

Assessing the challenges and the effects of climate change on street vendors in Jaipur, Rajasthan

1.Introduction

According to the United Nations Framework Convention on Climate Change (UNFCCC), climate change is "a change that is either directly or indirectly caused by human activity and alters the composition of the global atmosphere in addition to the natural climate variability observed over comparable time periods (UNFCCC 1992).

Climate change has been termed as the most important public health concern of the twenty-first century (WHO 2008). It has an impact on vital aspects of human life, including the air people breathe, the food they consume, the water they use, and their exposure to severe infectious illnesses (WHO 2014; Ebi and Semenza 2008).

Climate change's impact

Climate change is evident in extreme heat conditions, abrupt rainfalls, rising air pollution, and water scarcity.

Intense heat waves and heavy rains are becoming more commonplace globally, which is the most evident effect of climate change (IPCC 2021). Such abrupt temperature changes contribute to the development of extreme cold (hypothermia) and heat stress (hyperthermia), which raise the mortality rates from cardiovascular and respiratory diseases (Gasparrini et al. 2015).

Diseases such as dengue and malaria are spreading more rapidly by rising temperatures and altered rainfall patterns, which provide favourable conditions for disease-carrying vectors (Campbell-Lendrum et al. 2015; Watts et al. 2015). Climate change has significantly increased mortality rates five to twenty times in affected areas (Hales et al. 2003; McMichael et al. 2006)

Rising temperatures and erratic rainfall patterns also threatened food security by reducing crop yields and escalating undernutrition, which claims three million lives each year (Myers et al. 2017; Wheeler and von Braun 2013).

Climate change and street vendors

There is an urgent need to understand the impact of climate change on informal street vendors, as they are among the most severely affected by its negative consequences. Working in open environments, they are continuously exposed to extreme heat and air pollution for long hours each day. During periods of extreme heat, customer footfall drops, which leads to reduced sales and income.

Climate change has increased economic constraints for informal sellers, drastically affecting their livelihoods. Extreme weather events and environmental stresses can cause lower

revenue, higher operating expenses, and disruptions in lives. (Masago mercy sepadi et al. 2015-24).

India's response to Climate change.

In 2008, India developed the National Action Plan on Climate Change (NAPCC) in response to these risks to address climate-related problems and develop effective mitigation and adaptation methods. (Government of India 2008).

Climate change initiatives in Rajasthan

Street vendors in Rajasthan, an area already prone to high heat and erratic weather, is becoming increasingly exposed to the consequences of climate change. Increasing temperatures, repeated heat waves, unusual rainfall, and dust storms have an influence on their health, daily income, and work environment. Most vendors do not have access to shelters, clean drinking water, or cooling devices, making extended periods in the sun harmful (SEEDS 2020).

There is a critical need to understand how climate change influences their everyday lives and what adaptive strategies, both at the institutional and personal levels, are present or needed.

Rajasthan, which is particularly susceptible to climate change, developed the Climate Change Agenda for Rajasthan (CCAR) in 2010, followed by the Rajasthan Environment Policy (SEP 2010). These efforts were intended to create a structure for adaptation and mitigation strategies from 2010 to 2014.

To tackle significant environmental issues, Rajasthan created the Rajasthan Environment Mission, which resulted in the establishment of task forces in seven vital areas - Water resources, agriculture and animal husbandry, human health, urban governance and sustainable habitats, forestry, biodiversity, solar energy, and climate change strategy.

In 2012, the Rajasthan Action Plan on Climate Change (RAPCC 2010-2014) was presented in alignment to the CCAR, Rajasthan Environment Policy, and Rajasthan Environment Mission. However, the RAPCC stayed in draft form and was never officially executed.

2.Review of Literature

Climate change has emerged as a major cause of public health problems and socioeconomic instability, disproportionately affecting informal labor such as street vendors. The Intergovernmental Panel on Climate Change (IPCC, 2021) observed that climate change is causing a surge in severe heat events, irregular rainfall, and air pollution, which has a direct impact on the health and livelihoods of vulnerable communities.

According to Gasparrini et al. (2015), extreme temperature changes contribute to both cold and heat-related diseases, greatly increasing cardiovascular and respiratory mortality. Street sellers in India are particularly vulnerable to environmental stresses because they are regularly exposed to them without proper protection or infrastructure.

According to UNICEF India (2024), street sellers in Rajasthan, which is already prone to high temperatures and dust storms, face income fluctuations, weariness, dehydration, and heat-related ailments as a result of extended outdoor exposure. Furthermore, Chakraborty and Joshi (2023) found that climate change-induced heatwaves in metropolitan areas not only lower customer turnout but also raise operational expenses as vendors seek to adapt with improvised solutions.

Despite the severity of the vulnerability, India's legislative frameworks have addressed only the special demands of street sellers. The 2008-launched National Action Plan on Climate Change (NAPCC) focused on macro-level mitigation and adaptation initiatives but did not include informal urban livelihoods in its framework. The Rajasthan Action Plan on Climate Change (RAPCC), which is linked with the state's Climate Change Agenda, was prepared in 2010 but has yet to be implemented, highlighting inadequacies in state-level implementation (RajRAS, 2023).

Earth Exponential (2023) has observed small-scale adaptation measures such as changing vending hours, using umbrellas or tents, and migrating to shaded areas. However, these answers are frequently fleeting and unsupported by local government. Sharma and Patel's (2022) gender-based study discovered that female sellers endure extra constraints such as water access issues, safety concerns, and increased physical stress, highlighting the need for intersectional policy attention.

There has also been little psychological and mental health study on street sellers. Climate change-related stress, anxiety, and uncertainty about daily income have been observed, but not adequately explored in India (Kaur & Sharma, 2021).

Thus, there is a considerable lack in region-specific and occupation-sensitive research that investigates the physical and socioeconomic implications of climate change on urban street vendors in India, particularly in high-risk regions like Rajasthan.

Gaps

- Limited attention to vendors in drafting local climate adaptation frameworks
- No regional large scale studies assessing **stress, anxiety, or psychological impact** of climate change on street vendors.
- No gender-specific analysis of how climate stressors impact male and female vendors differently in terms of workload, safety, and health.

Research question

What are the climate change-related challenges faced by the street vendors in Jaipur?

Objectives

1. To explore the climate change-related problems encountered by street sellers in Jaipur.
2. To explore the impact of climate change-related difficulties on the livelihoods of street vendors in Jaipur.
3. To understand about climate change adaption tactics used by street sellers.

3. Material and methods

Study design

A cross-sectional study design will be used.

Variables:

Independent variable:

Extreme heat conditions

Abrupt rainfall

Rising air pollution

Sudden storms /strong winds

Dependent variable:

Reduced customer footfall

Decreased sales and income

Health impact

Impact on livelihood

SETTING

The study will be carried out in Jaipur's urban areas where street vending is a common occupation. Most of the street vendors could be vegetable sellers, fruit sellers, fast food sellers, etc.

STUDY POPULATION

Inclusion Criteria:

- Street vendors who are 18 years old or older.
- Persons who have been involved in the vending industry for a minimum of one year.
- Sellers working in outdoor areas in Jaipur

Exclusion Criteria:

- Vendors who function indoors or closed spaces

Study measure

Quantitative questionnaire: (mostly) to assess challenges, impact, and adaptation strategies among street vendors.

Study duration

Three months

Sample size

100 street vendors

Sampling technique

Convenience sampling will be used to select street vendors from different locations.

Data collection

Data will be collected through face-to-face interviews using a structured questionnaire.

4.Operational definitions

Street vendor: A street vendor is someone who sells goods or services to the public from a temporary fixed structure or mobile stand.

Street vendors can be stationary or mobile, selling their wares from push carts, motorcycles, or moving buses. (NASVI, or the National Association of Street Vendors of India).

Negative effect of climate change: Climate change's negative effects are changes to the natural environment or living organisms that have a negative impact on the structure, strength, or production. According to the United Nations Framework Convention on Climate Change, natural and controlled ecosystems, the operation of social and economic systems, or human health and wellbeing

Coping/ Adaptation strategies: Vendors actions to offset the consequences of climate change, such as the use of umbrellas, changes in sale hours, and relocation to covered places.

5.Data analysis plan

Need to plan

6. Ethical considerations

- Before taking part, informed consent will be obtained either verbally or in writing.
- The purpose of the study and the participants' right to withdraw from participation at any moment without any consequences will be conveyed to them.
- To maintain confidentiality and anonymity, no personal identifiers will be documented.

7. Implications of research

- This research will provide significant insights into how street vendors experience climate change. The results can be utilized by policymakers to develop targeted support initiatives such as awareness programs, financial assistance, and heat shelters.
- The results could be beneficial for urban planners in establishing vending areas with enhanced facilities, including access to water and shaded spaces.
- Furthermore, by supporting vendors in sustaining their livelihoods amid changing environmental circumstances, this study will deepen our comprehension of climate resilience within informal economies.

8. REFERENCES

- RajRAS. (n.d.) *Rajasthan Action Plan on Climate Change*. Retrieved April 5, 2025, from <https://rajras.in/rajasthan-action-plan-on-climate-change/>
- World Health Organization (2016) *Climate change and health: Fact sheet – Regional Forum on Health Environment*. Retrieved April 5, 2025, from [https://www.who.int/docs/defaultsource/wpro---documents/hae---regional-forum-\(2016\)/climatechange-factsheet-rfhe.pdf](https://www.who.int/docs/defaultsource/wpro---documents/hae---regional-forum-(2016)/climatechange-factsheet-rfhe.pdf)
- Mohapatra, G., George, M & Pandey, S. (2022). Vulnerability and adaptation to climate change in Rajasthan. <https://doi.org/10.2298/EKA2234109M>
- UNICEF India (2024, August 29) *Coping with climate change in Rajasthan*. Retrieved April 5, 2025, from <https://www.unicef.org/india/stories/coping-climate-change-rajasthan>
- Earth Exponential (n.d.) *Climate resilience for urban street vendors*. Retrieved April 5, 2025, from <https://earthexponential.org/project/climate-resilience-for-urban-street-vendors/>
- ResearchGate. (2022). *Vulnerability and adaptation to climate change in Rajasthan*. https://www.researchgate.net/publication/365987250_Vulnerability_and_adaptation_to_climate_change_in_Rajasthan
- Earth Exponential. (n.d.). *Climate resilience for urban street vendors*. <https://earthexponential.org/project/climate-resilience-for-urban-street-vendors/>