

Climate Change, Health and Livelihood Vulnerability among Unorganised Workers in India: A Social Protection Perspective

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Abstract- Climate change is no longer a distant environmental concern in India but an increasingly lived reality for the nearly 90 per cent of the workforce engaged in the unorganised sector. Street vendors, construction workers, agricultural and allied workers, home-based workers, sanitation workers, fisher folk, brick-kiln workers and domestic workers face heightened exposure to rising temperatures, erratic rainfall, floods, cyclones and heat waves, while often lacking formal employment arrangements, occupational safeguards and adequate social security. This paper examines the intersecting health and livelihood vulnerabilities of unorganised workers in the context of climate change and critically assesses the adequacy of existing social protection mechanisms in addressing these emerging risks. Drawing on empirical studies, policy documents and grey literature, the paper develops an integrated conceptual and policy-oriented perspective on the climate–health–livelihood nexus. It argues that climate risk is increasingly a labour and social protection challenge rather than solely an environmental concern. Despite recent initiatives, including the Labour Codes, e-Shram and heat action plans, India's social protection architecture remains fragmented and predominantly reactive, with limited integration of climate-related occupational and health risks. The paper concludes by proposing a portable, inclusive and climate-responsive social protection framework to strengthen the health, livelihood security and adaptive capacity of India's unorganised workforce.

Keywords- Climate change; unorganised workers; occupational health; livelihood vulnerability; social protection; informal economy

I. Introduction

India's unorganised sector employs the majority of the country's workforce across agriculture, construction, street vending, domestic work, fisheries, home-based manufacturing and platform-based work. These workers typically face informal employment arrangements, low and irregular incomes, limited social security and weak bargaining power. Such structural vulnerabilities heighten their exposure to the health, economic and livelihood impacts of climate change.

Indian workers are estimated to have lost 259 billion hours of labour annually between 2001 and 2020 owing to the effects of humid heat, and the International Labour Organization projects that India could lose close to 5.8 per cent of total working hours by 2030 due to heat-related productivity loss (International Collective in Support of Fish workers [ICSF], 2024). Heat waves, once episodic, have become recurring and structural, with temperatures regularly crossing 40°C by April in large parts of the

country, disrupting outdoor work in agriculture, construction, transport, sanitation and street vending (Padhan, Mahapatra, & Meher, 2026). Beyond heat, workers face flooding, cyclones, vector-borne disease outbreaks and air pollution, each of which interacts with occupational exposure to compound ill-health and income loss.

Against this backdrop, the present paper situates climate vulnerability among unorganised workers within a social protection framework, asking not merely how climate change affects health and livelihoods, but whether India's welfare and labour institutions are structurally equipped to absorb and mitigate these emerging risks.

II. Review of Literature

Chen (2016) characterises the informal economy as heterogeneous but consistently marked by the absence of legal and social protection, a condition that shapes workers' capacity to cope with external shocks, including climatic ones. Building on this, a growing body of scholarship has begun to map the specific climate–health–livelihood nexus among informal workers.

A scoping review by Ansah, Ankomah-Appiah, Amoadu, and Sarfo (2021) covering developing economies found consistent associations between rising ambient heat and occupational injuries, heat exhaustion, kidney disease and reduced productivity, with outdoor and physically demanding occupations - agriculture, construction, brick-making and mining most severely affected. Focusing specifically on Tamil Nadu, a comparative study of indoor and outdoor unorganised workers found that outdoor workers experienced significantly greater heat-health vulnerability due to the absence of cooling interventions, job rotation and welfare facilities that are more common in organised sectors.

Case-study evidence from Indian and Zimbabwean cities similarly shows that the direct physiological impacts of climate change on informal workers are compounded by poor housing, lack of occupational health and safety provisions, and exclusion from social protection schemes, and argues that integrating informal workers into social protection systems is 'perhaps the single most significant policy change' for building their climate resilience (Dodman et al., 2023).

At the household and city level, research on migrant workers in Kochi, Surat and Mumbai demonstrates that climate vulnerability is embedded within the wider political economy of migration, with poor access to livelihood resources and decision-making power compounding health inequities (Jaswal, Sasidevan, Datta, Khan, & Kuruvilla, 2015). More recent analysis by the Indian Institute for Human Settlements found that of 94 climate- and migration-related policy interventions reviewed across India, nearly 80 per cent ignored climate risk altogether, and barely four qualified as genuinely 'adaptive social protection' - schemes combining safety nets with climate adaptation and disaster preparedness (as cited in Nature India, 2025).

At the macro level, Dasgupta, Sharma, Joe, Chowdhuri, and G (2025), analysing data from 575 rural Indian districts, found a statistically significant negative relationship between district-level climate vulnerability and health outcomes under the Sustainable Development Goals, with children in highly climate-vulnerable districts 1.25 times

more likely to be underweight and women 1.38 times more likely to have non-institutional deliveries. On the policy side, Costella et al. (2023) offer a critical framework showing that social protection systems can act as instruments of climate adaptation - through shock-responsive cash transfers, public works and insurance - but only where design and delivery are explicitly climate-informed, which remains rare in practice.

Research Gap

Although existing studies have extensively examined climate change and health and separately, the socioeconomic vulnerability of informal workers, limited attention has been given to the integrated relationship between climate exposure, occupational health, livelihood vulnerability and social protection among India's unorganised workforce.

Objectives Of The Study

1. To examine the nature and extent of health vulnerabilities faced by unorganised workers in India due to climate change.
2. To analyse the livelihood-related consequences of climate variability and extreme weather events for unorganised workers.
3. To critically assess the responsiveness and adequacy of India's existing social protection framework to climate-induced risks faced by unorganised workers.
4. To suggest policy measures for a more inclusive and climate-adaptive social protection architecture.

III. Methodology

This paper adopts a descriptive-analytical design based on secondary sources. It draws upon peer-reviewed journal articles, scoping and systematic reviews, government and multilateral policy reports, and recent field-based studies concerning climate change, occupational health, informal labour and social protection in India. Sources were purposely selected for thematic relevance to the climate–health–livelihood–social protection nexus among unorganised workers, and findings were synthesised narratively under the study's four objectives. As a review-based paper, the study aims to provide an integrated conceptual and policy-oriented understanding of an emerging and rapidly evolving field.

Climate Change and Health Vulnerability of Unorganised Workers

The most immediate and well-documented health impact of climate change on unorganised workers is heat stress. Prolonged exposure to elevated temperatures produces core-temperature elevation and dehydration, leading to fatigue, impaired judgement, and reduced coordination and, in severe cases, heat stroke and acute kidney injury. Outdoor occupations such as construction, agriculture, brick-making, salt-pan work and street vending are particularly affected, since these workers typically lack shaded rest areas, adequate drinking water, flexible working hours or access to cooling technologies available in organised workplaces.

Gendered dimensions of this vulnerability are significant. Qualitative research in Puducherry highlights that women construction workers often avoid drinking adequate water during work hours due to the absence of safe and private sanitation facilities at

worksites, compounding dehydration-related risk. Women engaged in unpaid care work, cooking, water collection and farm labour also face elevated exposure to heat-related illness, kidney disease and pregnancy complications, risks that remain largely unaddressed in mainstream heat-response policy (Padhan et al., 2026).

Beyond heat, climate change is reshaping the disease burden faced by informal workers. Migrant and slum-dwelling workers face heightened exposure to dengue, chikungunya and other vector-borne diseases linked to monsoon flooding, stagnant water and unsanitary housing, while prolonged, repetitive occupational tasks under climatic stress (such as long hours of garment stitching in poorly ventilated conditions) have been linked to cardiovascular strain (Nature India, 2025). Air pollution, intensified by changing weather patterns, further compounds respiratory illness among outdoor and informal manufacturing workers. Cumulatively, these exposures interact with pre-existing socio-economic disadvantages - poor nutrition, inadequate housing and limited access to healthcare - to produce compounded, rather than additive, health risk.

IV. Climate Change and Livelihood Vulnerability

For unorganised workers, health impacts and livelihood impacts are inseparable: lost workdays translate directly into lost wages in the absence of paid leave, insurance or employment guarantees. Construction workers unable to work during extreme heat, fisherfolk unable to access the sea during cyclone warnings, and agricultural labourers facing crop failure due to erratic rainfall all experience climate shocks not as discrete disaster events but as recurring, localised disruptions to daily earnings (Saurenergy, 2026). Because informal work is typically paid on a daily or piece-rate basis, even short weather-related disruptions can push already-precarious households into debt or distress migration.

Climate-induced livelihood stress is also a driver of migration, which in turn generates new vulnerabilities. Migrant workers frequently move into equally informal and unprotected employment at their destination, losing access to whatever local entitlements - ration cards, health schemes, housing support - they may have had at their place of origin, since most social protection benefits in India remain non-portable across states (Jaswal et al., 2015; Nature India, 2025). Analysis from coastal Odisha similarly shows that income loss, food insecurity and land degradation associated with climate change increase the risk of undocumented and unsafe migration, exposing workers to further exploitation, including forced labour and trafficking, in the absence of accessible social protection (Climate Change & Modern Slavery Hub, n.d.).

The cumulative effect is a vulnerability spiral: climate stress erodes income and assets, weak social protection fails to cushion the shock, and the resulting economic distress increases exposure to further climatic and social risk - including debt bondage, unsafe migration and depleted coping capacity for the next climatic event.

Social Protection Perspective: Policies, Gaps and The Way Forward

India possesses one of the world's largest social protection systems on paper, encompassing food security under the National Food Security Act, employment guarantees under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), health insurance under the Pradhan Mantri Jan Arogya Yojana

(PMJAY), and, more recently, the e-Shram portal intended to register and extend benefits to unorganised workers. The four new Labour Codes notified in recent years also formally extend social security provisions to gig, platform and migrant workers for the first time (Saurenergy, 2026).

However, the evidence reviewed suggests that India's social protection architecture remains largely climate-blind. A review of 94 climate- and migration-related interventions found that nearly 80 per cent overlooked climate risks, while more than two-thirds overlooked migrant communities; only a few qualified as genuinely adaptive social protection (Nature India, 2025). e-Shram, intended as a key platform for informal-worker welfare delivery, also faces challenges in coverage and benefit access. Costella et al. (2023) argue that social protection can effectively reduce climate vulnerability when it ensures adequate coverage, responds rapidly to climate shocks, and integrates climate-risk information into programme design. These conditions remain only partially fulfilled in India.

Emerging good practice does exist. Kerala's Bandhu Clinics extend health services to migrant worker settlements while generating data on climate-linked disease (Nature India, 2025). Parametric heat-insurance pilots - such as that developed with the Self Employed Women's Association (SEWA), which links payouts to verified extreme-heat days represent an innovative instrument for insuring against a risk that conventional indemnity insurance struggles to price (CETEX, 2026). India's Heat Action Plans, first piloted in Ahmedabad, have demonstrably reduced heat-related mortality where implemented with early-warning systems, cooling shelters and outreach to informal workers; yet more than half of India's climate-vulnerable districts, home to nearly three-quarters of the population, still lack these basic protective measures (Padhan et al., 2026).

Based on this evidence, several policy priorities emerge. First, social protection entitlements -particularly food, health and employment guarantees should be portable across state and district boundaries so that migrant unorganised workers do not lose benefits when they move. Second, MGNREGA and similar public-works programmes should explicitly incorporate climate resilience through heat-safe working hours and adjusted wage-day norms during extreme weather. Third, enforceable occupational heat-safety standards, including shaded rest areas, water access and flexible scheduling, should extend to unorganised worksites. Fourth, decentralised panchayat-level registration and outreach can improve the coverage and accuracy of e-Shram and reach vulnerable migrant and informal workers. Finally, index-based or parametric insurance for heat and flood risks, linked to platforms such as MGNREGA and PMJAY, can provide rapid, low-cost compensation where conventional insurance mechanisms remain inadequate (CETEX, 2026; ICSF, 2024).

V. Conclusion

Climate change is reshaping the health and livelihood risks faced by India's unorganised workers, turning occasional environmental hazards into persistent threats. As these workers often lack the protections available to organised workers, they are less able to cope with climate-related shocks. The evidence reviewed suggests that India's social protection system, despite its scale and recent reforms, has not yet fully

adapted to these emerging risks. Coverage remains incomplete, benefits are often non-portable, and climate risks are rarely integrated into programme design. Social protection should therefore be recognised as a key instrument of climate adaptation, rather than treated solely as a welfare measure. Future research should focus on longitudinal and sector-specific evidence to support the development of portable, shock-responsive and gender-sensitive social protection measures for India's unorganised workforce.

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