CORPORATE SOCIAL RESPONSIBILITY POLICY
(India)

CORPORATE SOCIAL RESPONSIBILITY POLICY

Etsystore Private Limited

Pursuant to Section 135 read with Schedule VII of the Companies Act 2013 and the Companies
(Corporate Social Responsibility Policy) Rules, 2014

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1.	Purpose

The Corporate Social Responsibility ("CSR") Policy ("CSR Policy") of Etsystore Private Limited (the "Company") has been formulated and approved by the Board of Directors on January 23, 2024. This CSR Policy shall be reviewed annually and amended as necessary to ensure alignment with extant law. In the event that expenditures in respect of the Company's CSR activities will exceed INR 50,00,000 in any fiscal year, a CSR committee comprising of at least two directors shall be constituted by the Company.

The activities specified in this CSR Policy are to be carried out by the Company either individually or in association with eligible Implementing Agencies registered with the Ministry of Corporate Affairs. The CSR Policy is formulated in accordance with the provisions of section 135 of the Companies Act, 2013 and rules made thereunder and other laws applicable to the Company.

2.	Effective Date

This CSR Policy shall be effective from the beginning of the financial year 2023-24 (1 April 2023 to 31 March 2024).

3.	Definitions

a. "Act" means the Companies Act, 2013.

b. "Administrative Overheads" means the expenses incurred by the Company for 'general management and administration' of CSR functions in the Company but shall not include the expenses directly incurred for designing, implementing, monitoring, and evaluating any particular CSR project or program.

c. "Board of Directors" or "Board" means the collective body of the directors of the Company.

d. "Company" means Etsystore Private Limited.

e. "CSR Policy" means the CSR Policy of Etsystore Private Limited.

f. "CSR Rules" means the Companies (Corporate Social Responsibility Policy) Rules, 2014 as amended from time to time.

g. "Annual Action Plan" means the annual action plan as prescribed under the CSR Rules, 2014.

h. "Net Profit" shall mean the Net Profit, calculated as per the Act and CSR Rules based on which the specific percentage for CSR expenditure has to be calculated.

i. "Implementing Agency" means any entity registered with the Ministry of Corporate Affairs and fulfilling the criteria specified in the CSR Rules for undertaking CSR projects, which is engaged by the Company to implement various projects in accordance with this CSR Policy.

Any term used in this CSR Policy but not defined herein shall have the same meaning assigned to

the term under the Act and CSR Rules as applicable to the Company.

4. Functions of the Board

The Board shall have the following responsibilities under this CSR Policy:

a. To approve this CSR Policy and the activities to be undertaken by the Company in the areas specified in Section 5 of this CSR Policy or otherwise permitted by Schedule VII to the Act;

b. To approve the amount of CSR spending to be allocated to the activities referred to in clause (a);

c. To formulate, or approve an Annual Action Plan (if formulated by an Implementing Agency), covering the following aspects of the CSR program:

    i.   the list of approved CSR projects or programs to be undertaken in areas or subjects specified in Schedule VII to the Act;

    ii.   the manner of execution of such projects or programs as specified in rule 4(1) of CSR Rules;

    iii.   the end-uses sought to be achieved by the CSR projects and deployment timelines or milestones for the utilization of funds and implementation schedules for the CSR projects or programs;

    iv.   the allocation of funds and implementation schedules for the projects or programs;

    v.   monitoring and reporting mechanism for the projects or programs; and

    vi.   details of need and impact assessment, if any, for the projects undertaken by the Company;

d. The Board shall be empowered to alter the Annual Action Plan during the financial year, based on reasonable causes necessitating such an alteration.

a. To monitor the implementation of this CSR Policy from time to time either by direct oversight or via a third party contracted for monitoring of the CSR Policy; and

b. To recommend the approach and direction of CSR activities to be undertaken by the Company, or on the Company's behalf by an Implementing Agency, and also provide guidance for the:

    i.   Selection of CSR projects, programs, and activities;

    ii.   Implementation of CSR projects, programs, and activities;

    iii.   Monitoring of CSR projects, programs, and activities; and

    iv.   Formulation of the Annual Action Plan.

5. Focus Areas of Operation

In accordance with the requirements under the Act, the Company's CSR activities are expected to focus on:

Rural Transformation	● Creating sustainable livelihood solutions, eradicating, poverty, hunger and malnutrition; ● Sanitation including contribution to the Swach Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water; ● Rural development projects; and ● Slum area development. For this item, the term `slum area' shall mean any area declared as such by the Central Government or any State Government or any other competent authority under any law for the time being in force.
Education	● Access to quality education, training and skill enhancement; ● Promoting special education and employment enhancing vocation skills especially among children, women, elderly, and the differently abled and livelihood enhancement projects; ● Projects or activities that support the promotion and upgrading of IT skills and knowledge; and
Environment	● Ensuring environmental sustainability, ecological balance, protection of flora and fauna, animal welfare, agroforestry, conservation of natural resources, and maintaining the quality of soil, air, and water.
Disaster Response	● Disaster management, including relief, rehabilitation, and reconstruction activities.
Medical and other Welfare	● Promoting gender equality, empowering women, setting up homes and hostels for women and orphans; setting up old age homes, daycare centers, and other facilities for senior citizens, and measures for reducing inequalities faced by socially and economically backward groups; and ● Providing medical relief and rehabilitation to communities who either don't have access to quality health care or cannot afford it.

The Company shall, to the extent practicable, give preference to the local area and areas around it where it operates, for carrying out CSR activities.

6. Activities not qualified to be included under CSR

There are certain activities which do not qualify to be covered under CSR Activities. These include:

a. Activities which are exclusively for the benefit of employees of the Company or their family members;

b. Activities undertaken in pursuance of normal course of business of the Company;

c. Direct or indirect contribution to political parties;

    d.   Expenditure on item(s) not in conformity with Schedule VII of the Companies Act 2013;

    e.   One-off events such as marathons, awards, charitable contribution, advertisement, sponsorships of TV program, etc;

    f.   Expenses incurred by companies for the fulfillment of any act or statute of regulations (such as Labour Laws, Land Acquisition Act, etc.);

    g.   Sponsorship activities for deriving marketing benefits for products or services; and

    h.   Activities undertaken outside India, except for training of Indian sports personnel representing any State or Union Territory at national level or India at international level.

7. CSR Spending

Unless otherwise permitted by applicable law, the Company shall earmark not less than 2% of the average Net Profits of the Company during the three immediately preceding financial years for the purpose of CSR activities.

The Board shall ensure that the Administrative Overheads shall not exceed 5% percent of the total CSR expenditure of the Company for the financial year.

Any income or surplus arising out of the CSR activities, projects or programs shall not form part of the business profit of the Company and the same shall be reinvested back for use in CSR activities as set out in the CSR Rules.

All the expenditure relating to CSR shall be pre-approved by the Board. A person responsible for financial management of the Company shall monitor the utilization of funds for the purposes set forth and certify to this effect.

Unspent CSR amount, if any, shall be transferred to a separate bank account in accordance with the applicable CSR Rules from time to time.

If it is observed that any CSR Activity taken up for implementation is not properly implemented, the Board shall discontinue funding the project at any time during the course of implementation and use such funds for any other project.

8. Mode of implementation

Unless otherwise approved by the Board, CSR programs, projects or activities of the Company shall be implemented through Implementing Agencies.

9. Capital Assets

Capital assets acquired or created by CSR projects should be held by the beneficiaries of such CSR projects, or a trust or public authority for the benefit of all. The Company should take appropriate measures to ensure that such assets are utilized for the purpose they were meant for and not be transferred or disposed of without prior permission of the Company.

10.   **Amendment to the Policy**

The Board can amend this CSR Policy at any time. Any or all provisions of the CSR Policy are also subject to revision or amendment as may be required to comply with the CSR Rules or other applicable laws.

The Company reserves the right to modify, cancel, add, or amend this CSR Policy in accordance with the Companies Act, 2013.

11.   **Information Dissemination**

The CSR Policy and an overview of activities undertaken as a part of the CSR initiatives of the Company shall be disseminated for public access and shall be published in the directors' report of the Company in the format prescribed under the Act and CSR Rules.

Project Summary:

- Etsystore provided a grant to Center for Sustainability, Policy and Technology Management (SusPoT) to develop a research report assessing the climate impacts faced by the Indian artisan community as well document existing resources available for this community to build climate resilience.

RESEARCH REPORT

Submitted To: Etsystore Private Limited

A Review of
Climate Resilience
and Disaster
Recovery Initiatives
for Indian MSMEs
and Textile Workers

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A Review of Climate Resilience and Disaster Recovery Initiatives for Indian MSMEs and Textile Workers

1.   Introduction

Over 70% of the global workforce faces climate-change-related health hazards, straining existing occupational safety and health (OSH) protections. More than 2.4 billion workers worldwide are exposed to excessive heat during work, leading to approximately 18,970 annual work-related deaths and 2.09 million disability-adjusted life years lost due to occupational injuries from excessive heat. Additionally, 26.2 million people globally suffer from chronic kidney disease linked to workplace heat stress. Various health conditions in workers, such as cancer, cardiovascular disease, respiratory illnesses, kidney dysfunction, and mental health issues, are exacerbated by climate change. The hazards extend to exposure to excess heat, UV radiation, workplace air pollution, pesticides in agriculture, and parasitic/vector-borne diseases, resulting in significant work-related fatalities annually. Table 1 below provides an estimate of the magnitude of the number of workers affected across the globe by various climate hazards [1][2].

Table 1: Impact of climate hazards on global workforce

Climate Hazard	Number of Workers Affected
Excessive Heat	Over 2.4 billion
UV Radiation	1.6 billion
Air Pollution	1.6 billion
Pesticide Exposure	Over 870 million
Vector-borne Diseases	15,000 annually

In recent years, India also has witnessed an increase in the frequency and intensity of natural disasters, exacerbated by the effects of climate change. These disasters pose significant challenges to the livelihoods and well-being of millions of people, particularly those engaged in small-scale businesses and artisanal production. Recognizing the urgent need to address these challenges, various government agencies, non-governmental organisations (NGOs), and philanthropic entities have implemented programs and initiatives aimed at promoting livelihoods, enhancing resilience, and mitigating the impacts of climate change and disasters across different regions of the country.

This research endeavours to provide comprehensive insights into the diverse array of Indian programs and state-wise initiatives aimed at addressing climate change and disaster risks while promoting sustainable livelihoods. By examining the breadth and scope of these initiatives, we seek to understand their effectiveness and impact on vulnerable communities, particularly small-scale enterprises and makers. Through a systematic analysis and evaluation of these programs, we aim to uncover valuable lessons and best practices that can inform future policy interventions and support mechanisms.

At the core of our research lies the recognition of the interconnectedness between climate change, disasters, and livelihoods. Climate change-induced events such as cyclones, floods, droughts, and heatwaves not only threaten lives and infrastructure but also disrupt economic activities, particularly in sectors reliant on natural resources and traditional production methods. Small businesses and makers, often operating on the margins of society, are disproportionately affected by these disruptions, facing challenges in recovering from losses and rebuilding their livelihoods.

2.   Methodology

In conducting this comprehensive research into the array of disaster management and resilience-building initiatives across India, a multi-faceted approach was adopted to gather relevant data from a variety of credible sources. Central to our research were the official websites of both central and state government departments. These platforms, including sites dedicated to disaster management, micro, small, and medium enterprises (MSMEs), and textile/handloom development programs, provided invaluable insights into governmental efforts directed at mitigating disaster impacts and promoting sustainable livelihoods. We found around 38 such websites to be relevant for our study.

Next, we dived into reports from think tanks and consulting firms. These reports helped us categorise different types of disasters, understand their effects, and see what governments and other organisations are doing to help. We included insights from 16 such reports in this study. These detailed reports gave us a clearer picture of the situation and the efforts being made and helped us understand the nuances of the disaster management landscape in India.

Academic journals constituted another cornerstone of our data collection, offering peer-reviewed studies and scholarly articles that examine disaster management strategies, resilience building, and climate adaptation practices from a theoretical and empirical standpoint. We referred to 7 such journal articles in this report. These academic insights enriched our research with evidence-based findings and theoretical frameworks critical for assessing the effectiveness of existing initiatives.

Thereafter, our exploration into the philanthropic sector involved an examination of individual philanthropists' websites, guided by prior knowledge, market intelligence, and strategic Google searches. Around 31 websites of NGOs and philanthropists working in this domain were explored while preparing this report. This endeavour shed light on the unique contributions and innovative approaches spearheaded by philanthropic efforts in bolstering disaster recovery and resilience among vulnerable populations.

Finally, we looked into press releases and newspaper articles. We identified 12 such news articles to be of our interest and studied them. This gave us insights on the ground level status of the schemes and initiatives.

A summary of the types of sources referred to for conducting this research is presented in Figure 1 below:
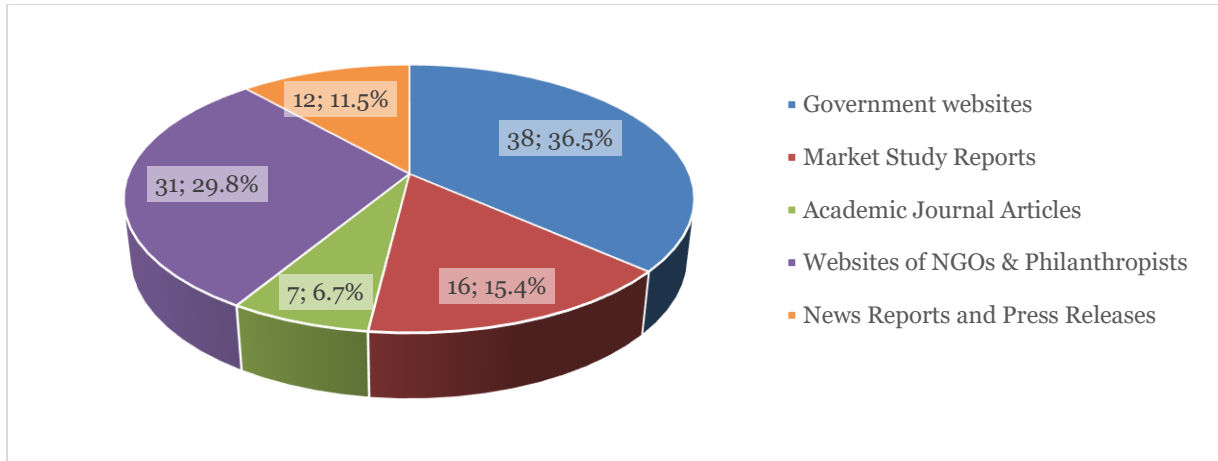
Figure 1: Summary of Research Sources Compiled in Our Study.

Together, these diverse data sources formed the bedrock of our research, providing a comprehensive overview of the efforts to counteract disaster impacts and foster resilience within India's communities and small business sectors.

3. Findings

In the findings section, we provide an extensive overview of initiatives aimed at bolstering disaster resilience in India. Out of the numerous Government schemes and initiatives available for Indian textile and MSME workers for climate risk and disaster resilience, we found 20 of them to be of **'high'** and 28 to have **'medium'** correlation. Categorising schemes and activities across governmental, non-governmental, and philanthropic sectors, we highlight concerted efforts to strengthen disaster management, support livelihoods, and foster climate resilience in communities and small businesses. From government policies to grassroots initiatives, our analysis offers insights into the diverse landscape of actions undertaken to mitigate disaster impacts and promote sustainable development across various facets of Indian society.

3.1. India's MSME and Textile Workers' Landscape

India's textile industry, deeply interwoven with the country's cultural and economic fabric, is undergoing a transformation, fuelled by initiatives aimed at technological upgradation, environmental sustainability, and artisan welfare.

3.1.1. Empowering Artisans and Weavers

Key to the sector's development are schemes like the National Handloom Development Programme and the National Handicrafts Development Programme, which aim to uplift artisans and weavers by providing access to raw materials, financial support, and market connectivity. The implementation of the Handlooms (Reservation of Articles for Production) Act, 1985, further safeguards traditional crafts, ensuring their survival and relevance in contemporary markets [1].

Data from the Fourth All India Handloom Census 2019-20 reveal a predominance of full-time male weavers and significant part-time female engagement, especially in rural areas. Initiatives such as MUDRA loans and cluster development strategies reflect a targeted approach to support the weaver community, though challenges like limited governmental support and competition from power looms persist [4].

3.1.2. Technological Enhancement and Infrastructure Development

The government's Amended Technology Fund Upgradation Scheme (ATUFS) and the Samarth scheme for skill development are instrumental in infusing modern technology and enhancing skills within the sector. Infrastructure growth is significantly bolstered by the PM-Mega Integrated Textiles and Apparel Park (PM-MITRA), which aims to create comprehensive, state-of-the-art facilities to streamline production processes, reduce logistics costs, and bolster global competitiveness [1].

The Textile Cluster Development Scheme (TCDS) targets the modernization of traditional clusters, ensuring they remain competitive in the fast-evolving industry landscape. Meanwhile, the Integrated Processing Development Scheme (IPDS) focuses on environmental compliance, supporting projects for Zero Liquid Discharge (ZLD) systems, emphasising the industry's shift towards sustainable practices [1].

3.1.3. Sustainable Development Initiatives

The Sustainable Textiles for Sustainable Development (SusTex) project exemplifies the industry's potential to contribute to eco-friendly and socially responsible growth. By advocating for sustainable production methods and improving labour conditions, SusTex sets a precedent for future initiatives, marrying environmental stewardship with economic advancement [5].

India's textile and MSME sectors are on a transformative path, embracing technological advancement, sustainability, and artisan support to remain globally competitive and environmentally responsible. Government initiatives are pivotal in modernizing infrastructure and skills, highlighting a significant shift towards sustainable practices with a focus on zero liquid discharge systems. Empowerment of artisans and weavers through access to resources and markets is crucial, yet the sector faces challenges like competition from power looms that need addressing. These efforts collectively underscore a move towards integrating economic advancement with environmental stewardship and social responsibility.

3.2. Understanding Climate Risk and Disaster Impacts on the Indian MSMEs and Textile Workers

India's vulnerability to climate change-induced disasters is a pressing concern, necessitating comprehensive strategies to mitigate risks and enhance resilience. From floods to cyclones, the country faces a myriad of challenges that impact households, businesses, and entire urban ecosystems. The manufacturing and production sector, particularly the textile industry, faces significant challenges due to climate change-induced disasters. Coastal cities are particularly vulnerable to cyclones, floods, and rising sea levels, exacerbating existing urbanisation challenges and highlighting the urgent need for climate-resilient practices.

A study in Surat (a major textile hub in western India) revealed that recovering from a four-day flood takes an average of 49 days, exacerbating labour shortages as workers migrate out of the affected areas. The financial toll on the textile industry is substantial, with an average loss of ₹1.51 million, accounting for 23% of total profits, highlighting the necessity of including indirect losses in disaster impact assessments. Despite the evident risks, there's a moderate perception of future flood risks among owners, potentially deterring investments in adaptation strategies. This study underscores the need for comprehensive disaster assessments that account for indirect losses and compensation [6].

If we look at one of India's closest neighbours – Bangladesh, which is also one of the largest textile hubs in the world, we find very similar challenges faced by ready-made garment (RMG) workers there too, where climate change adversely affects their health and job security. In Bangladesh, over half of the RMG workers have suffered from natural disasters, yet less than half received any humanitarian aid, leading to increased migration, job competition, and reduced wages. Furthermore, the majority of these workers report illness due to rising temperatures, underscoring the urgent need for a comprehensive

understanding of climate impacts on the manufacturing sector and workplace in both India and Bangladesh, to foster resilience and safeguard livelihoods against future climate-induced adversities [7].

Moving forward, enhancing resilience in India's manufacturing sector necessitates proactive measures to mitigate climate risks and adapt to changing conditions. This includes investing in resilient infrastructure, implementing comprehensive disaster preparedness plans, and enhancing workforce health and safety measures. Additionally, fostering a higher risk perception among industry stakeholders can encourage the adoption of adaptive strategies, such as flood-resistant infrastructure and emergency response protocols. By learning from experiences in Bangladesh and implementing proactive measures to enhance resilience, India can safeguard its industries, protect livelihoods, and build a more sustainable and climate-resilient future.

3.2.1. *Mapping Disaster-Prone Areas*

The India Climate and Energy Dashboard, whose snapshot is presented in Figure 2, provides valuable insights into disaster-prone regions across the country, aiding in targeted risk assessment and mitigation efforts [8].
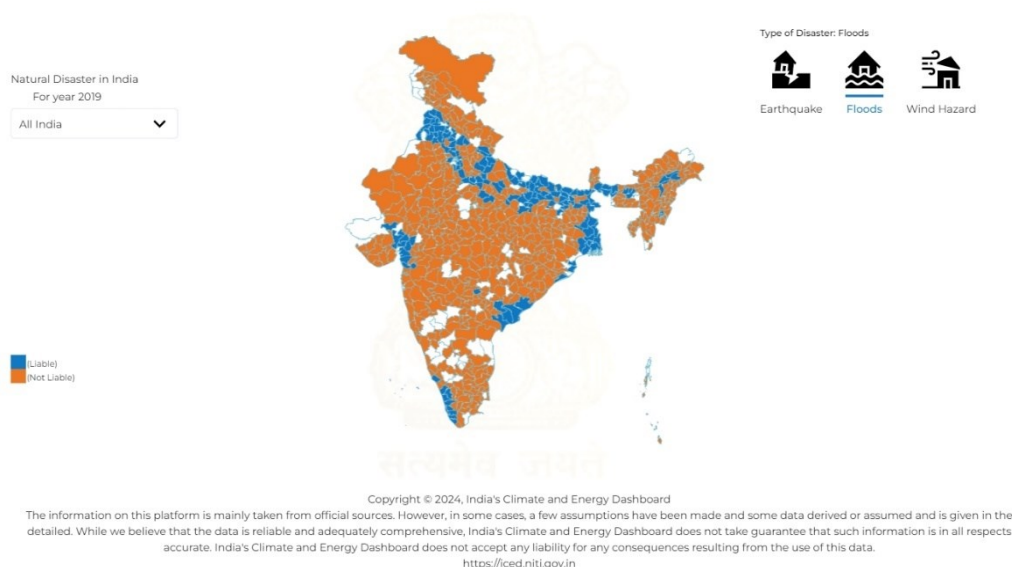
Figure 2: Screenshot of India Climate and Energy Dashboard.

This data-driven approach enables stakeholders to identify high-risk areas and allocate resources effectively to minimise the impact of disasters.

3.2.2. *Impacts on Small Businesses*

Archana Patankar's research underscores the disproportionate impact of natural disasters on small businesses, particularly in terms of damage to premises, equipment, and inventory. Limited technical and financial capacities, coupled with the absence of effective business continuity plans, render small businesses more vulnerable to flood impacts, hindering their recovery and affecting customer confidence [9].

India's MSME and textile sectors, crucial to the economy, face significant threats from climate-induced disasters, notably in coastal and major industrial areas like Surat. These events not only cause immediate production halts and financial losses but also long-term labour shifts and operational disruptions. The experience of garment workers in Bangladesh parallels these challenges, emphasizing

the universal need for industry-wide resilience and adaptive strategies. To counter these risks, a comprehensive approach involving resilient infrastructure, disaster preparedness, and enhanced workforce protections is essential. Leveraging data for targeted mitigation, particularly for vulnerable small businesses, is crucial for minimizing the impact of climate change on these critical sectors.

Understanding climate risk and disaster impacts in India requires a multifaceted approach that encompasses data-driven risk assessment, corporate philanthropy, government interventions, and urban adaptation strategies. By addressing these challenges holistically and proactively, India can build resilience, safeguard livelihoods, and mitigate the adverse effects of climate change on its communities and economy.

3.3. Pre-disaster Preparedness - Indian Scenario

In India, various stakeholders have initiated specific schemes and initiatives aimed at enhancing pre-disaster resilience across different domains. From early warning systems to community-based initiatives, concerted efforts are underway to mitigate the impact of disasters and build resilience in vulnerable communities. Some of the mechanisms that are in place are:

Early Warning Systems: The India Meteorological Department (IMD) provides cyclone warnings and forecasts, while some of the State Disaster Management Authorities (SDMAs) implement localised early warning systems for floods and landslides [10]. NGOs like SEEDS (Sustainable Environment and Ecological Development Society) work on community-based early warning systems, while philanthropic organisations fund the installation of weather monitoring stations and dissemination of early warnings in vulnerable areas [11].

Capacity Building and Training: The National Disaster Management Authority (NDMA) conducts training programs for disaster management personnel, complemented by State Institutes of Disaster Management (SIDMs) providing training to government officials and volunteers [12]. NGOs such as Oxfam India conduct community-based disaster preparedness training workshops, and philanthropists like the Azim Premji Foundation support capacity-building initiatives for teachers and community leaders in disaster-prone regions.

Infrastructure Development: National Rural Infrastructure Development Agency (NRIDA) funds the construction of flood shelters and cyclone-resistant buildings in rural areas [13], while Public Works Departments (PWDs) undertake infrastructure projects like embankments and drainage systems. NGOs like Habitat for Humanity build disaster-resilient houses in partnership with vulnerable communities [14], and philanthropic organisations like Tata Trusts support the construction of resilient infrastructure in tribal and marginalised communities [15].

Policy and Planning: The National Disaster Management Plan (NDMP) integrates disaster risk reduction into national development planning, while State Disaster Management Plans (SDMPs) align with NDMP and include state-specific risk assessments and mitigation strategies [12]. NGOs like the Center for Science and Environment (CSE) advocate for mainstreaming climate resilience into urban planning policies [16], and philanthropists, such as the Rockefeller Foundation, support policy research and advocacy initiatives on resilience-building in urban areas [17].

Public Awareness and Education: Directorate of Public Relations (DPR) conducts national-level awareness campaigns during Disaster Preparedness Month [18], with Information and Public Relations Departments (IPRDs) organising awareness programs at district and block levels. NGOs like Save the Children conduct school-based disaster risk reduction education programs [19], and philanthropists like Infosys Foundation sponsor the production of educational materials on disaster preparedness for schools and communities [20].

Livelihood Diversification: The Ministry of Rural Development implements the National Rural Livelihoods Mission (NRLM) to promote alternative livelihoods [21], with State Departments of

Agriculture offering subsidies and training for diversification into climate-resilient crops. NGOs like Self-Employed Women's Association (SEWA) support women in setting up microenterprises in non-agricultural sectors [22], while philanthropic organisations, including the Bill & Melinda Gates Foundation, fund livelihood projects focusing on smallholder farmers and rural artisans [23].

Ecosystem-based Approaches: The Ministry of Environment, Forest and Climate Change (MoEFCC) implements afforestation and mangrove restoration programs, while Forest Departments undertake watershed management and soil conservation projects [24]. NGOs like WWF-India work with local communities to restore degraded ecosystems and conserve biodiversity [25], and philanthropists, such as The Nature Conservancy, support community-led conservation projects in ecologically sensitive areas [26].

Insurance Schemes: Pradhan Mantri Fasal Bima Yojana (PMFBY) provides crop insurance coverage to farmers against crop losses due to natural calamities [27], while state-specific insurance schemes like Raj Sahakar Personal Accident Insurance Scheme in Rajasthan are implemented [28]. NGOs like MicroEnsure partner with insurance companies to offer affordable microinsurance products to low-income households [29], and philanthropic organisations, including the Gates Foundation, support innovative insurance schemes for livestock and agricultural assets in vulnerable communities [23].

Research and Innovation: The Department of Science and Technology (DST) funds research projects on climate change adaptation and disaster risk reduction, with State Councils for Science and Technology (SCSTs) supporting local research initiatives [30]. NGOs like Practical Action conduct action research on innovative technologies for disaster risk reduction in vulnerable communities [31], and philanthropic organisations, such as Google.org, fund technology-driven solutions for disaster preparedness and response [32].

Community-Based Initiatives: National Rural Health Mission (NRHM) facilitates community health workers' involvement in disaster preparedness and response [33], while Panchayati Raj Institutions (PRIs) mobilise local communities for disaster risk reduction activities. NGOs like ActionAid India empower communities to develop their own disaster preparedness plans and response mechanisms [34], and philanthropists, including the Ford Foundation, support community-based organisations working on disaster resilience and social protection initiatives [35].

A flyer on the Govt. of India's action plan and preparedness landscape for disaster management depicts an integrated approach to the subject [36], as shown in Figure 3 below:
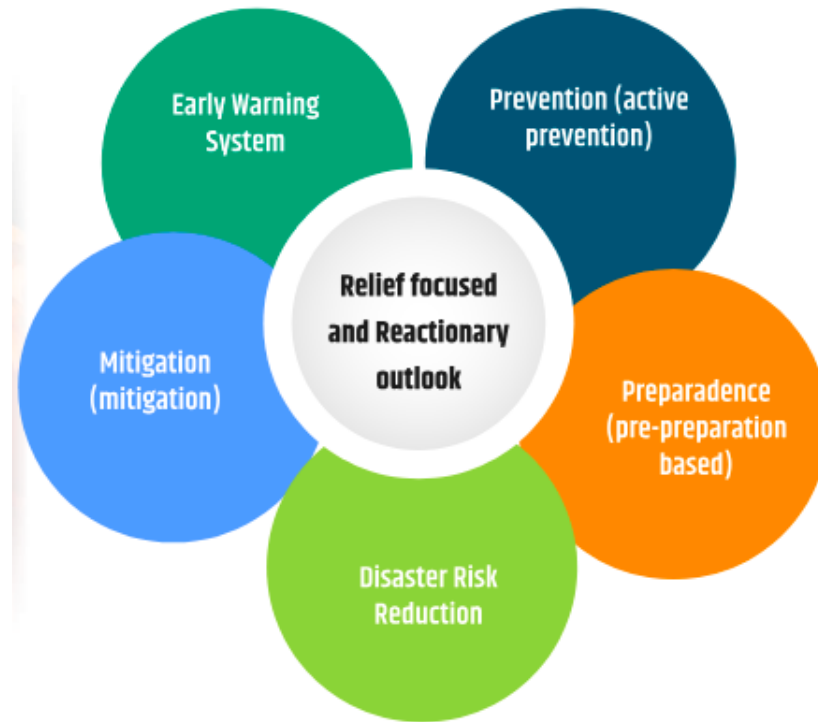
Figure 3: India's integrated approach to disaster management.

Through these diverse initiatives, stakeholders are working collaboratively to strengthen India's pre-disaster resilience and minimise the impact of disasters on vulnerable communities.

3.3.1.   Urban Climate Change Adaptation Strategies

Aromar Revi's work highlights the urgent need for adaptation and mitigation strategies in Indian cities, given the projected urban population growth and associated climate risks [37]. Integrating rural adaptation measures and incorporating climate considerations into infrastructure investments are crucial steps towards building resilient urban ecosystems.

3.3.2.   Challenges to Disaster Resilience

Disaster management in India encounters significant hurdles, as identified in various studies. A comprehensive grasp of disaster risks, including hazards, vulnerability, exposure, and capacity, is fundamental for effective disaster management. This understanding facilitates risk assessment, prevention, mitigation, and response strategies. Enhancing disaster risk governance at grassroots levels is imperative to bolster management effectiveness and ensure that responses are locally relevant and swift. Boosting investment in disaster risk reduction is vital to foster resilience at all levels. Despite this urgency, investors often lack clarity regarding the opportunities present in disaster resilience initiatives [38].

Effective coordination among diverse stakeholders is critical for achieving disaster risk reduction goals. Given the complex array of roles and responsibilities within different institutions, seamless collaboration is essential. Optimal utilisation of human resources, technical expertise, and a multi-disciplinary approach is paramount for effective disaster management efforts. The formulation of comprehensive frameworks encompassing response, recovery, mitigation, and preparedness aspects is crucial for effective disaster management. Ensuring the efficient implementation of these frameworks is essential for enhancing disaster response capabilities and avoiding duplication of efforts [39].

Despite the essential role insurance plays in mitigating risks, especially in the post-pandemic era, the majority of MSMEs remain uninsured, with nearly 85% foregoing insurance protection. This reluctance stems from a historical perception of insurance as an unnecessary expense rather than a strategic investment, compounded by a communication gap between insurance providers and MSMEs, hindering access to competitive pricing and tailored products [40][41]. Despite the critical need for insurance coverage, particularly for MSME exporters dependent on complex supply chains, awareness about modern insurance products remains low, with many businesses unaware of options like product liability and director liability coverage[42][43][44].

Amidst these challenges, there is a growing recognition of the immense potential within the MSME insurance market, estimated to be between Rs 1.5 lakh crore and Rs 1.8 lakh crore [40][41]. Efforts to bridge the insurance gap for MSMEs include leveraging technology to simplify the insurance buying process and offering customized solutions tailored to specific sectors [44]. Government initiatives, such as tax incentives and standard insurance products designed for MSMEs, aim to promote insurance awareness and accessibility[45]. However, addressing the lack of awareness and the perception of insurance as a compliance burden requires concerted efforts through financial literacy programs, incentives, and enhanced agent training to ensure the long-term sustainability and resilience of India's vital MSME sector[40][41][42][43][44][45].

3.3.3.   Strengthening Resilience Across Sectors

In India, the need for effective disaster management is recognized as crucial for safeguarding lives and livelihoods amidst diverse and often unpredictable natural hazards. As per a recent report by KPMG, infrastructure plays a pivotal role, with considerations such as structural maintenance, backup power supplies, and flood protection materials being essential for resilience. Staff training in emergency response and first aid, along with early notification mechanisms for swift evacuation, are integral components of disaster preparedness efforts. Business continuity planning is crucial, involving secured storage for critical assets, robust insurance policies, and coordinated efforts with suppliers and customers to resume operations promptly. The report also identifies some of the challenges faced by MSMEs in terms of disaster preparedness, as shown in Figure 4 below [46]:

Category	Challenges
Insurance	• MSMEs are sometimes not aware or are not educated enough to deal with claims management • The long drawn processes of claims and lack of documentation of business assets has led to rejection of claims, thereby creating low confidence in the insurance mechanism • There is a lack of awareness of information needed to support claims leads to undervaluation of losses • Insurance does not cover raw materials and inventory • Low familiarity with insurance coverage can also lead to under-coverage • Indirect losses are not recognised and, hence, not calculated.
Banking	• MSME sector has not received the required support from the banking sector due to structural issues • Centralised banking procedures have led to unsatisfactory structure of sanctioning disaster relief loans, with no local guidelines being issued to banks • Track record of companies is not taken into account while extending loans for disaster relief • Immediate relief measures offered by the banks are inadequate, e.g. the extension of overdraft limits by 10 to 15 per cent • The State Level Bankers' Committee (SLBC) guidelines issued and RBI circulars are not fully implemented • Banks should look at extending all possible support in terms of working capital flexibility, overdraft limit extension, term loans, letter of credit, etc., considering the track record of MSMEs and order book values.
Infrastructure	• Industrial estates are in flood prone areas. • Waterline, gradient and water-flow studies were not taken into consideration before setting up factories • No storm drain facility is available to divert water to water bodies • Several estates have implemented incorrect master-plans. • Lack of training and knowledge on the banking, insurance, accounting and book keeping processes • Unorganised micro sector employs contract staff and do not have any cover like Employees State Insurance or Provident Fund
Government	• Lack of standard guidelines for assessing the losses • The tax holidays provided to MSMEs are not sufficient to enable revival • The calculation of various fees and taxes basis the past six months or one year industrial output data seems to be an inadequate benchmark for any calculation of losses, payment of utility bills and tax holidays • The existing industrial estates are very old and may have had no infrastructure upgrades since their inception

Figure 4: Challenges faced by MSMEs in terms of disaster preparedness in India.

The National Disaster Management Authority (NDMA) leads policy formulation and guideline dissemination for disaster management, emphasising effective coordination, resource allocation, and grassroots-level governance [12]. Recognizing the need for enhanced investments in disaster-prone sectors, International Finance Corporation's initiatives like blended finance models aim to mobilise resources for climate-resilient development programs [47]. Community-based solutions like SELCO Foundation's 'Sustainable Energy driven Livelihood Application' harness sustainable energy to address livelihood challenges and foster resilience [48]. The Government of India, through schemes and programs by the Ministry of Home Affairs, actively engages in disaster risk reduction and response efforts across different states [49].

International collaboration, facilitated by organisations like the World Bank, supports India in strengthening disaster resilience through various projects focusing on climate adaptation, river basin management, and infrastructure development. The World Bank plays a vital role in supporting India's

disaster resilience efforts through various projects and initiatives. By providing financial assistance and technical expertise, the World Bank collaborates with the Indian government to enhance disaster preparedness and response capabilities [50]. Some of the active schemes of World Bank in India are highlighted in Table 2 below:

Table 2: Some active schemes by World Bank in India.

Scheme	Objective	State Govt. / Agency
Additional Financing for Resilient Kerala Program	The objective of the Program is to enhance Kerala's resilience against the impacts of climate change and natural disasters, including disease outbreaks and pandemics.	Government of Kerala
Assam Integrated River Basin Management Program	To reduce the vulnerability of people to climate-related disasters and improve integrated water resources management in Assam.	Flood and River Erosion Management Agency of Assam, Government of Assam, Water Resources Department, Assam State Disaster Management Authority
The Resilient Kerala Program	The objective of the Program is to enhance Kerala's resilience against the impacts of climate change and natural disasters, including disease outbreaks and pandemics.	Government of Kerala
Jhelum and Tawi Flood Recovery Project	The project development objective is to support the recovery and increase disaster resilience in Project Areas and increase the capacity of the Project Implementing Entity to respond promptly and effectively to an eligible crisis or emergency.	Project Implementing Entity

Figure 5 below summarises a disaster preparedness guide issued by HDFC Bank [51], which can be followed at an individual level to safeguard oneself:

Disaster Preparedness (for all) by HDFC

Step 1: Protecting Home and Family

Ensure your home has strong foundations and is equipped with measures specific to the region's natural calamities (e.g., earthquake-resistant structures, avoiding building in flood-prone areas).

Step 2: Digital Document Storage

Store important documents digitally to prevent loss during disasters. Use platforms like DigiLocker for secure storage, making it easy to access and share documents when needed.

Step 3: Invest in Home Insurance

Home insurance provides coverage for damage to your home and belongings caused by natural disasters such as floods, earthquakes, fire, etc. It helps in rebuilding or replacing lost or damaged items.

Step 4: Opt for Life Insurance

Life insurance is crucial, especially for breadwinners, providing financial security to families in case of unexpected events. It ensures that loved ones are supported financially if the worst happens.

Step 5: Keep Emergency Cash

Maintain a reserve of emergency cash at home to cover essential needs during disasters, especially when electronic transactions might be unavailable due to power outages. Cash can help bridge financial gaps until normalcy is restored.

Step 6. Natural Disaster Insurance

Integrating natural disaster insurance into financial planning is essential for post-disaster rehabilitation. It helps in resuming normal life with minimal disruptions, offering financial support during recovery phases.

Figure 5: Disaster Preparedness Guide developed by HDFC bank in India.

India's disaster management strategy is a comprehensive mix of early warning systems, capacity building, infrastructure development, policy planning, and community-based initiatives, aimed at enhancing resilience against natural calamities. Various stakeholders, including government bodies, NGOs, and international partners like the World Bank, collaborate to implement these initiatives across multiple sectors. Challenges in disaster management include the need for improved risk understanding, better governance, increased investment, and effective coordination among stakeholders. Efforts to overcome these challenges include infrastructure resilience projects, livelihood diversification programs, insurance schemes, and research and innovation in disaster risk reduction. The overarching goal is to integrate disaster preparedness into the national development agenda, ensuring sustainable development and minimizing the impact of disasters on vulnerable communities.

3.3.4.   Essential Tools and Websites to Identify Climate Hazards

In the face of increasing climate-related risks, it's crucial to have access to reliable tools and websites that help identify and respond to potential hazards. Here are some essential resources:

- **SACHET - National Disaster Alert Portal:** Developed by the Government of India, SACHET is an integrated alert system that disseminates near real-time alerts about natural and man-made disasters. It utilizes geo-intelligence and offers alerts through SMS, mobile apps, browser notifications, and RSS feeds in multiple languages. Additionally, SACHET provides important guidelines and best practices for various disasters, such as cyclones, through informative texts and videos [52].
- **India Meteorological Department (IMD):** As the primary agency responsible for weather forecasting in India, IMD offers valuable resources for identifying climate hazards. Users can access station-wise nowcast warnings [53] and sub-division wise alerts [54] to stay informed about weather-related risks in their specific regions.
- **National Disaster Management Authority (NDMA):** NDMA's Alert Section releases weekly alerts, providing critical information on potential disaster events and preparedness measures. These alerts serve as essential tools for individuals and communities to plan and respond effectively to impending hazards [55].
- **Role of Media in Disaster Management:** Recognizing the crucial role of media in disaster communication, this resource highlights the significance of leveraging media channels, such as radio and newspapers, to disseminate warnings and recovery efforts, emphasizes the importance of timely information sharing for effective disaster management [56].
- **Cell Broadcast Alert System:** Deployed by the Government of India and emergency services, the Cell Broadcast Alert System delivers critical, time-sensitive alerts to all mobile devices within a specific area. This technology ensures widespread dissemination of emergency information, including severe weather warnings and other potential threats. Ongoing tests across various regions evaluate the system's efficiency and effectiveness, enhancing preparedness and response capabilities nationwide [57].

With these tools and websites at hand, individuals, communities, and authorities can better identify and address climate hazards, ultimately strengthening resilience and mitigating the impact of disasters.

Having a holistic approach spanning infrastructure development, policy formulation, community engagement, and international collaboration, India continues to bolster its disaster readiness to mitigate the impacts of natural calamities and ensure sustainable development.

3.4.   Post-disaster Recovery Mechanisms in India

In the aftermath of natural disasters, India implements comprehensive recovery mechanisms aimed at restoring communities and infrastructure while enhancing resilience against future calamities. Central

to these efforts are collaborations between various stakeholders, including government bodies, philanthropists, and international organisations.

3.4.1. *Support from International Bodies*

Partnerships with international organisations like the World Bank facilitate the mobilisation of resources for disaster recovery and resilience-building initiatives. Projects such as the Resilient Kerala Program and the Assam Integrated River Basin Management Program receive funding and technical expertise to mitigate climate-related risks and enhance community resilience [50].

The Sendai Framework, for example, prioritises understanding of disaster risk, strengthening disaster governance, investing in risk reduction, and enhancing preparedness for effective response and recovery. Additionally, grants from the GFDRR Multi-Donor Trust Fund support initiatives such as flood-resilient urban development and mainstreaming disaster resilience into national urban missions [51]. Schemes like the Urban Climate Change Resilience Trust Fund, administered by the Asian Development Bank, provide financial and technical assistance to develop climate-resilient infrastructure in fast-growing cities [59].

3.4.2. *Non-Governmental and Philanthropic Contributions*

Philanthropists are increasingly addressing climate action and resilience, with initiatives like the ACT Grants [60] and GROW Fund [61] supporting collaborative efforts in climate, gender, health, and nutrition, as elaborated in a report by Bain and Company [62]. Recommendations from reports like 'Time to Act' by FSG urge philanthropists to prioritise climate funding and utilise resources effectively for climate justice and resilience [63]. NGOs like Rapid Response, which specialise in disaster relief, recovery, preparedness, and environmental programs, often collaborate with the Government authorities and play a crucial role in disaster recovery [64]. The Aga Khan Development Network (AKDN) collaborates with nine development agencies to enhance life quality for marginalised communities across South and Central Asia, sub-Saharan Africa, and the Middle East through a comprehensive approach. In India, their key activities include relief efforts following Cyclone Tauktae in Gujarat, training individuals as first responders in disaster-prone areas, and building disaster resilience by preparing nearly 40,000 local volunteers for emergency response and disaster management [65].

HDFC Bank Limited has specialised Disaster Response and Business Continuity teams that perform thorough business impact assessments and establish swift response measures for events such as floods. Their Parivartan program plays a crucial role in rebuilding infrastructure and aiding communities impacted by natural disasters [66]. Meanwhile, NABARD focuses on combating the impacts of climate change through its National Adaptation Fund for Climate Change (NAFCC), funding projects designed to bolster climate resilience in areas deemed vulnerable by State and National Action Plans on Climate Change [67]. Additionally, the Tamil Nadu Industrial Investment Corporation Ltd (TIIC) has rolled out a "Flood Relief Scheme for MSMEs," offering financial support to small and medium enterprises in flood-hit regions. This assistance, primarily in the form of working capital, is aimed at rejuvenating industries and facilitating their recovery after disasters [68].

3.4.3. *Government Initiatives*

In response to the escalating challenges posed by climate risks and natural disasters, government initiatives in India are increasingly geared towards not only ensuring effective disaster recovery but also bolstering social security and supporting the upliftment of key economic sectors, including MSMEs and the textile industry. Recognizing the vulnerability of these sectors to environmental hazards and their critical role in the economy, the government has embarked on a multifaceted strategy. This includes implementing robust disaster management frameworks, enhancing resilience through technology and

infrastructure development, and rolling out targeted financial and policy measures to aid recovery and growth. Additionally, efforts to fortify social security mechanisms aim to protect the most affected populations, including workers in the MSME and textile sectors, ensuring their well-being and economic stability. Through these integrated approaches, the government endeavours to create a resilient economic landscape capable of withstanding and adapting to the impacts of climate change and natural disasters.

Some of the flagship schemes of the Central and state governments and their key focus areas are summarised in Table 3 below:

Table 3: Summary of Government Schemes in India.

Focus Area	Scheme(s)
All workers	**Pradhan Mantri Shram Yogi Maan-dhan (PM-SYM)** This pension scheme is aimed at providing social security to unorganised workers in India. Eligible beneficiaries include individuals between the ages of 18 to 40 years who work in the unorganised sector and have a monthly income below a certain threshold. The scheme provides a monthly pension after the age of 60, ensuring financial stability for the elderly [69].
Handloom Workers	**Prime Minister Employment Generation Programme (PMEGP)** Operated by the Khadi and Village Industries Commission, PMEGP aims at generating self-employment opportunities by promoting micro-enterprises in rural and urban areas. It offers financial assistance for setting up new ventures or expanding existing ones [70]. **Group Accident Insurance Scheme for Handloom Weavers (GAISHW)** Under Mahatma Gandhi Bunkar Bima Yojana (MGBBY, this scheme provides insurance coverage to handloom weavers and their families against accidental death or disability. However, it is essential to verify whether heat-related deaths are included under such accidents [71]. **Rajiv Gandhi Shilpi Swasthya Bima Yojana (RGSSBY)** This scheme focuses on providing health insurance coverage to artisans, including handloom weavers, thereby ensuring their access to quality healthcare services [72]. **Group Insurance Scheme for Powerloom Weavers** Aimed at powerloom weavers, this scheme offers group insurance coverage, providing financial security in case of accidents or other unfortunate events [73].
Training for Livelihood	**National Bamboo Mission** This initiative focuses on the holistic development of the bamboo sector, including capacity building, research and development, and market promotion, thereby enhancing livelihood opportunities for bamboo artisans and stakeholders [74]. **Seekho aur Kamao (Learn & Earn)** This scheme aims at skill development among minority communities, facilitating employment generation and economic empowerment [75].
Technology	**175 Livelihoods Sustainable Energy Driven Application** This program focuses on leveraging sustainable energy-driven technologies to enhance livelihood opportunities across various sectors, thereby contributing to economic growth and environmental sustainability [76]. **Amended Technology Upgradation Fund Scheme (ATUFS)** ATUFS aims at upgrading technology in the textile industry, fostering

Focus Area	Scheme(s)
	modernization, competitiveness, and sustainable growth [77].
Infrastructure	**National Mission for Green India (GIM)** GIM focuses on afforestation, biodiversity conservation, and enhancing ecosystem services, contributing to climate change mitigation and adaptation efforts [78]. **Coalition for Disaster Resilient Infrastructure (CDRI)** CDRI aims at promoting resilient infrastructure to mitigate the impact of disasters, ensuring sustainable development and risk reduction [79].
Disaster Relief	**National Cyclone Risk Mitigation Project (NCRMP)** NCRMP aims at enhancing preparedness, early warning systems, and disaster resilience to mitigate the impact of cyclones [86]. **Establishment of National Disaster Response Force Academy, Nagpur** This academy provides training to disaster response personnel, including NDRF, SDRF Battalions, Civil Defence Volunteers, and personnel from SAARC countries, strengthening disaster management capacities [86]. **Sustainable Reduction in Disaster Risk in 10 Multi-Hazard Districts** This initiative focuses on vulnerable districts in five identified states, implementing measures to reduce disaster risk and enhance resilience [88].
Insurance	**Bharat Laghu Udyam Suraksha** Covers loss due to unexpected events which result to physical loss, damage or destruction of building and structures, plant and machinery, stock and other assets relating to your business, if total assets value ranges above Rs 5 crore upto Rs 50 crore at policy commencement date [89]. **Bharat Sookshma Udyam Suraksha** For entrepreneurs with total assets value ranges upto Rs 5 crore at policy commencement date [90].
MSME Funding	**Credit Guarantee Trust Fund for Micro & Small Enterprises (CGTMSE)** CGTMSE provides credit guarantees to financial institutions for loans extended to micro and small enterprises, facilitating access to finance and promoting entrepreneurship [91]. **GEF-5 Project on 'Promoting Market Transformation for Energy Efficiency in MSMEs** This project aims at enhancing energy efficiency in micro, small, and medium enterprises, contributing to sustainable development and climate change mitigation [92].
Women and Children	**Grant in Aid on Child and Women Labour** This initiative focuses on organising and educating working women about their rights and duties, providing legal aid, and conducting seminars and workshops to address issues related to child and women labour [80]. **Skill Upgradation & Mahila Coir Yojana (MCY)** MCY aims at empowering women through skill development and providing subsidised spinning equipment, thereby enhancing their participation in the coir industry [81]. **Nai Roshni** This scheme focuses on leadership development among minority women, empowering them to actively contribute to socio-economic development [82].

Focus Area	Scheme(s)
	Streeshakthi Scheme Streeshakthi Groups are formed to inculcate the savings habit in the members empowering the women economically. About 15 to 20 women members who are from below poverty line families, landless agricultural laborers, SC/ST women join together [83]. **Amrutha Swasahaya Kiru Uddime Yojane** Rs 75.00 crore seed money will be provided to each of the 7500 self-help groups operating in the state to convert as small enterprises [83].
Women in Climate Change	**CARE** This program addresses the nexus between gender, climate change, and disaster risk reduction, promoting gender-responsive approaches to enhance resilience and adaptation [84]. **Training Manual on Gender and Climate Change Resilience** It provides guidance on integrating gender considerations into climate change adaptation and resilience-building efforts [85].

While states like Odisha, Gujarat, Kerala, Tamil Nadu, and Andhra Pradesh have been actively involved in disaster preparedness, response, and recovery efforts due to their susceptibility to various natural hazards, yet some states like Kerala, Mizoram, Himachal Pradesh, Uttar Pradesh, Rajasthan, Gujarat, and Maharashtra have been promoting green initiatives, which are likely linked to climate change mitigation and disaster risk reduction, albeit to varying extents.

India's post-disaster recovery mechanisms emphasize restoring and enhancing the resilience of communities and infrastructure through collaborations with various stakeholders, including government bodies, philanthropists, and international organizations. International bodies like the World Bank and the Asian Development Bank play a crucial role by providing financial and technical support for climate resilience projects. Philanthropic and non-governmental contributions also significantly impact recovery and resilience efforts, with initiatives focused on climate action, health, and disaster preparedness. Government initiatives aim at bolstering economic sectors vulnerable to disasters, like MSMEs and the textile industry, through targeted financial, policy measures, and technological upgrades. The comprehensive recovery strategy integrates social security mechanisms, infrastructure development, and capacity building, emphasizing sustainability and inclusivity to mitigate the impacts of climate change and natural disasters effectively.

Through collaborative efforts across sectors and stakeholders, India continues to strengthen its post-disaster recovery mechanisms, emphasising resilience, sustainability, and inclusivity in the face of evolving climate challenges.

3.5. Gender Equality in Disaster Recovery and Resilience in India

In the face of climate change and natural disasters, the role of gender equality becomes pivotal in shaping effective disaster recovery and resilience strategies. India, with its vast diversity and socio-economic disparities, presents a unique case for integrating gender perspectives into climate action and disaster management. Drawing insights from various sources, including the United Nations Sustainable Development Group and local initiatives, this section explores the critical intersections of gender, climate, and work towards a more inclusive and equitable approach to disaster resilience.

Despite progress, systemic barriers continue to limit women's access to resources and meaningful participation in disaster management and climate adaptation. Financial biases, patriarchal norms, and disparities in health impacts and labour participation underscore the need for a gender-responsive approach in climate finance and policymaking.

3.5.1. *Gender Equality and Climate Action*

The 2030 Agenda for Sustainable Development underscores the significance of gender equality and women's empowerment as foundational to achieving all sustainable development goals (SDGs), explicitly linking this principle to climate action [93]. As per a UNSDG report, despite global strides toward these goals, the world is off track in achieving gender equality, highlighting an urgent need to embed gender considerations into climate resilience frameworks. The United Nations Sustainable Development Group emphasises the disproportionate impacts of climate change on women, advocating for a gender-responsive approach to climate action in India [94]. In Odisha, a state recognized for its robust disaster management framework, the increasing involvement of women and girls in disaster preparedness and response highlights a transformative shift towards gender inclusivity. Supported by UNFPA, these efforts demonstrate the critical role of women in enhancing community resilience, though challenges persist due to enduring social and economic disparities [96].

3.5.2. *Enhancing Accessibility to Digital and Financial Resources*

In India, especially in the rural and backward areas, the privilege to education and other facilities for women is significantly constrained in comparison to their male counterparts. Even the aspiring women entrepreneurs face discrimination when it comes to access to resources. Patriarchal societal norms often result in assets being registered under male family members, making it difficult for women to meet collateral requirements for loans. Additionally, there is an unseen bias within the loaning system, leading to delayed or rejected loan applications for women despite their equal capabilities. Many women struggle to expand their enterprises due to inadequate financial backing, hindering their ability to grow and compete in the market. Urgent government intervention is needed to address these challenges and ensure equitable access to credit for women entrepreneurs, fostering a more inclusive and prosperous entrepreneurial ecosystem in India [95]. Enhancing digital literacy among women would not just be a step towards gender equality but it is a foundational necessity for their empowerment in the face of climate challenges.

The UNSDG report also suggests that deployment of digital solutions for early warnings and post-disaster relief is critical. However, a significant acceleration in making digital public infrastructure accessible to women is necessary [96]. Initiatives like the Women Entrepreneurship Platform and sustainable agricultural practices, such as decentralised cold storage and solar pumps, underscore the importance of technological and financial empowerment in advancing women's economic independence and climate resilience [97].

Integrating gender equality into disaster recovery and resilience strategies is crucial for enhancing the efficacy of climate action in India. Addressing the unique challenges faced by women and leveraging their capacities can pave the way for a more resilient and inclusive future. Equitable access to resources, specialised training, and decision-making roles are fundamental to realising sustainable development in the face of climate adversity. By acknowledging the insights from various sources, including the United Nations Sustainable Development Group and specific case studies within India, this article highlights the integral role of gender in shaping resilient and equitable responses to climate challenges.

3.6. Tracking the Reach and Effectiveness of Programs

This section attempts to provide an evaluation of various disaster recovery initiatives and programs implemented in India. It examines the performance, impact, and outcomes of these initiatives in terms of their effectiveness, reach, and contribution to disaster resilience and recovery efforts.

3.6.1. *Understanding the Scale of Disaster Management & Recovery Initiatives*

The Government of India approved the National Cyclone Risk Mitigation Project (NCRMP) Phase-I for Andhra Pradesh & Odisha in January 2011, initially budgeted at Rs. 1496.71 crore. Following revisions due to additional scope of works and completion date extensions, the project cost was further revised to Rs. 2541.60 crore by May 2017. Similarly, NCRMP Phase-II, approved in July 2015 for several states, saw a budget increase to Rs. 2691 crore, with an extended completion date of March 2021 [98].

In April 2023, a pilot program was launched with a $500,000 investment from Cool Capital Stack, focusing on solutions such as personal accident, maternity care, and disability insurance. Partners including Arsht-Rock, SEWA, and Blue Marble are actively involved in evolving the program to include investments in heat early warning systems and practical products like heat-resistant hand tools and gloves [99].

3.6.2. *Training and Capacity Building Initiatives*

The NDRF Academy, with an annual training capacity of 2412, conducts various courses for disaster response personnel. These include Collapsed Structure Search & Rescue (CSSR), Medical First Responder (MFR), Flood Rescue, and Chemical, Biological, Radiological and Nuclear (CBRN) Emergencies. The academy plays a crucial role in enhancing disaster response capabilities among stakeholders [100].

3.6.3. *Community and Social Welfare Schemes*

Various community welfare schemes, such as the Group Accident Insurance Scheme for Handloom Weavers and the Group Insurance Scheme for Powerloom Weavers, have yielded positive outcomes. Surveys indicate increased financial security among weavers, with significant reductions in accidents and improved confidence to handle emergencies. These schemes have also contributed to industry sustainability and increased retention rates among weavers [101].

The Reliance Foundation's aid to 1.9 crore people across 293 districts in 19 states & 3 UTs underscores the significant impact of private sector involvement in disaster recovery efforts [102]. Additionally, initiatives like the TNSDMA focus on research needs in disaster risk reduction, including areas such as climate adaptation and ICT-based tools for communication [103]. Municipalities like Eloor, Maradu, and Koothattukulam have achieved high enrolment rates in waste management programs, showcasing successful community participation in disaster preparedness initiatives [104].

The assessment of disaster recovery initiatives in India highlights the multifaceted approach taken to address various aspects of disaster management and resilience. While significant progress has been made, there remains room for improvement, particularly in enhancing the reach and effectiveness of these programs. Continued evaluation and refinement of strategies will be essential to build a more resilient and disaster-ready nation.

The landscape of Indian programs and initiatives addressing climate change and disaster risks reflects a multifaceted approach grounded in resilience, innovation, and collaboration. From national frameworks like the National Disaster Management Plan to grassroots efforts promoting sustainable agriculture and women's empowerment, India demonstrates a commitment to confronting the interconnected challenges of climate change and disaster management. However, significant gaps remain in integrating gender perspectives, ensuring inclusive access to resources, and scaling up adaptation measures to reach vulnerable communities. Moving forward, concerted efforts are needed to bridge these gaps, foster partnerships across sectors, and leverage technological advancements to build more resilient and equitable societies. By amplifying community voices, strengthening

institutional capacities, and prioritising climate justice, India can chart a path towards sustainable development that safeguards both people and the planet for generations to come. Through ongoing collaboration and collective action, India can emerge as a global leader in climate resilience, inspiring positive change on a local, national, and international scale.

4. Key Takeaways and Lessons Learnt

India's textile and micro, small, and medium-sized enterprise (MSME) sectors, though significant sectors for the economy, are facing increasing vulnerability to climate change and natural disasters, posing significant challenges to the livelihoods of workers and the sustainability of businesses. This article explores the critical intersection of climate risk, disaster resilience, and gender equality within India's textile and MSME industries, highlighting key initiatives, challenges, and pathways towards building resilience and ensuring sustainable development.

4.1. Climate Resilience in India's Textile Sector

The textile industry in India is undergoing a profound transformation, driven by a concerted focus on technology, sustainability, and artisan welfare. Initiatives such as the National Handloom and Handicrafts Development Programmes aim to support artisans and weavers by enhancing access to raw materials, financial aid, and market connectivity while safeguarding traditional crafts through legislation like the Handlooms Act of 1985. Despite efforts to empower the artisan community, challenges such as limited government support and competition from power looms persist.

Technological upgrades and infrastructure development are being facilitated through schemes like the Amended Technology Fund Upgradation Scheme and the PM-Mega Integrated Textile and Apparel Park, aimed at boosting the sector's global competitiveness and reducing environmental impact. The industry is also transitioning towards sustainability, with initiatives like the Sustainable Textiles for Sustainable Development (SusTex) project promoting eco-friendly production methods and improved labour conditions.

The transformation underscores a holistic approach to development, integrating technological advancement with environmental stewardship and social responsibility. However, addressing competition and ensuring more comprehensive governmental support are essential steps to fully realize the sector's potential and maintain its global competitiveness and sustainability.

4.2. Challenges and Opportunities

India's MSME and textile sectors are acutely vulnerable to the adverse effects of climate change, with natural disasters such as floods and cyclones posing significant threats. This vulnerability is particularly pronounced in coastal and industrial regions like Surat, where disasters can disrupt production, cause financial losses, and lead to workforce displacement.

A study highlighted that recovery from a short-term flood in Surat could take disproportionately long, significantly affecting the textile industry's profits and underscoring the importance of accounting for indirect losses in disaster impact assessments. Similarly, experiences from Bangladesh's ready-made garment sector reveal shared challenges, including the adverse effects of climate change on worker health and job security, further emphasizing the need for a comprehensive approach to resilience.

Key takeaways include the necessity for disaster preparedness plans, resilient infrastructure, and enhanced health and safety measures for the workforce. The moderate perception of future risks among business owners suggests a barrier to investing in adaptation strategies, highlighting the need for increased awareness and proactive measures.

Learning from global parallels, it's clear that building resilience requires integrating risk perception with actionable strategies for infrastructure and emergency response. Data-driven tools like the India Climate and Energy Dashboard facilitate targeted risk assessments, helping allocate resources efficiently and mitigate disaster impacts.

Addressing the disproportionate effects on small businesses, through technical and financial support, is also crucial for minimizing long-term disruptions and fostering a climate-resilient future for India's critical economic sectors.

4.3. Pre-disaster Preparedness and Collaboration across Sectors

India's pre-disaster preparedness landscape encompasses a wide array of initiatives across various domains aimed at enhancing resilience against natural calamities. Early warning systems provided by the India Meteorological Department and state disaster management authorities play a crucial role in mitigating disaster impacts. Capacity-building efforts led by the National Disaster Management Authority and NGOs focus on training personnel and empowering communities with disaster preparedness skills.

Infrastructure development initiatives, supported by agencies like the National Rural Infrastructure Development Agency and NGOs such as Habitat for Humanity, aim to create resilient structures and shelters. Policy frameworks like the National Disaster Management Plan integrate disaster risk reduction into national development planning, while public awareness campaigns and education programs ensure community participation in disaster resilience efforts.

Challenges in disaster management include the need for improved risk understanding, better governance, increased investment, and effective coordination among stakeholders. Efforts to overcome these challenges include infrastructure resilience projects, livelihood diversification programs, insurance schemes, and research and innovation in disaster risk reduction.

The overarching goal is to integrate disaster preparedness into the national development agenda, ensuring sustainable development and minimizing the impact of disasters on vulnerable communities. Through a holistic approach spanning infrastructure development, policy formulation, community engagement, and international collaboration, India continues to bolster its disaster readiness to mitigate the impacts of natural calamities and ensure sustainable development.

4.4. Post-disaster Recovery, Resilience and Restoration Efforts

India's post-disaster recovery mechanisms involve collaborations with stakeholders like government bodies, philanthropists, and international organizations to restore communities and infrastructure while enhancing resilience. International bodies such as the World Bank provide crucial support for climate resilience projects like the Resilient Kerala Program. Philanthropic initiatives like the ACT Grants and GROW Fund address climate action and health, while NGOs like Rapid Response aid in disaster relief and preparedness.

Government initiatives focus on bolstering vulnerable economic sectors like MSMEs and textiles through financial and policy measures. The recovery strategy integrates social security mechanisms, infrastructure development, and capacity building for sustainability and inclusivity. Overall, collaborative efforts aim to mitigate the impacts of climate change and natural disasters effectively, emphasizing resilience, sustainability, and inclusivity.

Additionally, partnerships with academic institutions and research organizations play a vital role in post-disaster recovery and resilience-building efforts. These partnerships contribute expertise in areas such as disaster risk reduction, environmental sustainability, and community resilience. By leveraging the knowledge and resources of academic institutions, governments and organizations can implement evidence-based strategies and innovative solutions to address the complex challenges posed by

disasters. Through ongoing collaboration, stakeholders can continuously refine and improve post-disaster recovery mechanisms to build more resilient communities and infrastructure.

4.5. Bridging the Gender Gap in Disaster Resilience

Gender equality plays a pivotal role in shaping effective disaster recovery and resilience strategies in India amidst climate change. Despite progress, systemic barriers hinder women's access to resources and participation in disaster management. Government intervention is imperative to ensure equitable access to credit and enhance digital literacy among women. Initiatives promoting technological empowerment and sustainable practices highlight the importance of integrating gender equality into disaster recovery strategies for inclusive climate action.

In Odisha, women's increasing involvement in disaster response shows progress, but challenges remain. Women face constraints in accessing education and resources, hindering entrepreneurship. Patriarchal norms and biases in loan systems compound these challenges. Government intervention is needed to ensure equitable access to credit and enhance digital literacy among women.

Digital solutions for early warnings and relief are crucial, requiring improved accessibility for women. Initiatives like the Women Entrepreneurship Platform and sustainable agricultural practices highlight the importance of technological empowerment for women's economic independence and climate resilience. Integrating gender equality into disaster recovery strategies is vital for inclusive climate action, leveraging women's capacities for a resilient future.

In conclusion, India's textile industry undergoes a transformative journey towards sustainability and resilience, embracing technological advancements, sustainability initiatives, and gender equality. Collaboration among stakeholders, proactive measures, and a holistic approach are vital to realizing the sector's full potential and maintaining global competitiveness amidst evolving challenges.

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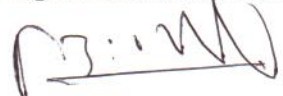
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CSR UTILIZATION CERTIFICATE

This is to Certify that a CSR fund of Rs. 7,77,014 (Rupees Seven hundred seventy-seven thousand fourteen only) was released to CENTER FOR SUSTAINABILITY, POLICY AND TECHNOLOGY MANAGEMENT, having office at #387, 14th B Cross, EWS Yelahanka New Town, Bangalore-560064 from **M/s ETSYSTORE PRIVATE LIMITED** on 22/02/2024. The funds have been utilized for the project "A Review of Climate Resilience and Disaster Recovery Initiatives for Indian MSMEs and Textile Workers", as per the terms and conditions mentioned in the MoU/ Agreement dated 19/01/2024. Further, NIL unspent balance is available in the account of said project.

The aforesaid statements are certified to be true and correct to the best of our knowledge and belief and based on the information provided to us to our satisfaction.

For B.R.V. Goud & Co.,
Chartered Accountants
Firm Registration No. 000992S

(A B Shiva Subramanyam)
Partner
M. No. 201108

Place : Bangalore

Date : 04-04-2024

UDIN : 24201108BKBMCH9950