledge, innovation, and education to build a culture of safety and resilience.

Conclusion

The evolution of disaster management in Odisha since the 1999 Super Cyclone has transformed the state's approach, marked by the establishment of the Odisha State Disaster Management Authority (OSDMA) and the Disaster Management Act of 2005, which have strengthened preparedness and response systems. The recognition of OSDMA with the Subhas Chandra Bose Aapda Prabandhan Puraskar-2023 reflects significant progress, yet ongoing challenges from climate change necessitate continuous adaptation of strategies. Addressing gaps in compensation policies, exploring alternative livelihoods, and implementing effective environmental strategies are crucial for building resilience. Experiences from response teams like the NDRF and ODRAF highlight the importance of community engagement in crafting inclusive disaster management strategies. This study advocates for policy improvements that reinforce legal frameworks and strengthen institutional mechanisms, ensuring better preparedness and sustainability for Odisha's vulnerable populations.