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# Food price shocks and food supply in fragile states: a scoping review

**RESEARCH ARTICLE**

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## Abstract

Food price and supply shocks have detrimental effects on consumers worldwide, but they disproportionately affect vulnerable populations in fragile states. We conduct a scoping review of the literature on food price shocks and food supply chain issues in fragile states. We started with a robust set of 4476 peer-reviewed articles gathered from multiple repositories, including the Web of Science, PAIS International, and Econ Lit. We ended up with 17 studies for a full review following a series of exclusion criteria. Then, we systematically review the studies and synthesize evidence on the connection between food price shocks and the food supply chain. We find that food price shocks significantly weaken the food supply chain and household food security in fragile states across the world, though the mechanisms are context-specific. We find that local informal markets and locally led actions are critical in mitigating the adverse impacts of food price shocks and improving the resilience of the food supply chain in fragile states. We conclude that governments and development stakeholders in fragile states can improve food system resilience by providing targeted policy and investment support to informal markets and local actions, in addition to formal supply chain development.

**Keywords:** food price shocks, food supply chain, fragile states, scoping review

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## 1. Introduction

Fragile states, characterized by weak governance, political instability, economic vulnerability, and social unrest, face considerable challenges in maintaining a stable and reliable food supply (Baliamoune-Lutz and McGillivray, 2008; Grimm *et al*., 2015; Nay, 2013). These challenges are exacerbated by the lack of effective state institutions and infrastructure, which hinders the implementation of food security policies (Candel, 2014; Rocha and Lessa, 2009; Zerbian and de Luis Romero, 2023). Economic dependence on a few sectors, such as agriculture or natural resources, coupled with political instability, also hampers long-term planning and development efforts. Additionally, fragile states are highly vulnerable to external shocks, including food price volatility, conflict, and global crises such as the COVID-19 pandemic, which disrupt food systems and further intensify existing vulnerabilities (Ihle *et al*., 2019; Broyaka *et al*., 2025; Minten *et al*., 2023; Yami *et al*., 2019; Goeb *et al*., 2026). Research on fragile states has repeatedly highlighted how these external shocks can lead to food insecurity, increasing both the severity and duration of food crises (Adeyonu *et al*., 2021; Alam *et al*., 2022, 2024). For example, the COVID-19 pandemic significantly disrupted food supply chains in countries already struggling with weak governance and economic instability. This led to sharp increases in food prices and difficulties in ensuring access to essential food items (Goeb *et al*., 2022; Hasan, 2019; Yami *et al*., 2019).

A considerable body of research in fragile states has explored the impacts of food prices and related shocks on food insecurity (Green *et al*., 2013; Goeb *et al*., 2022; Rahman *et al*., 2024). However, the broader concept of the food supply chain[1] has been largely underexplored. A significant bulk of the literature has focused primarily on food access and the challenges households face in securing enough food, often overlooking the intricate dynamics of how the broader food supply chain functions in these fragile contexts (Khan *et al*., 2022; Quinn *et al*., 2014). The food supply chain, which includes both formal and informal markets, plays a crucial role in ensuring that food reaches consumers on time, especially in regions where formal markets are weak or underdeveloped. However, how these systems respond to price shocks and disruptions from external factors, such as natural disasters or political instability, remains insufficiently examined (Brown and Kshirsagar, 2015; Laborde *et al*., 2019). Understanding the functioning and resilience of food systems[2] during crises is essential for improving food security in fragile states and vulnerable regions of any country (Bruck *et al*., 2017; Savary *et al*., 2020). A stable and accessible food supply chain ensures that even during crises, vulnerable populations can access sufficient and nutritious food.

In fragile states, local markets may often operate inefficiently, failing to meet consumer demand on time. External aid is not always available, and when available, it may be insufficient or delayed in reaching those most affected. Strengthening the local food supply chain is, therefore, a key area that requires more attention. Identifying the literature that examines supply chain issues of food and their prices, as well as addressing gaps, is critical in building resilience in food systems that could significantly enhance long-term food security for those living in the world's most vulnerable regions.

The primary goal of this study is to synthesize existing research and identify research gaps related to the resilience of the food supply chain in fragile states. We achieve this by exploring four specific research questions: (Q1) What is the impact of food price shocks on the food supply chain, and how does price volatility affect food availability and accessibility in fragile settings?; (Q2) What coping strategies do households employ in these contexts, particularly in response to food supply disruptions?; (Q3) What role

[1] The food supply chain is defined according to the Food and Agriculture Organization (FAO), which defines it as "a complex network that connects the production system with the consumer through a series of operations: production, manufacturing, packaging, distribution, retail, and storage. At the same time, the supply chain connects companies that provide inputs, such as seeds and fertilizers, to producers".

[2] We use 'the food supply chain' interchangeably with 'the food system' because, as the FAO defines it, it is difficult to separate explicitly the food supply chain and a broader food system. According to FAO, "food systems encompass the entire range of actors, and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded".

do informal food markets play, which are often crucial in times of crisis, and how do these markets interact with formal market systems during periods of disruption?; and (Q4) What are the barriers to the effective implementation of government policies in stabilizing food supply in fragile environments? By addressing these questions, this study contributes to the literature on fragile states' food system resilience in several ways. First, we provide a better understanding of the mechanisms through which food price shocks affect food supply in fragile states. Second, we synthesize the critical role of informal markets in maintaining food availability and ensuring food security in fragile states. Third, we synthesize the evidence on different coping strategies vulnerable households in fragile states have used in mitigating food supply disruptions during crises. Finally, we identify potential barriers for the effective implementation of government policies and international programs related to food security and food system resilience.

The remainder of this paper is organized as follows. Section 2 describes the methodology for the scoping review. Section 3 summarizes the results. Section 4 discusses the implications and policy implications, and section five concludes.

## 2. Methodology

This scoping review is guided by a conceptual framework rooted in vulnerability and resilience theories to understand the multifaceted impacts of food price shocks on food supply and security in fragile states (Pham *et al*., 2014). We posit that these impacts are a function of the system's exposure to price shocks and the inherent sensitivity of the food supply chain caused by the lack of adaptive capacities in fragile states. These states are characterized by weak governance, conflict, and economic instability, which limits the capacity of state and non-state actors and private sector businesses. Exposure to fragility shocks depends on the nature and degree of the price and supply chain shock driven by societal instability. The context of the fragile state determines the sensitivity, the extent to which the food system is affected, and adaptive capacity, which is essentially the ability to adjust and cope. The interplay between these elements determines the impact on food (in)security through price shocks and a brittle supply chain. This framework helps structure our analysis of the literature, linking the causes and consequences of food price and supply chain shocks in fragile states.

Scoping reviews differ fundamentally from traditional reviews in their approach to study selection. In a traditional review, the inclusion or exclusion of studies may be influenced by the authors' theoretical perspectives or anticipated outcomes. In contrast, a scoping review follows a clear and transparent methodology, where studies are selected based on predefined criteria, ensuring that the process is objective and reproducible. For this review, two researchers were responsible for the literature selection process. In cases where these two researchers had differing opinions regarding the inclusion of a particular study, a third researcher was involved to resolve the discrepancy and make the final decision. This collaborative process aimed to ensure consistency and reduce bias in the study selection. Only those studies that met the established inclusion criteria, as determined by consensus among all three researchers, were included in the final sample, enhancing the reliability and validity of the review's findings.

### *2.1 Literature search*

We gathered relevant empirical studies through a comprehensive search across several prominent academic databases, including the Web of Science, PAIS International, and EconLit (Harris *et al*., 2013; Waddington *et al*., 2012; Zürcher 2017;). These databases were chosen for their extensive coverage of economics, public policy, and social sciences, ensuring a broad and diverse collection of studies. We used the Fragile States Index (FSI), formerly known as the Failed States Index and developed by the Fund for Peace, to identify fragile states for our study. The FSI ranks countries based on a set of indicators that measure political instability, economic resilience, social cohesion, and governance, providing a clear and reliable way to categorize countries based on their level of fragility. Total fragility scores range from 0 to 120, with higher scores indicating greater fragility. The index also suggests cut-off points based on fragility scores to categorize

countries as "sustainable" (score 0–30), "stable" (30–60), "warning" (60–90), and "alert" (90–120). For this review, countries that ranked within the top 40 in the Fragile States Index Annual Report (Fund for Peace, 2023) were identified and used in country-specific searches described in the next paragraph. These countries fell within the FSI "Very High Alert/High Alert/Alert/High Warning" classification tiers.

The search strategy employed a variety of search terms related to the intersection of food supply, food systems, food price shocks, and food security in fragile states". We used the following search terms: "Food supply in [Country] AND "Food price in [Country], AND Food price shock in [Country]", where Country refers to each of the top 40 countries in the Fragile States Index. Additionally, we also used the following general search terms without using any Boolean operators: "Food supply in fragile states", "Food price shocks and fragile states", "Impact of food price volatility on food supply", "Food systems in conflict zones", and "Food security and food supply in developing countries". We believe our strategy to search for the literature for each of the top 40 fragile countries separately has not been done previously in a similar context and is a primary contribution of this review.[3] Using the top 40 countries from the FSI in our search strings ensured that the studies selected for our review addressed contexts where food supply systems were most vulnerable.

These terms were carefully chosen to capture studies that explore both the direct effects of food price volatility and the broader food supply dynamics in fragile and conflict-affected contexts. The combination of these terms helped identify a range of empirical studies that examine the vulnerability of food systems in fragile states, the coping strategies of households during food supply disruptions, and the role of government and international interventions in mitigating food insecurity. This search strategy ensured that the review incorporated a comprehensive set of studies focused on understanding the multifaceted challenges to food supply in fragile and conflict-affected environments.

Figure 1 presents the PRISMA flowchart for the literature search and screening process. We identified a total of 4838 records in the three databases, of which 207 items were removed due to duplication and 155 items were removed due to lack of relevance. We screened the remaining 4476 articles for this review, of which 3802 articles were excluded during title screening. The remaining 671 articles were retrieved and screened for full texts, of which 455 articles were excluded in the full-text screening process. A set of clear inclusion and exclusion criteria (described in Sections 2.2 and 2.3) was established to ensure that only the most relevant and robust studies were included for the review. Among the remaining 216 articles, only 17 articles were included for this review, as the remaining 199 articles were excluded according to the exclusion criteria.

### *2.2 Inclusion criteria*

We used three specific inclusion criteria to ensure the inclusion of peer-reviewed research papers with verifiable findings and real-world applicability. First, we considered only those studies that had the outcome variable directly related to food supply or food prices. Second, only peer-reviewed and published studies were included in the review; working papers, conference papers, and archived studies were excluded to maintain the quality and reliability of the research. Third, we included empirical studies only. Empirical studies that use macro or micro-level data, such as household surveys, national-level data, or other comprehensive datasets, were included, but studies based on simulation models were not. Simulation studies often lack the empirical grounding required for a detailed understanding of real-world dynamics.

[3] However, a handful of studies have used the Fragile States Index in similar, though not directly related, contexts, such as Elgar *et al*. (2021), Natalini *et al*. (2015) and Quinn *et al*. (2014).

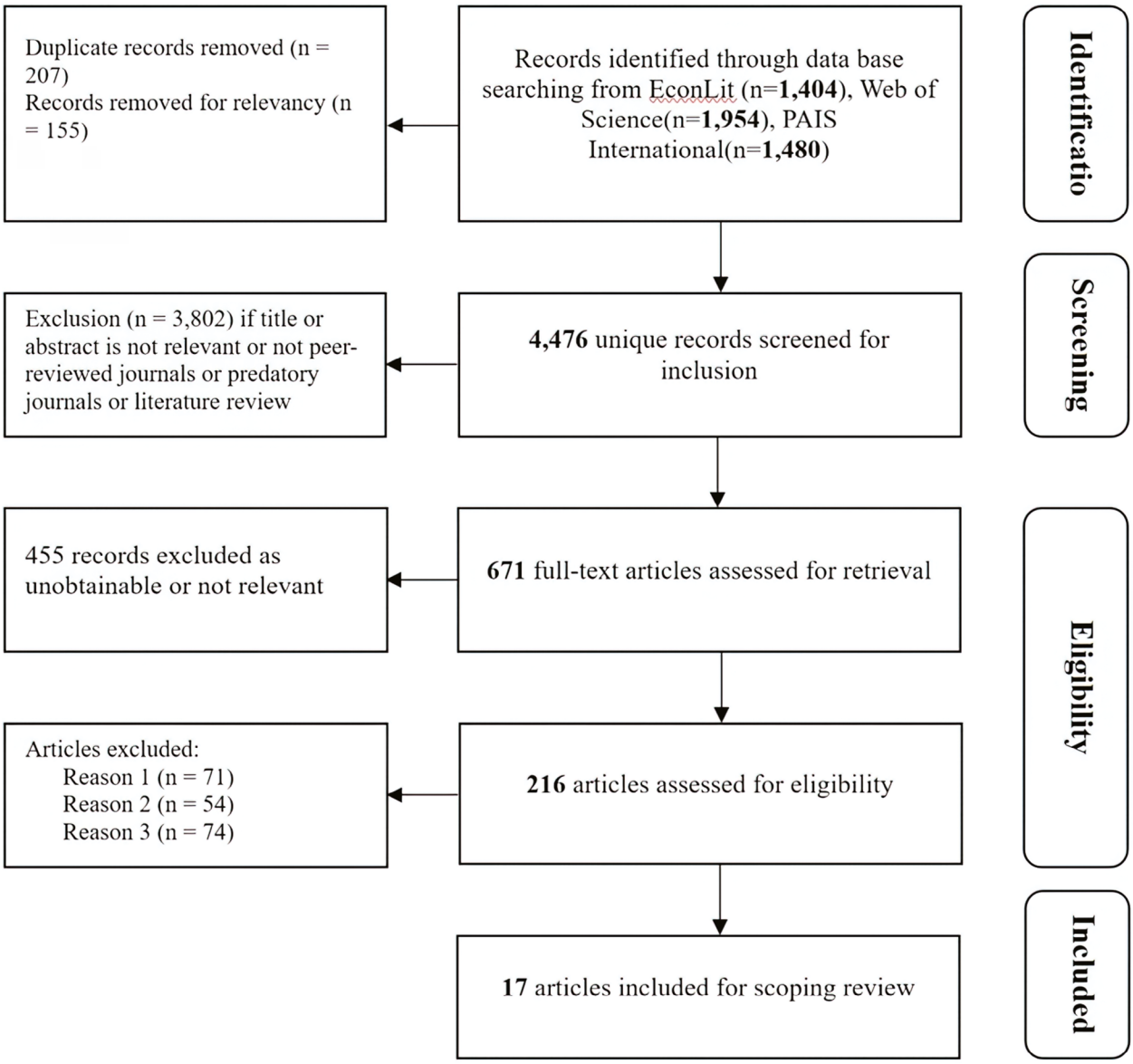


**Figure 1.** PRISMA flowchart for literature search and screening.

The inclusion criteria were further refined by selecting only research published after 2012.[4] This time frame was chosen to focus on the most recent developments and data on food supply systems in fragile states, especially given the rising frequency and severity of food price shocks, global crises, and conflicts in the last decade.

[4] We intentionally restricted the review to evidence published after 2012 for two reasons. First, the literature on food supply chain resilience shifted toward systemic resilience frameworks (e.g., FAO's Resilience Index Measurement and Analysis), integrating multi-dimensional factors like conflict, climate, and governance into food supply chain analyses. Earlier studies (pre-2012) largely focused on isolated price shocks or humanitarian responses, with limited emphasis on institutional or systemic drivers. By prioritizing post-2012 work, we ensure synthesis of literature that reflects modern and holistic understandings of fragility. Second, studies published post-2012 often re-examine historical crises (e.g., 2007–2008) using advanced econometric techniques (e.g., synthetic control methods, machine learning) and novel datasets (e.g., high-frequency price monitoring) that were unavailable or underutilized in earlier decades. For example, Alam *et al*. (2022) and Ihle *et al*. (2019) analyze pre-2012 shocks but leverage granular price volatility metrics and conflict event data developed post-2012. This retroactive analytical depth ensures consistency in evidence quality.

### *2.3 Exclusion criteria*

We used three specific exclusion criteria to exclude studies that were not relevant for this review. First, we excluded studies that focused solely on food security without addressing the food supply chain; the primary aim of this review is to explore the broader concept of food supply systems, rather than only food access or availability (Reason 1, 71 studies excluded). Second, research based on simulated data or studies lacking empirical evidence were excluded to ensure that the findings relied on actual observations and data from real-world contexts (Reason 2, 54 studies excluded). Finally, studies from countries that were not classified among the top 40 fragile states in the 2023 Fragile States Index were excluded (Reason 3, 74 studies excluded). This was done to ensure that the review focuses on food supply issues in the most vulnerable nations, where food systems are most likely to be disrupted by external shocks, conflict, and weak governance. At the end of the screening process, we are left with 17 peer-reviewed articles.

## 3. Results

This section discusses the results from our analysis. The studies used for our analysis in are listed in Table 1.

The studies in Table 1 are organized by geographical focus, starting at a global scale before delving into relevant literature from the Asia and Africa regions, respectively. The table shows the key focus of each study included, cites the study within parentheses below the corresponding key focus, summarizes the

**Table 1.** The summary of the studies used for the review.

| Key focus | Methodology | Main findings | Research gap/extension |
|---|---|---|---|
| Region of focus: Global | | | |
| Migration-food security linkages (Crush, 2013) | Cross-country household surveys | Migration reduces household food insecurity but risks brain drain | Limited analysis of remittance's impacts on local food supply stability |
| US food aid and civil conflict (Nunn and Qian, 2014) | Cross-country panel data analysis | US food aid increases conflict intensity due to insurgent targeting | Does not examine local food supply chain distortions caused by aid dependency |
| Region of Focus: Asia | | | |
| Southeast Asia | | | |
| Traceability in food supply chains (Aung and Chang, 2014) | Value chain analysis, case studies | Weak traceability in informal markets increases safety risks | Does not evaluate the cost-effectiveness of traceability systems in informal economies |
| Afghanistan | | | |
| Household coping to rising food prices (D'Souza and Jolliffe, 2012) | OLS models, household surveys | 33% decline in per capita food consumption; shift to cheaper, less nutritious foods | Narrow focus on household-level adjustments; lacks analysis of systemic supply chain failures |
| Long-term food insecurity and price shocks (D'Souza and Jolliffe, 2014) | Panel data analysis | Reduced dietary diversity (not caloric intake); urban households are more vulnerable | Does not address formal-informal market linkages during prolonged crises |
| Bangladesh | | | |
| The impact of refugee influx on food prices (Alam *et al*., 2022) | Natural experiment (DiD) | 8% price increase for protein-rich foods; aid mitigated spikes partially | Limited discussion of local production responses to demand shocks |

**Table 1.** Continued.

| | | | |
|---|---|---|---|
| Myanmar | | | |
| COVID-19 lockdown effects on urban prices (Goeb *et al*., 2022) | Retail price surveys, spatial analysis | 3% price rise in lockdown areas; informal markets stabilized supply | Does not include analysis of upstream agricultural production disruptions or long-term market restructuring |
| Rice value chains under political instability (Minten *et al*., 2023) | Value chain analysis, case study | Resilient rice chains despite 11% price rise; $0.5B welfare loss | Overlooks cross-border trade dynamics and spillover effects on regional markets |
| Palestine | | | |
| Political instability and food price volatility (Ihle *et al*., 2019) | Time-series econometrics | Staple prices are highly volatile due to political shocks (e.g., wheat +25%) | Does not explore grassroots market stabilization mechanisms during instability |
| Region of Focus: Africa | | | |
| Kenya | | | |
| Price-safety nexus in food markets (Hoffmann and Moser, 2017) | Product testing, regression analysis | Higher-priced foods safer; low-income households face contamination risks | Does not include trade-offs between safety regulation and supply chain accessibility for the poor |
| Burkina Faso | | | |
| COVID-19 food insecurity and coping strategies (Alam *et al*., 2024) | Household surveys, econometric analysis | Reliance on remittances buffered food price shocks; migration and informal markets are critical | Limited exploration of long-term resilience mechanisms beyond immediate shocks or interactions with climate stressors |
| Conflict-driven food system collapse (Béné *et al*., 2024) | Mixed methods (surveys, interviews) | 40–50% decline in trader operations; systemic collapse despite individual resilience | Does not have prescription for rebuilding post-conflict supply chains with formal-informal integration |
| Nigeria | | | |
| Coping strategies during 2015–2018 price shock (Quinton *et al*., 2024) | Longitudinal household surveys | Shift from savings depletion to credit reliance; remittances crucial | Limited insight into intergenerational or gendered impacts of coping strategies |
| Boko Haram's impact on food security (George *et al*., 2020) | Panel data (GHS) | Conflict reduced dietary diversity and portion sizes; indirect harm to agricultural inputs | Does not assess input market disruptions (seeds, fertilizers) or recovery pathways |
| Agricultural productivity and food insecurity (Villacis *et al*., 2022) | Panel data, IV regression | 10% productivity increase reduces reliance on less preferred foods (3.7%), dietary variety loss (3.9%), portion limits (1.9%) | Overlooks linkages between productivity gains and food distribution networks |
| Oil price shocks and food crop production (Obayelu *et al*., 2022) | Time-series regression | Oil price volatility reduced agricultural investment; staple crop yields declined | Does not discuss or study food imports as a possible buffer against domestic supply shocks |

methodology used, reports the main findings from the study, and identifies critical research gaps and/or potential extensions that are relevant to the study. The key findings from the studies are categorized into themes, and the identified research gaps are collated to form recommendations for future research in the next few sections. Figure 2 further helps visualize the themes, regional focus, and types of research gaps identified in the included studies.

We organize our key findings by categorizing them into four major thematic areas, corresponding to our four research questions, that provide a comprehensive understanding of the effects of food price shocks and food supply in fragile states. The first theme addresses research question 1 and explores the impact of food prices on the food supply chain, food availability, and food access in fragile settings. The second theme addresses research question 2 and explores the coping strategies employed by households in response to food supply disruptions. The third theme addresses research question 3 and investigates the role of informal food markets and their interactions with formal markets during periods of disruption. The last theme addresses research question 4 and delves into some of the barriers to the implementation of effective government policies and international interventions to stabilize food supply in fragile environments. To further facilitate mapping the section contents with the exact research questions addressed, we have added identifiers for each section, where *Qi* refers to the $i^{th}$ research question identified in the introduction section.

### *3.1 Impact of food price shocks on food supply (Q1)*

In this subsection, we address research question (1): "What is the impact of food price shocks on the food supply chain, and how does price volatility affect food availability and accessibility in fragile settings?" The literature shows that food price shocks have significant effects on food supply systems in fragile states. Food price shocks disrupt both household consumption and broader supply chain operations, particularly in places with weak institutions, political instability, and limited infrastructure. Two key dimensions of this disruption are (1) reduction in food availability and access, and (2) structural vulnerabilities that exacerbate the effects of price volatility.

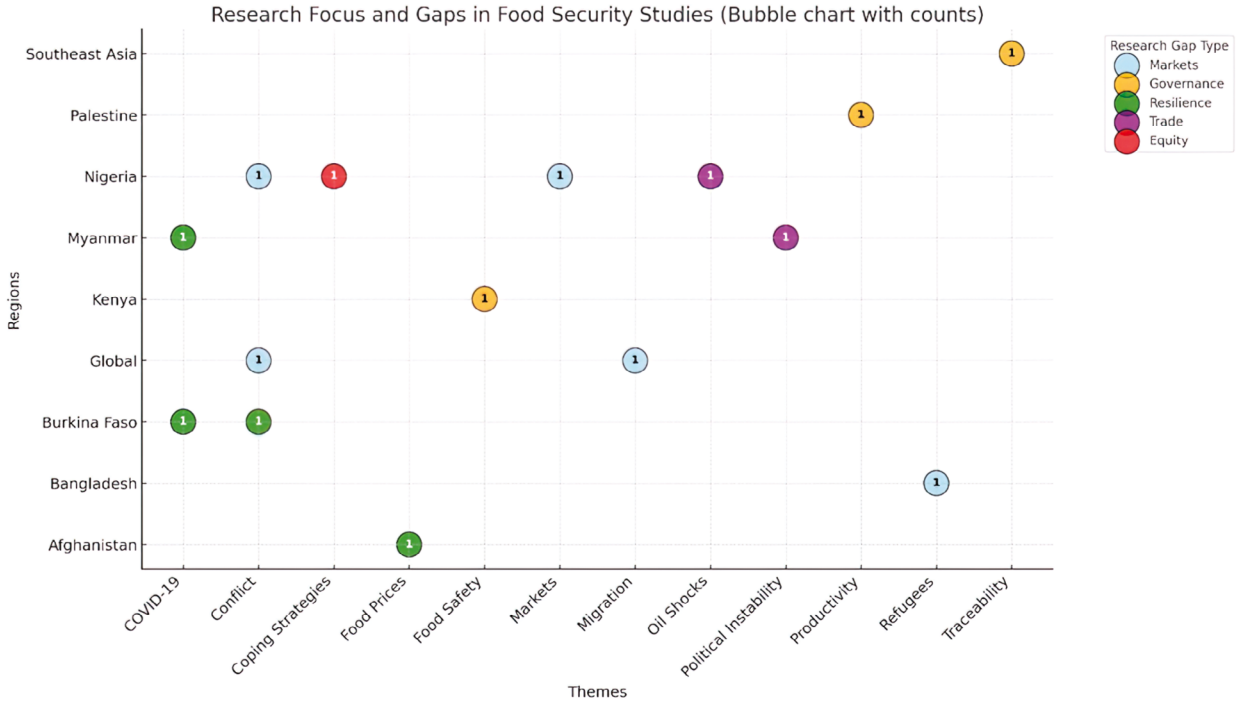


**Figure 2.** Research focus and gaps in included studies. Source: Authors' creation.

*Food availability and access*

While most of the literature on fragile states focuses on food security or food prices in isolation (Alinovi *et al*., 2007; George *et al*., 2020; Pingali *et al*., 2005). Studies that examine the broader implications of price shocks on food supply systems are in short supply. However, the existing literature consistently reveals that food price shocks significantly reduce food availability and access for vulnerable populations. For example, during the 2007–2008 global food crisis, Afghanistan experienced a 33% decline in per capita food consumption, which shows the direct impact of the food price inflation on household access to basic staples (D'Souza and Jolliffe, 2012). Similarly, during the military coup in Myanmar, retail rice prices rose by 11% on average, impacting access to staple food, especially for low-income households (Minten *et al*., 2023). These findings emphasize the urgent need for comprehensive strategies that address both the immediate and long-term impacts of price volatility on food supply in fragile states.

*Factors exacerbating price shocks*

The negative effects of food price shocks are often magnified by existing structural vulnerabilities such as political instability, weak governance, and economic dependence on external factors. In these environments, the modest price increases can destabilize the food systems and reduce affordability for low-income households. For instance, in Myanmar, the impact of the COVID-19 pandemic was compounded by the breakdown in governance, leading to a 3% increase in food prices in regions under COVID-19 lockdown, with particular price hikes seen in raw or lightly processed commodities (Goeb *et al*., 2022). This example shows that food price shocks cannot be viewed in isolation. Their impact is mediated by broader political and institutional conditions, which shape the degree to which the supply chains can be resilient or fragile under pressure. Addressing this challenge requires policies that not only support households from short-term price shocks but also strengthen the structural capacity of the food system.

*3.2 Coping strategies and adaptation measures (Q2)*

In this subsection, we address research question (2): "What coping strategies do households employ in these contexts, particularly in response to food supply disruptions?" Households in fragile states adopt various coping strategies to mitigate the adverse effects of food price shocks and disruptions to food supply. These strategies are particularly important in regions where state institutions are weak, formal safety nets are limited, and formal food supply chains are unreliable or inaccessible during crises (Ansah *et al*., 2021; D'Souza and Jolliffe, 2014; Quinton *et al*., 2024). In this section, we highlight three important household strategies observed in the literature: remittances, migration, and changes in food consumption. These strategies are often interlinked and form a part of broader financial and social strategies in communities that face long-term vulnerability.

*Remittances*

Remittances serve as an important financial coping strategy for households in fragile countries. For example, in Burkina Faso, families relied on cash transfers from relatives during the COVID-19 lockdown to sustain access to food amid the rising prices and economic disruption (Alam *et al*., 2024). These cash transfers not only helped smooth household consumption but also substituted for delayed or inadequate public assistance. Beyond meeting the immediate food needs of households, remittances also support long-term adaptation. In countries such as Afghanistan and Bangladesh, remittances were used not only to purchase food but also to invest in small-scale storage, strengthening household-level resilience (Choithani, 2017; Zezza *et al*., 2011). These examples show the dual role of remittances as both consumption support and capital for local food system engagement.

*Migration*

Migration is another widely used coping strategy in fragile countries. For example, faced with persistent food price volatility and limited economic opportunities, many households in Bangladesh and Afghanistan responded by sending family members to urban centers or abroad in search of income (Alam *et al*., 2022; D'Souza and Jolliffe, 2012). The remittances sent back by these family members become an important financial resource, enabling households to sustain access to food during periods of instability. This strategy reflects a broader pattern in fragile states, where mobility becomes a financial and survival tool during prolonged food insecurity (Crush, 2013; Zezza *et al*., 2011).

*Changes in food consumption*

Changes in food consumption are another common household strategy for coping with food price shocks in fragile states. When faced with rising food prices or supply disruptions, households typically respond by adjusting their consumption quantity, consumption quality, or both. Quantity responses involve overall reductions in food intake, while quality responses occur when households adjust their diets to maintain caloric intake levels. This typically involves shifting from a more diverse diet to a less diverse one. For example, in a study of the impact of wheat prices in Afghanistan, where wheat bread is a staple food, D'Souza and Jolliffe (2014) find that Afghan households respond by adjusting both the quantity and quality of food consumed in general, the specific coping strategy also depends on the household's relative position in the income distribution scale. Households at the top of the calorie distribution show the greatest decline in caloric intake, while the most vulnerable households, already near the minimum daily energy requirements, do not significantly reduce their caloric intake. Instead, these vulnerable households reduce dietary diversity, potentially sacrificing diet quality to maintain existing calorie levels.

*3.3 Informal markets and food safety (Q3)*

In this subsection, we address research question (3): "What role do informal food markets play, which are often crucial in times of crisis, and how do these markets interact with formal market systems during periods of disruption?" Informal food markets played a critical role in ensuring some level of resilience in the food supply. When formal food distribution systems break down due to conflict, pandemics, or natural disasters, informal markets often become the primary mechanism through which households get access to food. The resilience of informal markets lies in their flexibility, ability to set prices based on local conditions, and function without government support.

*Operational mechanism*

In many fragile states, informal markets dominate food supply systems due to institutional weaknesses, regulatory gaps, and logistical constraints (Aung and Chang, 2014; Béné *et al*., 2024). Unlike formal market systems that rely on standardized contracts, regulated prices, and centralized logistics, informal markets operate through decentralized price-setting and flexible supply chains, where prices are determined by localized bargaining, real-time assessments of scarcity, and transport availability. Transactions typically occur without written contracts, with suppliers negotiating directly with farmers or intermediaries based on trust and informal credit arrangements. This flexibility enables informal markets to respond swiftly during crises. For example, following the 2003 conflict in Iraq, Looney (2006) observed that the informal economy, including the food supply chain, was the only functioning sector, sustaining access to essential goods. Similarly, during the 2021 military coup in Myanmar, rice traders used informal channels to export their rice (Minten *et al*., 2023). These examples show that informal markets are closely connected to the local communities and can react more quickly and effectively to shocks than formal systems.

*Informal food markets and food safety concerns*

Despite their importance in maintaining food availability, informal markets often pose a serious risk to food safety. Their unregulated nature means that food products are frequently exposed to contamination throughout the supply chain. Traders may store or handle food in unsanitary conditions, lack access to clean water or refrigeration, and operate without oversight from food safety authorities (King *et al*., 2017). These risks are serious for low-income families, who often rely on informal food markets and have limited means to access or manage food safety. Hoffmann and Moser (2017) highlighted that these markets rarely invest in quality assurance systems, making them more prone to distributing unsafe or substandard food. The limited consumer protection in these markets makes households more vulnerable to foodborne illness and nutritional deficiencies, especially in fragile environments.

*Price and food safety dynamics*

Some studies show a connection between food prices and food safety in informal markets. For example, Hoffmann and Moser (2017) shows that higher-priced food brands are more likely to meet safety standards, as traders with reputational stakes invest in quality control and are more closely monitored. In contrast, lower-priced foods tend to bypass these safety investments. This has significant implications in fragile states, as the majority of low-income consumers are priced out of formal markets. As a result, these households face a trade-off between affordability and safety; purchasing cheaper food exposes them to health risks. This reinforces structural disparities, that is, although informal markets help households to access food during crises, these markets can simultaneously deepen vulnerability to foodborne disease and long-term malnutrition. This situation creates a big challenge for policymakers: how to support the flexibility of informal markets while also fixing the food safety issues. Thus, in fragile states, there is a need to provide education on food safety while building better infrastructure to support food supply.

*3.4 Barriers to government policies and international interventions (Q4)*

In this subsection, we address research question (4): "What are the barriers to the effective implementation of government policies in stabilizing food supply in fragile environments?" Government policies and international interventions are critical in stabilizing food supply during crises, particularly in fragile states (Ihle *et al*., 2019; Obayelu *et al*., 2022). Unfortunately, fragile state Governments often meet persistent barriers that limit their abilities to implement policies effectively. These include weak institutional capacity, logistical bottlenecks to short-term policies, and poor coordination among various government departments and other stakeholders. We synthesize some of the key evidence on how these barriers undermine both national and international efforts to stabilize the food systems during crises below.

*Government interventions and their limitations*

Governments in fragile states implement measures such as food subsidies, price controls, and direct distribution programs to protect food access during crises. However, the effectiveness of these interventions is often undermined by weak infrastructure, corruption, and a lack of long-term strategic planning. For example, price controls and subsidies failed to mitigate the escalation of food prices during the 2007–2008 food crisis and the COVID-19 pandemic in Afghanistan and Myanmar (D'Souza and Jolliffe, 2012; Goeb *et al*., 2022). In many cases, these policies provide only temporary relief and do not reach the most vulnerable populations.

*International interventions and their challenges*

International aid has also played a significant role in stabilizing food prices and availability during periods of acute shortages in fragile states (Nunn and Qian, 2014; Tadesse and Shively, 2009). However, international interventions often suffer from coordination failures, duplication, or dependency risks. In addition, the

temporary nature of these interventions means that they often fail to address the root causes of food insecurity, such as low agricultural productivity, inadequate infrastructure, and weak governance. For example, in Kenya, external food assistance programs were essential in providing relief and ensuring food security during times of crisis, such as droughts or conflict-induced disruptions (Hoffmann and Moser, 2017). However, questions remain about the sustainability of these programs and their ability to strengthen long-term food. Although it is evident in the literature that government interventions and international aid programs are critical for emergency response to crises, they are often insufficient in creating long-term structural changes to the food supply systems in fragile contexts.

*Assessing and achieving policy effectiveness*

A significant thread emerging from this review concerns the effectiveness of government policies, national and international interventions, and strategic private sector initiatives aimed at stabilizing food supply and mitigating the impacts of price shocks in fragile states. While the literature (as explored in Section 3.4) acknowledges the intent and occasional short-term necessity of such intervention, ranging from price controls and subsidies to food aid, a consistent finding is that their effectiveness in reaching the impoverished and sustainability in the long term is lacking. The inherent characteristics of fragile states, including weak governance, political instability, corruption, inadequate infrastructure, and a lack of long-term strategic planning, frequently undermine policy implementation and a congenial atmosphere for the private sector to thrive. For example, interventions like price controls may fail to contain price escalations or can lead to unintended market distortions. Furthermore, while external assistance can provide crucial immediate relief, its impact often remains temporary, failing to address the systemic vulnerabilities or build sustainable local capacity both for the society and its enterprises. A critical gap identified is the lack of robust, context-specific evidence on how to implement policies and corresponding programs. Hence, there is a need for future research to focus more on the implementation of policies and adaptive supply chain management practices.

## 4. Discussion and policy recommendations

We find that food price shocks lead to significant decreases in food consumption and dietary diversity, among urban households, and with the most severe effects among those without access to agricultural lands. In response to these challenges, households often rely on coping strategies such as migration of family members, reliance on informal markets, and the use of remittances for food purchases, which serve as lifelines during food price volatility and supply disruptions.

The studies we reviewed have consistently shown that informal food markets play a crucial role in maintaining food supply during crises. While this helps vulnerable populations at the outset, it raises serious concerns about food safety and quality. Informal markets are often unregulated and lack oversight, which may expose vulnerable populations to unsafe food products, exacerbating health risks. Strengthening regulatory frameworks to ensure food safety in these markets is therefore imperative.

The findings of this review have important policy implications. First, strengthening food safety standards in both formal and informal markets is essential to reduce contamination risks, which are particularly high in regions with weak regulatory frameworks. Informal markets, which often serve as critical food sources for vulnerable populations, are typically unregulated, leading to higher risks of unsafe food. Governments should extend regulatory oversight to the informal sector, including establishing food safety monitoring systems, regular inspections, and food safety certification processes for informal vendors. Considering the complexity around developing and implementing quality standards to regulate informal markets and weak institutional enforcement capacity in fragile states, we recommend implementing phased and multi-faceted interventions. Specifically, governments could start a pilot food quality regulatory program in a specific region and learn what works and what does not. Once a reasonable regulatory framework is identified, it could scale up the program nationally. For example, in the short run, the pilot program could (1) offer informal

vendors basic training on food safety practices at no cost, and (2) run weekly quality checks of street food stalls. In the long run, it could require informal markets to secure a food safety license to be able to operate an informal market. Vendors seeking the food safety license could be required to complete the food safety training and meet other food safety requirements as needed. Implementing stronger food safety measures in these markets can protect public health while ensuring that food safety standards are met across all levels of the food system. Additionally, governments can formalize small-scale food vendors, offering them support in meeting safety standards and transitioning from informal to formal market structures in the long run.

Second, boosting local food production by investing in agricultural infrastructure is crucial for increasing the resilience of food supply systems in fragile states. For example, better storage facilities, transportation networks, and irrigation systems are necessary to enhance food production and ensure smooth distribution. The lack of adequate storage facilities, for instance, is a common issue in fragile states, where food often perishes before it can reach the market. This inefficiency not only results in food waste but also drives up food prices. Building proper storage infrastructure, such as cold chains for perishables and silos for grains, would help farmers store their produce longer, allowing them to sell it when prices are more favorable. Additionally, strengthening transportation networks would ensure that food can be efficiently distributed from rural areas to urban centers, where demand is higher. Expanding access to irrigation systems would allow farmers to produce food year-round, reducing the vulnerability of food production to seasonal changes and climate-related shocks. This combination of infrastructure investments would create a more reliable and resilient food supply, reducing the fragility of food systems in these regions.

Third, government and international aid programs must shift their focus from short-term emergency responses to long-term sustainability. We know that government and international interventions are essential for stabilizing food prices and ensuring access to food, but these efforts are frequently insufficient in fragile states. In addition, while food aid or subsidies are important during crises, these measures cannot address the underlying vulnerabilities of food systems in fragile states. International aid can be more effective when it targets long-term capacity building, such as providing technical support for local farmers, introducing drought-resistant crop varieties, and improving access to markets. This long-term approach requires collaboration between governments, international donors, NGOs, and local communities to create a shared vision of food security. Governments should invest in rural development programs that can help farmers increase their yields, diversify their income sources, and improve food access for their communities.

Finally, it is vital to address market segmentation and ensure that food safety measures are extended to poorer households, especially those dependent on informal markets. The poorest households, often living in rural or marginalized areas, are more likely to rely on informal food markets, which may offer lower-priced but potentially unsafe options. Governments can ensure that all households, regardless of their income or location, have access to safe and nutritious food by extending food safety regulations to informal markets and addressing market disparities.

In addition to these policy recommendations, the findings from this review have several important implications for small to large agribusiness owners, managers, and executives working in fragile food systems. They can partner with researchers and development practitioners (illustrated by Baker *et al*., 2026) to implement and measure impactful extension programs. Program managers in NGOs and development agencies should consider informal markets not as obstacles, but as critical avenues in ensuring food security. Rather than imposing formal regulations outright in these markets, implementing basic training in food safety, deploying community-based inspection mechanisms, and piloting mobile-based certification tools may offer more feasible starting points. Similarly, private-sector actors, including processors, input suppliers, and small-scale distributors, can play an important role in stabilizing food supply chains by adopting inclusive business models that respond to local constraints. Such models may involve shared-risk contracts, investments in decentralized logistics, or partnerships with grassroots organizations, and using farmer networks through ICT technologies.

Likewise, development partners and local governments can further support these efforts by investing in infrastructure and digital tools that enhance the flexibility, transparency, and responsiveness of food systems in fragile contexts. These practical approaches can complement formal policy reforms and contribute to building more resilient and equitable food systems. Additionally, it is important that agribusinesses and project implementers use novel approaches to data generation and perform predictive analysis (Kibriya and Fatema, 2025) to understand supply and pricing dynamics in fragile areas of the world. More data-driven analysis is required to predict emergencies and avoid market failures in fragile areas.

## 5. Conclusion

We synthesize empirical literature on the impacts of food price shocks and food supply chain disruptions in fragile states using a scoping review. We started with close to 5000 studies but came down to 17 peer-reviewed articles after a meticulous review following a series of exclusion/inclusion criteria. We find that food price shocks lead to significant decreases in food consumption and dietary diversity in fragile states. Households cope with these shocks by sending family members away, relying on informal food markets, and using remittances for food purchases. The studies we reviewed consistently showed that informal food markets play a crucial role in maintaining food supply during crises. While this helps vulnerable populations at the outset, it raises serious concerns about food safety and quality. We also find that the literature has underscored the importance of government interventions and international aid in both providing immediate food access during crises and ensuring long-term stability and sustainability. However, no concrete recommendations are provided on how these agencies can work to mitigate the negative effects of food price shocks and supply chain disruptions.

We provide several practical recommendations for governments and international agencies to consider. In conclusion, strengthening food safety standards, investing in local agricultural infrastructure, transitioning to long-term sustainability in aid programs, and addressing market segmentation are key strategies that can help fragile states better withstand the shocks that threaten the food supply. By improving food systems in fragile regions, governments and international organizations can reduce vulnerability, promote resilience, and work toward achieving long-term food security in some of the most economically and politically fragile areas of the world.

We also identify several key research gaps that future studies should focus on. First, future research should investigate how informal markets contribute to food supply chain resilience in fragile states, not only as temporary coping mechanisms during crises, but as evolving systems with potential for institutional integration. This can help identify how informal markets might be incorporated into broader food system resilience strategies. Second, research is needed to explore strategies for building sustainable food safety and regulatory frameworks suited to fragile states. Although some studies highlight the food safety risks inherent in informal markets (e.g., Hoffmann and Moser, 2017), there is limited guidance on feasible regulatory strategies in settings with weak institutional capacity. Future research could examine the design and implementation of low-cost, scalable food safety interventions (such as vendor training programs or community-based inspection systems) that are socially acceptable and contextually appropriate in fragile environments.

Third, future research should examine how food price shocks affect various components of the food supply system in fragile states and how these disruptions ultimately influence household food security. Given the frequency and intensity of shocks in such contexts, it is important to understand how price volatility transmits through supply chains, from producers to consumers. Empirical studies are needed to explore how disruptions in one segment of the system (e.g., input supply, transport, retail) generate ripple effects throughout the broader food economy. Fourth, there is a clear need for micro-level studies that explore localized responses to food system shocks. These include changes in production behavior, adaptations within supply chains, and the potential role of ICT-based innovations such as digital platforms for input distribution or price alerts, in enhancing resilience. ICT applications can improve transparency, reduce information asymmetries, and

support more efficient market coordination during crises. Importantly, ICT can also complement informal markets by lowering transaction costs for traders and consumers while creating opportunities for integration with formal supply chains. Understanding how ICT can both stabilize short-term shocks and foster long-term resilience will be important for designing adaptive food supply systems in fragile environments.

Finally, future research should investigate the role of the private sector in mitigating the adverse impacts of food price shocks on food availability and accessibility. Particular attention should be given to identifying effective and context-appropriate business models. Research in this area could explore how market-based innovations, risk-sharing mechanisms, and inclusive value chains can strengthen resilience and reduce vulnerability. By addressing these gaps, future research can offer more targeted and practical policy recommendations for governments and development agencies. Expanding our understanding of private sector engagement can also inform global efforts to reduce hunger, build resilient food systems, and improve the ability of fragile states to respond to crises.

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