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Climate-induced food price volatility and household nutrition security in India: A systematic review of evidence from the last decade

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Abstract

Climate change has emerged as a major driver of food systems instability, particularly in developing economies dependent on climate-sensitive agriculture. India, where a substantial proportion of households rely on agriculture for livelihood and food access, faces increasing vulnerability to climate-induced food price volatility. This systematic review synthesizes evidence published between 2015 and 2025 on the relationship between climate change, food price fluctuations, and household nutrition security in India. The review examines how extreme climatic events such as droughts, floods, erratic rainfall, and heatwaves affect agricultural production, disrupt supply chains, and increase food prices, thereby reducing household access to nutritious diets. Evidence from multiple Indian case studies indicates that poor and marginalized households are disproportionately affected through reduced dietary diversity, lower caloric intake, and increased malnutrition risks. The review further identifies adaptation strategies including climate-smart agriculture, public distribution systems, crop diversification, and social protection mechanisms. Significant research gaps remain regarding longitudinal nutrition outcomes, regional disparities, and integrated climate–nutrition policy frameworks. The findings emphasize the urgent need for resilient food systems and nutrition-sensitive climate policies in India.

Keywords: Climate change; Food price volatility; Nutrition security; Food inflation; India; Household food security; Climate resilience

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1. Introduction

Climate change is increasingly recognized as one of the most significant threats to global food systems and nutrition security. From a food systems perspective, climate change influences multiple interconnected components of the food system, including agricultural production, storage, transportation, food markets, consumer access, and dietary choices, thereby affecting all dimensions of food and nutrition security.[1] Rising temperatures, unpredictable rainfall, droughts, floods, and extreme weather events directly affect agricultural productivity and food supply chains. These disruptions frequently lead to food price volatility, reducing household purchasing power and limiting access to nutritious food, particularly among low-income populations.[2] The 2026 *Extreme Heat and Agriculture: FAO–WMO Joint Report* warns that increasing frequency and intensity

of heatwaves are emerging as major threats to global food systems by reducing agricultural productivity, disrupting food supply chains, and increasing food price volatility.[3] India is particularly vulnerable because agriculture remains highly climate-sensitive and supports a large share of rural livelihoods. Approximately half of India's workforce is dependent on agriculture, making climatic instability a major economic and nutritional concern.

Studies indicate that climate variability negatively affects all dimensions of food security in India, including food availability, accessibility, utilization, and stability. Figure 1 illustrates the pathways linking climate change to household nutrition security through agricultural production, food-price volatility, household economic vulnerability, dietary intake, and policy responses. These dimensions are closely interconnected within food systems, where disruptions in agricultural production and market functioning ultimately influence food affordability, dietary diversity, and nutritional outcomes, particularly among socioeconomically vulnerable populations.

Food price inflation has become a persistent challenge in India over the last decade. Climate shocks reduce crop output and increase market uncertainty, causing fluctuations in prices of cereals, vegetables, pulses, and edible oils. Food inflation disproportionately affects poor households because food expenditure constitutes a larger share of their income.[4] Nutrition security extends beyond caloric sufficiency and includes consistent access to safe, diverse, and nutritious diets. Climate-induced food price volatility can reduce dietary diversity and force households to adopt negative coping mechanisms such as skipping meals, reducing protein intake, or shifting toward cheaper calorie-dense foods.[5]

The food systems approach provides a useful conceptual framework for understanding these relationships. According to the High Level Panel of Experts and the Food and Agriculture Organization (FAO), food systems encompass the entire continuum of activities involved in producing, processing, transporting, marketing, consuming, and disposing of food, along with the socioeconomic and environmental drivers that influence these processes.[6] Within this framework, climate change acts as a systemic driver that disrupts agricultural production and food supply chains, contributes to food price volatility, alters food environments, and ultimately affects household dietary choices and nutrition security. Examining food price volatility through a food systems lens therefore provides a more comprehensive understanding of how climate shocks translate into adverse nutrition outcomes beyond reductions in agricultural production alone.

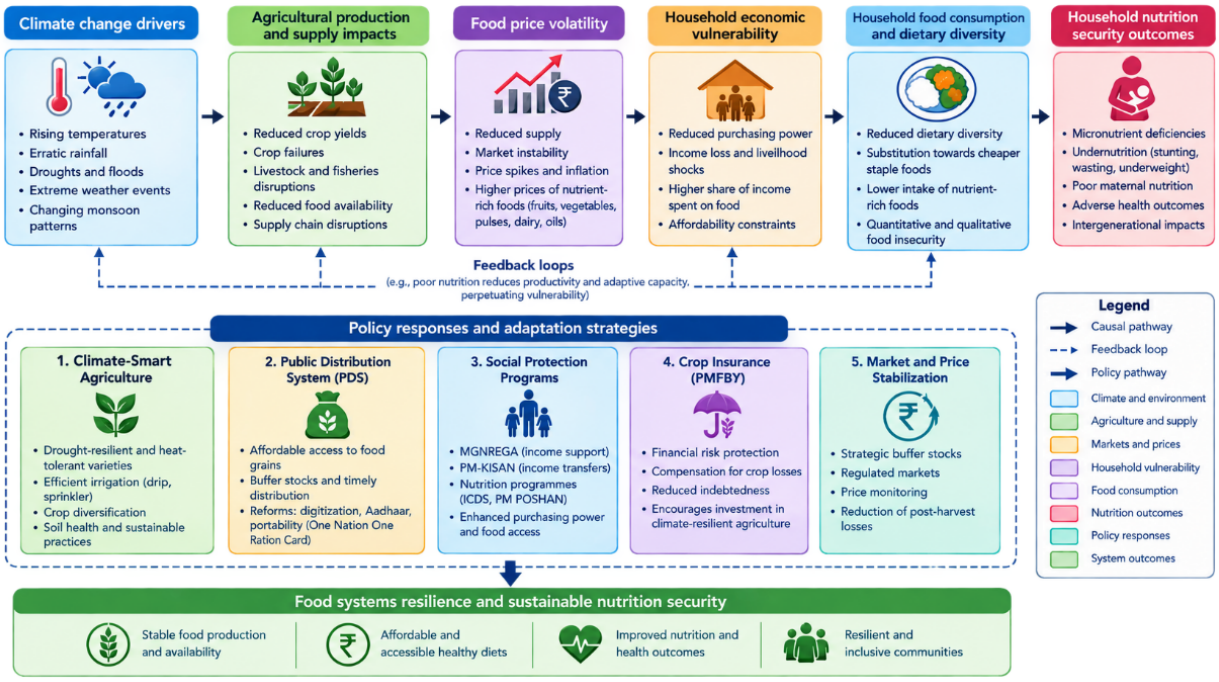


Figure 1. Conceptual framework: Pathways linking climate change to household nutrition security. Author's compilation based on Ref.[54] and relevant Government of India policy frameworks.

Although substantial literature has examined climate change, food prices, and food security separately, integrated evidence connecting these dimensions within the Indian context remains fragmented. Therefore, this systematic review aims to synthesize existing evidence on how climate change contributes to food price volatility and influences household nutrition security in India. By adopting a food systems perspective, the review examines the pathways through which climate-induced disruptions in agricultural production, food markets, and household purchasing power interact to influence dietary quality and nutrition outcomes. This perspective also facilitates a more integrated assessment of policy responses that enhance the resilience of food systems under a changing climate.

Figure 1 shows the conceptual framework that illustrates the pathways through which climate change influences household nutrition security via agricultural production, food price volatility, and household purchasing power, along with the principal policy interventions that strengthen food systems resilience.[7,8]

2. Methodology

This review was conducted by following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 framework to ensure a systematic and transparent approach in identifying, screening, and selecting relevant literature. The review protocol was developed to identify studies examining the relationships between climate change, food price volatility, and household nutrition security in India. A comprehensive search of published studies from 2015 to 2025 was carried out using major academic databases, including Scopus, Web of Science, PubMed, ScienceDirect, and Google Scholar. The literature search was conducted using combinations of controlled vocabulary and free-text keywords. The primary search terms included "climate change," "climate variability," "food price volatility," "food inflation," "nutrition security," "household food security," "dietary diversity," "food systems," and "India," combined using Boolean operators (AND/OR).

The search focused on literature examining the interconnections among climate change, food price volatility, and nutrition security in India. Studies were included in the review if they (i) specifically focused on the Indian context, (ii) examined the impacts of climate change on agriculture, food prices, or food systems, (iii) reported household food security, nutrition, or dietary outcomes, and (iv) were peer-reviewed articles published in English between 2015 and 2025. Studies were excluded if they lacked empirical or review-based evidence, failed to address issues of nutrition or household food security, were conference abstracts, editorials, commentaries, book chapters, duplicate publications, or publications without accessible full text.

After searching the databases, duplicate records were removed before screening. Titles and abstracts were screened for relevance, followed by full-text assessment against the predefined eligibility criteria. The study selection process is summarized in the PRISMA 2020 flow diagram (Figure 2).

For each included study, information on study characteristics, geographical setting, study design, climatic exposure, food price indicators, nutrition-related outcomes, key findings, and policy implications were extracted. The extracted evidence was subsequently organized into thematic categories corresponding to climate-related agricultural disruptions, food price volatility, household nutrition security, regional case studies, adaptation strategies, and research gaps.

This selection process ensured that the review remained focused on evidence directly relevant to understanding the relationship between climate variability, food price dynamics, and nutrition security in India.

3. Climate change and agricultural disruptions in India

Climate change has significantly affected Indian agriculture through increasing temperatures, erratic monsoon patterns, droughts, floods, and extreme weather events. Across the reviewed literature, there is consistent evidence that these climatic stressors reduce agricultural productivity through multiple pathways, including lower crop yields, increased pest and disease incidence, declining soil moisture, and disruptions to agricultural labor and water availability. Although the magnitude of impacts varies across agroecological regions and crop types, the evidence consistently demonstrates that reduced agricultural production constrains food availability and disrupts market supply, thereby increasing the likelihood of food price volatility.

Agricultural productivity losses have been reported across cereal, pulse, horticultural, and livestock production.[9] Research indicates that droughts and heat stress reduce crop yields, particularly in rain-fed regions such as Maharashtra, Rajasthan, and parts of Karnataka. Evidence demonstrates that Indian crop yields are increasingly influenced by long-term climatic variability and large-scale climate oscillations such as El Niño and monsoon fluctuations.[10] Flood-prone states, including Assam and Bihar, experience repeated crop losses and disruptions in food distribution systems.[11] A systematic

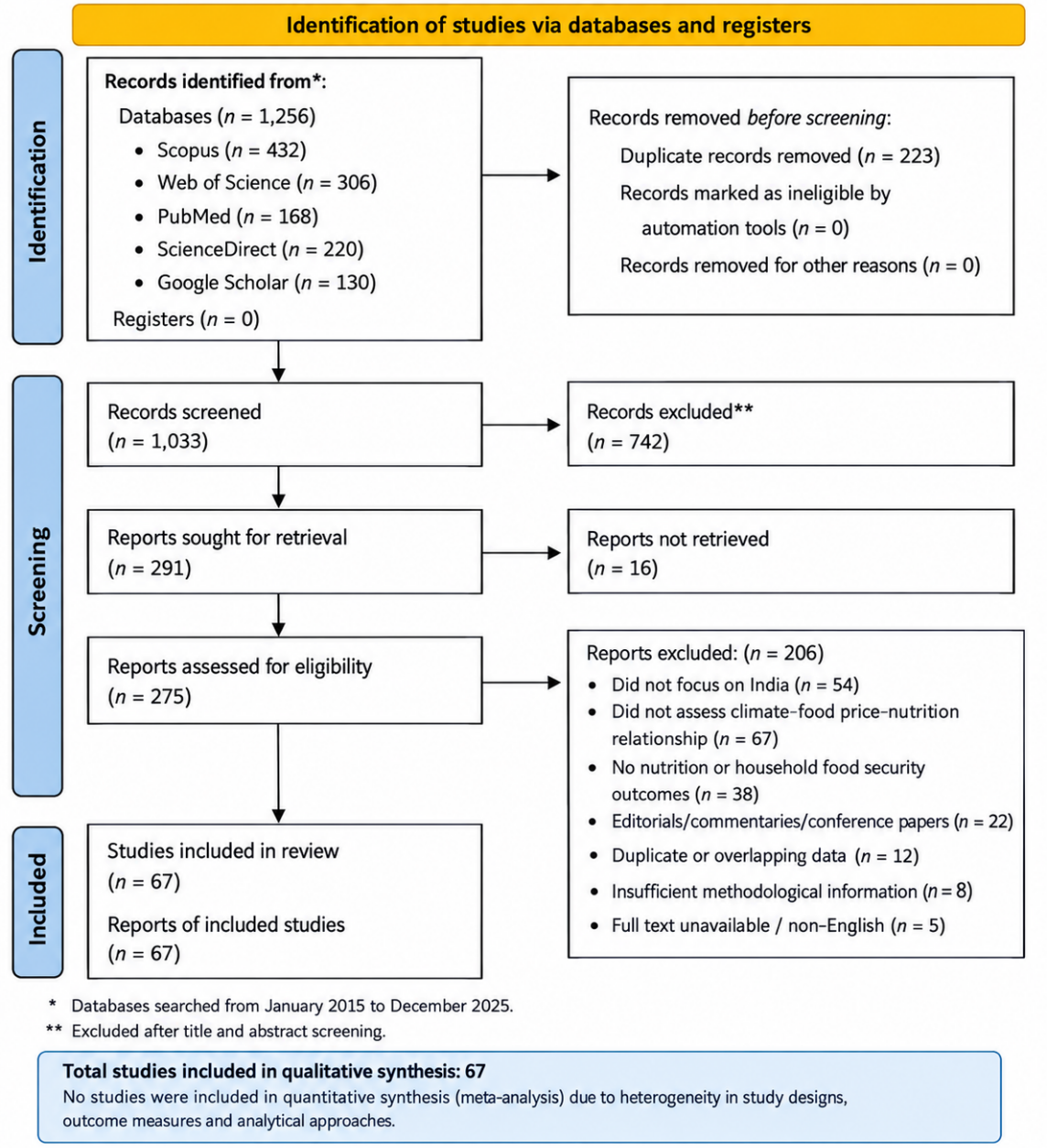


Figure 2. Study selection process

review on climate change and food security in India identified temperature variability and irregular rainfall as major drivers of reduced agricultural productivity and food system instability.[12] Climate variability also affects agricultural input costs, irrigation requirements, pest prevalence, and labor productivity, all of which contribute to market instability and rising food prices. Figure 3 shows climate hotspots and food insecurity risk in India.

Collectively, the reviewed studies indicate that climate change affects food systems through interconnected production, distribution, and market mechanisms rather than isolated agricultural losses. This synthesis suggests that recurrent climate shocks reduce the stability of food supply chains, amplify seasonal fluctuations in food availability, and increase market uncertainty, creating conditions that contribute to persistent food price volatility.

The *OECD-FAO Agricultural Outlook 2024–2033* projects that global agricultural and food systems will

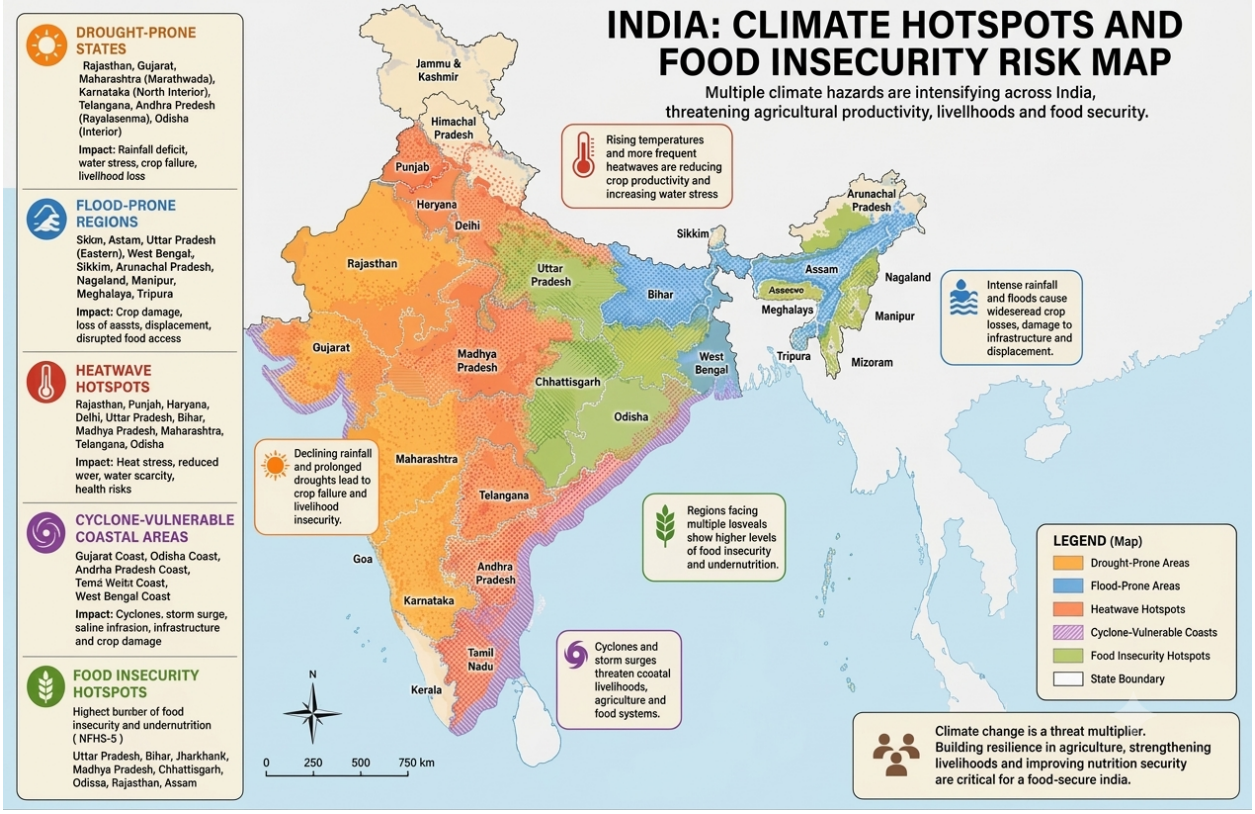


Figure 3. Climate hotspots and food-insecurity risk in India. Author's compilation from multiple datasets (IMD, CWC, NITI Aayog, ICAR, NFHS-5, MoEFCC, WFP, IPCC AR6 [2021]) using Google Gemini.

face increasing pressure from climate change, geopolitical instability, input-cost volatility, and changing consumption patterns over the coming decade.[13] A 2022 study highlights that climate risks extend beyond local agricultural production because many Indian states depend heavily on interstate food trade.[14] Consequently, climatic disruptions in major food-producing regions can affect food security across distant regions through supply chain and market linkages. The findings emphasize the need for climate-resilient agriculture, diversified food systems, and stronger disaster-risk management strategies to strengthen national food security. A recent study highlights that agricultural infrastructure, sustainability practices, irrigation access, storage systems, and market connectivity play a critical role in determining food security outcomes in India.[15]

4. Food price volatility and household vulnerability

Food price volatility refers to rapid and unpredictable changes in food prices over time. Across the reviewed studies, climate-related disruptions emerge as one of several important drivers of food price volatility by reducing agricultural output, interrupting transportation networks, and constraining market supplies. While the magnitude of price increases differs across commodities and regions, the reviewed evidence consistently shows that climate-induced supply shocks disproportionately affect nutrient-rich foods such as fruits, vegetables, pulses, and dairy products, thereby reducing the affordability of healthy diets. Studies indicate that extreme weather events, such as droughts, floods, heatwaves, and cyclones, significantly intensify food insecurity in India by disrupting agricultural production, supply chains, and rural livelihoods.[16,17] Studies suggest that climate extremes can increase food prices by over 30% during severe weather disturbances.[18]

In India, food inflation has remained a recurring concern over the past decade. Food inflation in India is driven by a complex interaction among climate shocks, government subsidy policies, and macroeconomic conditions such as money supply and fuel prices.[19] The reviewed evidence suggests that climate variability increasingly interacts with these economic factors to amplify both the frequency and persistence of food price shocks, making food inflation more structural than episodic.

Rising prices of pulses, vegetables, edible oils, and cereals have significantly affected household consumption patterns. Evidence suggests that higher food prices do not necessarily benefit smallholder farmers due to input-cost inflation and market inefficiencies.[20] Research on rural vulnerability in Bihar shows that recurrent floods significantly disrupt agricultural production, household income, and food access, particularly among economically marginalized farming communities.[21]

Across the reviewed literature, there is broad agreement that the nutritional consequences of food price volatility are mediated primarily through household purchasing power. Low-income households are disproportionately affected because they allocate a larger share of their income to food purchases and therefore have limited capacity to absorb sudden increases in food prices. Price shocks reduce the affordability of nutrient-rich foods such as fruits, milk, eggs, and pulses, increasing dependence on cheaper starchy staples. Consistent with these findings, global evidence indicates that the EAT–Lancet reference diet, designed to promote both human and planetary health, remains largely unaffordable for a significant share of the global population, particularly in low- and middle-income countries.[22]

The evidence further indicates that contemporary food inflation is increasingly shaped by interconnected global and domestic drivers—including climate shocks, geopolitical conflicts, commodity speculation, energy prices, and macroeconomic conditions—which reinforce household vulnerability and complicate policy responses aimed at improving nutrition security.

5. Household nutrition security

Nutrition security includes sustained access to adequate calories, proteins, micronutrients, and dietary diversity. Studies from India found that rising temperature anomalies and humidity levels reduce household dietary diversity in India, particularly among poorer households with limited adaptive capacity.[23] Household consumption expenditure survey data from 2011–2012 and 2023–2024 show inadequate intake of essential micronutrients despite dietary pattern shifts, indicating that improvements in calorie consumption do not necessarily translate into better nutritional quality or dietary diversity.[24]

Across the reviewed studies, a consistent pattern emerges whereby climate-induced food price increases reduce household purchasing power and alter food consumption behavior. Rather than uniformly reducing total food intake, households frequently adopt coping strategies that prioritize caloric sufficiency at the expense of dietary diversity and nutritional quality.

Likewise, a study on temperature and nutrition in India reported that high temperatures disproportionately reduce the consumption of perishable and micronutrient-rich foods among low-income households.[25] These findings complement the evidence on dietary diversity by demonstrating that climate-related shocks not only affect the quantity of food consumed but also shift consumption away from nutrient-rich foods toward cheaper staples.

Collectively, these studies indicate that coping responses to food insecurity often protect short-term calorie intake but undermine long-term nutrition security and dietary quality.

Drawing on evidence from South Asia, including India, a 2018 review highlights that increasing agricultural production alone is insufficient to reduce malnutrition, unless vulnerable households also gain access to affordable, diverse, and nutrient-rich foods through integrated food systems and policy approaches.[26] This reinforces the broader finding that improving agricultural productivity, while necessary, is insufficient to ensure nutrition security, unless accompanied by measures that improve food affordability and access.

A large-scale observational study found that children living in climatically vulnerable agricultural regions experience higher rates of stunting and undernutrition due to reduced agricultural productivity, food insecurity, and declining household income.[27] Food insecurity has been associated with child undernutrition, anemia among women, and increased micronutrient deficiencies in rural populations.[28] Together, these studies demonstrate that the nutritional consequences of climate change extend beyond food availability to include significant adverse effects on maternal and child health, particularly among socioeconomically disadvantaged households.

The FAO report "*Cost and Affordability of Healthy Diets Across and Within Countries*" emphasizes that rising food prices, income inequality, and limited access to diverse nutrient-rich foods constrain the ability of vulnerable households to achieve adequate nutrition, thereby worsening food insecurity and malnutrition.[29] Evidence also indicates that nutrition outcomes are closely linked with food affordability and income stability.[30,31] Climate shocks often reduce agricultural income while simultaneously increasing food prices, creating a dual burden for farming households.[32]

Across the reviewed literature, these interacting mechanisms consistently identify food affordability as the principal pathway through which climate-induced food price volatility influences household nutrition security. While the magnitude of impacts varies across regions and

socioeconomic groups, the evidence converges in showing that households dependent on climate-sensitive livelihoods experience the greatest nutritional risks.

6. Indian case studies

6.1. Maharashtra droughts

Recurring droughts in Maharashtra have reduced crop yields and increased food prices, especially for pulses and vegetables. Farming households reported reduced dietary diversity and increased dependence on subsidized food grains through the Public Distribution System (PDS). Studies also indicate that these climate shocks negatively influence household dietary diversity.[33] A study conducted in Akole block of Maharashtra found that vulnerable rural and tribal households facing climatic and economic stress often relied on limited cereal-based diets and experienced low dietary diversity due to poor market access, changing cropping patterns, and declining agricultural resilience.[34]

6.2. Bihar floods

Flood events in Bihar disrupted food supply chains and local markets, increasing food insecurity among rural households. Studies reported declines in food accessibility and increased reliance on low-cost calorie-dense foods.[35] Additionally, households in flood-prone districts of Bihar frequently adopt coping mechanisms such as reducing meal frequency, borrowing food, and relying heavily on subsidized grains distributed through government welfare schemes.[36]

6.3. Himalayan region

Research from the Indian Himalayan region highlights that climate change reduced farming productivity, household income, and food availability. Water scarcity and climate extremes increased food instability and dietary vulnerability.[37] Studies also demonstrate that climate extremes and declining natural resources increased dietary vulnerability and seasonal food insecurity among rural households in the Himalayan region.[38]

6.4. Odisha and Assam

Cyclones and erratic rainfall in Odisha and Assam disrupted rice production and market transportation systems. Food price spikes particularly affected low-income and landless households. Studies conducted in coastal Odisha following major cyclones, including Cyclone Phailin and Cyclone Fani, reported substantial losses in paddy cultivation, destruction of storage facilities, and disruptions in rural market connectivity.[39] Evidence shows that recurring cyclonic events in Odisha adversely affected agricultural livelihoods and contributed to temporary food shortages and rising food prices in affected districts.[40] Similarly, other studies found that climate extremes and flooding in Assam disrupted local food supply chains and reduced food accessibility among rural households dependent on agriculture.[41,42]

Collectively, the regional case studies demonstrate that although climatic hazards differ across India's agroecological regions, similar mechanisms link climate variability to household nutrition insecurity. Drought-prone areas primarily experience reduced agricultural production and prolonged price increases, whereas flood- and cyclone-affected regions face disruptions in food distribution, transportation, and local markets. Despite these regional differences, the evidence consistently shows that climate-induced food price volatility reduces household access to diverse and nutritious diets. This reinforces the central finding that food prices constitute an important pathway through which climate change influences nutrition security.

7. Adaptation strategies and policy responses

India has adopted a comprehensive and multidimensional policy framework to strengthen resilience against climate-induced food insecurity. Since agriculture remains highly dependent on monsoon rainfall and climatic stability, increasing temperatures, erratic rainfall, droughts, floods, and extreme weather events pose serious threats to agricultural productivity, rural livelihoods, and food availability.[43] In response, the Government of India has introduced several adaptation and social protection strategies that aim to reduce vulnerability, improve agricultural resilience, and ensure food and nutritional security for vulnerable populations. These strategies include climate-smart agriculture, food distribution systems, social welfare schemes, and crop insurance programs.[44] Across the reviewed literature, these interventions are viewed as complementary rather than standalone measures, collectively addressing the interconnected challenges of climate resilience, food affordability, and household nutrition security within the broader food systems framework.

7.1. Climate-smart agriculture

One of the most important strategies adopted by India is the promotion of climate-smart agriculture. Climate-smart agriculture refers to agricultural practices that improve productivity, strengthen resilience to climate change, and support environmental sustainability.[45] India has promoted climate-smart agriculture through initiatives such as the National Mission for Sustainable Agriculture,

which operates under the National Action Plan on Climate Change. The mission focuses on enhancing climate resilience through sustainable farming systems, soil health management, water conservation, and efficient agricultural practices.

Under climate-smart agriculture, the cultivation of drought-resistant and climate-resilient crop varieties has been promoted to improve productivity under changing climatic conditions by enhancing resilience to water stress, temperature variability, and extreme weather events.[46] Efficient irrigation methods such as drip and sprinkler irrigation have also been promoted under schemes like Pradhan Mantri Krishi Sinchayee Yojana and "Per Drop More Crop" to improve water-use efficiency and reduce water wastage.[47]

In addition, crop diversification is encouraged to reduce farmers' dependence on a single crop and minimize climate-related risks.[48] A recent study found a strong spatial association between agricultural diversity and nutritional outcomes in India, showing that regions with lower crop diversity often experience higher levels of nutrient deficiency and dietary vulnerability.[49] Sustainable agricultural practices such as conservation agriculture, integrated nutrient management, agroforestry, and organic farming are also promoted to improve soil fertility and ecological sustainability. One study found that environmentally sustainable agricultural systems not only help reduce greenhouse gas emissions but also enhance productivity stability, resource efficiency, and farmers' adaptive capacity under climate stress.[50] Research indicates that farmers adopting climate-smart agricultural practices achieve higher productivity, improved farm income, and greater resilience against climate shocks.[51,52]

Collectively, the reviewed evidence suggests that climate-smart agriculture contributes to household nutrition security primarily through indirect pathways by improving production stability, strengthening farmer resilience, and reducing the risk of climate-induced food price volatility. However, relatively few studies have directly evaluated its long-term impacts on dietary diversity and nutrition outcomes, highlighting an important area for future research.

7.2. Public Distribution System

The PDS is another major strategy adopted by India to combat food insecurity arising from climate-induced disruptions. Under the National Food Security Act, subsidized food grains such as rice and wheat are distributed to economically vulnerable households through an extensive network of fair-price shops across the country.[53]

Climate-related events such as droughts, floods, and crop failures often lead to food shortages and rising food prices, disproportionately affecting poor households.[54] Recent studies have shown that climatic variability and food inflation significantly reduce food accessibility among low-income populations, particularly in rural areas dependent on agriculture.[55] In India, extreme weather events and irregular rainfall patterns have contributed to sharp increases in the prices of essential food commodities such as vegetables, cereals, and pulses, thereby worsening household food insecurity.[56,57]

In such situations, the PDS functions as a critical safety net by ensuring affordable access to essential food grains for vulnerable households under the National Food Security Act. The expansion and strengthening of the PDS have played an important role in stabilizing food availability and protecting low-income families from market price shocks and nutritional deprivation.[58] Recent evidence further suggests that food grain distribution through the PDS has improved household welfare, dietary security, and child nutrition outcomes, especially during periods of economic and climatic stress.[59]

Furthermore, reforms such as digitization, Aadhaar-based authentication, and the "One Nation One Ration Card" initiative have improved transparency, efficiency, and portability within the PDS system, thereby enhancing food accessibility for migrant and vulnerable populations.[60] Across the reviewed studies, the PDS works best when combined with complementary nutrition-sensitive interventions and social protection measures. While the system substantially improves food access during climate shocks, continued diversification of food baskets and improved nutritional quality are necessary to address the broader challenges of household nutrition security.

7.3. Social protection programs

India has also implemented several social protection and welfare programs to reduce household vulnerability and improve resilience against climate-induced food insecurity. These programs help stabilize household income, increase purchasing power, and improve food access during periods of agricultural distress and climate shocks.[61]

One of the most significant programs is the Mahatma Gandhi National Rural Employment Guarantee Act, which guarantees wage employment to rural households. During droughts, crop failures, and other climate-related crises, the act provides an alternative source of income and helps rural families maintain food consumption and livelihood security.[62]

Similarly, the Pradhan Mantri Kisan Samman Nidhi scheme provides direct income support to farmers through

cash transfers. This financial assistance helps small and marginal farmers purchase agricultural inputs, adopt improved farming technologies, and cope with economic uncertainties caused by climatic variability.[63]

In addition, nutrition support programs such as the Integrated Child Development Services and the Mid-Day Meal Scheme/PM Poshan contribute to food and nutritional security among children, pregnant women, and other vulnerable groups.[64] These programs become especially important during climate-induced disruptions that increase the risk of malnutrition and food insecurity.[65]

Collectively, the reviewed evidence indicates that income support, employment guarantees, and nutrition-specific programs strengthen household resilience by protecting purchasing power and reducing the adverse nutritional consequences of temporary food price shocks. Their effectiveness is enhanced when implemented alongside climate-resilient agricultural and food distribution policies.

7.4. Crop insurance

Crop insurance has become an essential component of India's climate adaptation strategy in agriculture. Since Indian agriculture remains highly vulnerable to monsoon variability and extreme weather events such as droughts, floods, cyclones, and hailstorms, farmers often face severe financial losses due to crop failure. To address this challenge, the Government of India launched the Pradhan Mantri Fasal Bima Yojana, which provides insurance coverage and financial compensation to farmers affected by natural disasters and climate-induced crop losses.[66] The scheme aims to reduce income uncertainty, protect farmers against production risks, and promote agricultural stability.

Crop insurance helps farmers recover more quickly from climate shocks by compensating them for agricultural losses. It also reduces indebtedness, prevents distress migration, and encourages farmers to continue investing in agriculture despite increasing climate risks.[67] As a result, Pradhan Mantri Fasal Bima Yojana contributes significantly to strengthening farmer resilience and ensuring long-term food security in India.

Although crop insurance primarily targets agricultural producers, the reviewed evidence suggests that strengthening farm resilience may also contribute indirectly to more stable food supplies and reduced food price volatility. Nevertheless, empirical evidence directly linking crop insurance to household nutrition outcomes remains limited, indicating an important area for future research.

8. Research gaps

Despite a growing body of literature, several research gaps remain:

(i) Limited longitudinal evidence linking climate-induced food price shocks to long-term nutrition outcomes.
(ii) Insufficient studies adopting an integrated food systems perspective that simultaneously examines climate, agriculture, food prices, and nutrition outcomes.
(iii) Few gender-disaggregated analyses examining how climate-induced food-price volatility differentially affects women, children, and other vulnerable groups.
(iv) Inadequate evidence from tribal and ecologically fragile regions, where climate risks, livelihood patterns, and nutrition vulnerabilities differ substantially from those of the major agricultural regions.
(v) Existing literature also lacks standardized indicators for assessing nutrition security under climate stress conditions, making comparisons across studies difficult.

9. Conclusion

Climate change has emerged as a critical driver of food system instability and food price volatility in India. Climatic disruptions in agriculture reduce food availability, increase market uncertainty, and elevate food prices, thereby undermining household nutrition security. Poor and vulnerable households are disproportionately affected through reduced dietary diversity, lower nutrient intake, and heightened food insecurity.

Evidence from the last decade (2015–2025) demonstrates that climate-induced food price volatility is not only an agricultural challenge but also a major public health and development issue. The review further highlights that these impacts are shaped by interconnected processes operating across food systems, linking agricultural production, food markets, household livelihoods, and nutrition outcomes. Strengthening climate-resilient agriculture, improving social protection systems, stabilizing food markets, and integrating nutrition-sensitive policies are essential for achieving sustainable food and nutrition security in India. The evidence also suggests that these interventions are likely to be the most effective when implemented as complementary strategies within an integrated food systems framework rather than as isolated policy measures.

Future research should prioritize interdisciplinary approaches linking climate science, agricultural economics, nutrition, and social policy to better understand household vulnerability and resilience under changing climatic conditions.

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Conflict of interest

The author declares she has no competing interests.

Author contributions

This is a single-authored article.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data

Not applicable.

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