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Disciplining Importers, Sparing Exporters: A Bibliometric Analysis and Systematic Review of Food Security in International Trade Law, 2000-2025

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Abstract

Food security has moved from a peripheral non-trade concern to a central fault line of international trade law, yet scholarship remains divided among legal doctrine, agricultural economics, and international political economy. This study combines a bibliometric map of 218 Scopus-indexed articles published between 2000 and 2025 with a consensus-coded systematic review of 28 full-text studies. Nearly half of the scholarship (46%) appeared after 2020, authorship diffused from Northern centers toward India and Indonesia, and the field's vocabulary pivoted from trade liberalization to export restrictions, public stockholding, and the right to food after the 2008 price crisis, the 2013 Bali Ministerial, COVID-19, and the Russia-Ukraine war. Synthesizing four thematic clusters, we advance five testable propositions that describe a self-reinforcing governance trap. Multilateral rules discipline the import controls and price support of net food-importing developing states far more tightly than the crisis-magnifying export restrictions of major suppliers; recurrent shocks drive defensive demands for policy space; weak justiciability channels the right to food into diplomatic bargaining; and deadlock shifts rule-making to bilateral, unilateral, and crisis-specific forums that reproduce the original asymmetry. Across the literature, policy prescriptions follow authors' theoretical paradigms more closely than the crises they study.

1. Introduction

Food security entered the multilateral trading system as a subordinate non-trade concern in the preamble of the World Trade Organization (WTO) Agreement on Agriculture (AoA), where early post-Uruguay Round debates asked whether domestic farm support represented legitimate multifunctionality or disguised protectionism(Potter & Burney, 2002). Two decades of systemic shocks inverted that debate. From the 2007–2008 global food price crisis and the 2013 Bali Ministerial standoff over public stockholding (Margulis, 2024; Narayanan, 2015) to COVID-19 and the 2022 Russia-Ukraine war (Ben Hassen & El Bilali, 2022), the central question is no longer merely tariff reduction, but how trade law allocates supply risk between grain exporters and food-importing populations when markets fracture under export bans, quotas, and taxes (Fellmann et al., 2014; Götz et al., 2013).

Despite this transformation, scholarship remains split across disciplinary silos. International economic lawyers analyze General Agreement on Tariffs and Trade (GATT) Article XI exceptions and AoA Amber Box formulas; agricultural economists simulate spatial price transmission and micronutrient losses; international relations scholars trace regime complexes and paradigm mixes (Daugbjerg et al., 2017; Margulis, 2013); and agrarian scholars debate whether trade can ever align with food sovereignty (Burnett & Murphy, 2014). Because these traditions rarely converse, econometric proofs of how export restrictions transmit hunger remain disconnected from legal explanations of why those restrictions escape WTO discipline and political accounts of why developing coalitions mobilize human rights in trade negotiations.

Existing reviews do not close this gap. Bibliometric maps of food security research treat trade as one theme among land use, climate, and nutrition and do not examine the legal rules that govern trade measures (Xie et al., 2021), while doctrinal and policy reviews of WTO agricultural negotiations trace the history of specific mandates without measuring how the field as a whole has evolved (McMahon, 2024; Sharma, 2025). To our knowledge, no study has coupled a performance and conceptual map of the trade-law and food security nexus with a full-text synthesis that tests how legal rules, market shocks, and rights claims interact.

This article bridges those divides across four questions: (1) how publication volume, geography, institutional leadership, and conceptual vocabularies evolved from 2000 to 2025 alongside major crises and WTO ministerials; (2) which theories, legal instruments, empirical objects, and methods structure accessible full-text research; (3) where empirical and legal findings converge or clash, and why scholars studying identical crises prescribe opposite remedies; and (4) what integrated conceptual framework and research agenda emerge. Combining a bibliometric map of 218 Scopus-indexed articles with a consensus-coded systematic review of 28 full-text studies, we formulate five propositions showing how asymmetric trade rules, supply shocks, and weakly enforceable human rights interact in a closed institutional loop. The article makes three contributions. Empirically, it offers an integrated map of the field's growth, geography, and conceptual turnover across four

crisis periods. Analytically, it shows that the field's central disagreements are driven more by theoretical paradigm than by evidence. Theoretically, it extends regime-complex theory(Alter & Meunier, 2009) by showing that regime shifting (Helfer, 2004) in food trade runs in two directions at once: weaker states move claims into human rights language and forums, while stronger states and investors move rule-making into preferential, unilateral, and arbitral venues.

2. Methods

2.1 Search strategy and dataset

Scopus was queried on 4 November 2026 using TITLE-ABS-KEY (("food security" OR "food sovereignty" OR "right to food") AND (wto OR "trade law" OR "export restriction*" OR "agreement on agriculture" OR "international law")) for 2000–2025, returning 583 records. Filtering for peer-reviewed articles (excluding 257 items), English language (excluding 27), academic journals (excluding 4), and final publication stage (excluding 2) left 293 records. Restricting the subject area to Social Sciences removed 75 peripheral items, yielding a bibliometric corpus of 218 articles following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 flow(Page et al., 2021; Fig. 1).

2.2 Bibliometric procedures

The bibliometric mapping follows the performance-analysis and science-mapping logic set out byDonthu et al. (2021) and covers all 218 records. Country output was measured by full counting across the 211 records with affiliation data, crediting one count per country represented on an article, while authors were disambiguated via Scopus identifiers and institutions standardized at the organization level. Author keywords across 171 records were normalized to lowercase. To trace conceptual turnover, 25 thematic expressions were tracked across titles, abstracts, and keywords over four periods: 2000–2007 (early Doha Round), 2008–2013 (food price crisis to Bali MC9), 2014–2019 (post-Bali contestation), and 2020–2025 (COVID-19 and Russia-Ukraine polycrisis). Abstract vocabulary across 217 records was compared by total occurrences and document spread after stop-word removal.

2.3 Systematic review procedures

For the systematic review, full-text files were sought for all 218 records, yielding 59 open-access files. Document verification excluded eight mismatched files and one incomplete file, leaving 50 verified reports for eligibility screening. Inclusion required that food security, food sovereignty, or the right to food be a central object of analysis examined directly through international trade law, WTO rules, or an intersecting international legal regime in an English full text. Twenty-two reports were excluded at eligibility assessment (21 where the trade-food nexus was peripheral and one in Spanish), leaving 28 studies for qualitative synthesis.

Both authors independently read all 28 full texts, extracted theoretical frameworks, objects, methods, and findings, and settled all thematic classifications and analytical coding by consensus. Verbatim textual evidence was compiled from each study to anchor every claim. Inductive comparison across the four thematic clusters yielded five propositions (P1 to P5), with each study coded by consensus as supporting or contradicting and qualifying each proposition, weighting synthesis by citation impact and methodological rigor. Because proposition coding was interpretive and iterative, we report consensus decisions anchored in verbatim evidence rather than an agreement coefficient, in line with debates on when agreement statistics add value to qualitative coding(O'Connor & Joffe, 2020).

Three boundaries frame interpretation. First, data derive from a single curated database, Scopus. Second, full-text inclusion required verifiable open-access availability: full texts could be retrieved for 59 records (27% of the corpus), and the review synthesizes 28 of them (12.8%). The systematic review therefore tests the causal mechanisms of recent scholarship, while high-impact earlier landmarks whose full texts could not be retrieved or verified, such asPotter and Burney (2002), Götz et al. (2013), Margulis (2013), and Burnett and Murphy (2014), remain fully integrated in the bibliometric map and frame the

historical narrative and conceptual periodization. Third, interpretive judgment in proposition coding was mitigated through dual-author consensus and verbatim evidence verification.

2.4 Representativeness and robustness checks

Three checks assess whether open-access selection biases the synthesis. First, we compared the citation counts of included and non-included records with Mann-Whitney U tests, using both raw counts and counts normalized by years since publication. Second, because open-access availability is concentrated after 2020, we compared the prevalence of the 25 tracked concepts in included and non-included records within the 2020–2025 period using Fisher exact tests, which separates selection effects from temporal effects. Third, we read the abstracts of the 15 most-cited records outside the review and coded each as supporting, qualifying, or not addressing P1 to P5, applying the decision rules used for full-text coding. Results are reported in Section 6.1.

3. Bibliometric Results

3.1 Output over time

Across 2000–2025, the 218 articles were written by 362 authors and accrued 4,889 citations (22.4 per document). Reflecting doctrinal legal norms, 56% of the corpus (122 articles) is single-authored. Output is led by Food Policy (12 articles), Journal of World Trade (9), Quarterly Journal of International Agriculture (8), Food Security (7), Transnational Legal Theory (6), and Journal of International Trade Law and Policy (6). Citation impact is led by Ben Hassen and El Bilali (2022; 652 citations) on the Russia-Ukraine war, Long et al. (2010; 468) on rural restructuring in China, Tomlinson (2013; 347) on productivist discourse, and Potter and Burney (2002; 257) on agricultural multifunctionality.

Scholarly production moves in crisis-driven waves synchronized with commodity shocks and WTO Ministerial Conferences (Fig. 2). In the first period (2000–2007, 25 documents, 11.5%), output clustered in 2000 (8 articles) ahead of the Doha Round launch before dropping to one to three articles annually during 2004–2007. The 2007–2008 global food price crisis sparked a second wave (2008–2013, 43 documents, 19.7%), peaking at 18 articles (862 citations) in 2013 when public stockholding nearly deadlocked the Bali Ministerial (MC9). A third wave (2014–2019, 49 documents, 22.5%) followed the 2015 Nairobi Ministerial (MC10) and hit 16 articles in 2018 amid United States-China trade tensions and the UN Declaration on the Rights of Peasants. The fourth period (2020–2025) generated nearly half of the corpus (101 documents, 46.3%), rising from 15 articles in 2020 (COVID-19) to 16 in 2022 (MC12 and the Ukraine war) and a record 24 in 2024.

3.2 Countries

Affiliated scholars span 51 countries across 211 records with address data, including 36 multi-country articles (17%; Fig. 3). Output is led by the United States (38 documents), the United Kingdom (27), India (24), Australia (19), China (14), Italy (13), Germany (11), Indonesia (10), Canada (9), and South Africa (9). Period disaggregation reveals a structural shift from the Global North toward Global South demandeurs (Fig. 4). Whereas the United States (7) and the United Kingdom (4) dominated 2000–2007 and Australia entered from 2008, India grew sixfold from 2 articles in 2000–2007 to 3 in 2008–2013, 7 in 2014–2019, and 12 in 2020–2025, tracking its G33 leadership and National Food Security Act. Indonesia produced 8 of its 10 articles in 2020–2025 following WTO import-licensing disputes, and Italy produced 10 of its 13 in 2020–2025 alongside Rome-based UN food agencies, joined after 2020 by Ukraine (3), Vietnam (3), Jordan (2), Qatar (2), and Nigeria (2). Yet all African institutions combined appear in just 17 documents and Latin American institutions in 7, leaving import-dependent regions primarily as objects rather than authors of trade scholarship.

3.3 Authors and institutions

Authorship is dispersed: 339 of 362 authors (94%) published once in the corpus, entering episodically during crises (Fig. 5a). Matias E. Margulis leads with a continuous decade-long programme across trade law and global governance (7 articles, 272

citations, 2013–2024). Sustained contributors include Jagjit Kaur Plahe (3 articles, 59 citations, 2009–2013) on TRIPS and the AoA; Michael Fakhri (3 articles, 28 citations, 2018–2022), bridging scholarship and his mandate as UN Special Rapporteur on the Right to Food; Sachin Kumar Sharma (3 articles, 26 citations, 2019–2024, plus a 2025 keynote) and Ahamed Ashiq Shajahan (3 articles, 8 citations, 2023–2024) on WTO subsidy rules; and Linde Götz and Thomas Glauben (2 articles each, 134 citations, 2013–2019) on grain export controls. Institutional leadership shifted from Northern policy centers (IDS and the OECD) toward Monash University (5 articles, 2009–2023), New Delhi's Indian Institute of Foreign Trade (4, 2019–2024) and Centre for Trade and Investment Law (2, 2020–2023), the Graduate Institute Geneva (3), the International Water Management Institute (3), and the University of British Columbia (3; Fig. 5b).

3.4 Topics, concepts and theories

Normalized author keywords are led by food security (80 documents, mean year 2016.6), WTO (40, 2017.1), right to food (25, 2019.3), food sovereignty (21, 2016.9), agreement on agriculture (13, 2018.3), agriculture (12), human rights (12, 2020.0), climate change (11, 2019.0), export restrictions (9, 2020.2), and international law (9, 2020.2). Tracking 25 concepts across periods shows a sharp paradigm shift (Fig. 6). In 2000–2007, debate centered on trade liberalisation (60%, 15 of 25 documents), the AoA (24%), policy space and special and differential treatment (24%), the Doha Round (16%), subsidies (16%), and multifunctionality (12%). By 2020–2025, trade liberalisation fell to 8%, Doha to 3%, and multifunctionality to 2%, replaced by three crisis agendas: export restrictions rose from 0% before 2008 to 19% in 2008–2013 and 16% in 2020–2025 alongside price volatility (21% in 2008–2013); public stockholding jumped from 0% to 10% after Bali alongside dispute settlement (4% to 9%); and rights frameworks surged as food sovereignty hit 20% in 2014–2019, the right to food climbed from 8% to 27%, and human rights reached 25% in 2020–2025, alongside climate change (15%), sustainable development (14%), COVID-19 (13%), and the Ukraine war (12%).

Theoretical lenses shifted in parallel. Constructivist analyses of norms and ideas tripled from 8% in 2000–2007 to 24% (12 of 49 articles) in 2014–2019 and 13% in 2020–2025 to explain Doha deadlocks and Global South counter-mobilization. Regime complexity and legal fragmentation emerged after 2008 (5%) and reached 7% in 2020–2025, critiques of neoliberalism peaked at 8% in 2014–2019, and resilience (4% to 5%) and judicial enforceability (4%) entered after 2014. Quantitative economic modelling remained a steady minority throughout (4% to 9%), confirming the predominance of legal and political economy approaches.

3.5 Vocabulary of abstracts

Comparing word occurrences against document spread across 217 abstracts exposes the field's internal structure (Fig. 7). By total occurrences, top words are food (775), trade (373), security (299), international (261), countries (233), wto (206), agricultural (181), world (164), law (157), global (150), agriculture (138), right (138), policy (135), export (110), and economic (108). By abstract spread, top words are food (205 abstracts, 94%), security (158), trade (124), international (120), wto (106), world (103), countries (96), agricultural (80), agriculture (79), global (74), policy (69), law (67), agreement (63), economic (61), and development (59). Whereas "agreement" (63 abstracts, 1.43 per abstract) and "development" (59 abstracts, 1.51 per abstract) form shared background vocabulary, "right" (138 occurrences in 47 abstracts, 2.94 per abstract) and "export" (110 occurrences in 43 abstracts, 2.56 per abstract) mark intensive specialist enclaves on human rights and export controls.

4. Systematic Review Results

4.1 Theories, objects and methods

Consensus coding groups the 28 full-text studies into four thematic clusters (Table 1): multilateral rule-making, normative contestation, and institutional intervention at the WTO (T1, 6 studies, 21.4%); external trade shocks, network concentration, and export restrictions as drivers of food and nutritional insecurity (T2, 10 studies, 35.7%); national policy space, public stockholding, and import controls under WTO rules (T3, 4 studies, 14.3%); and the enforceability and fragmentation of the

right to food across international humanitarian, environmental, energy, biotechnology, and gender regimes (T4, 8 studies, 28.6%).

Each cluster deploys distinct theories and methods. Cluster T1 uses constructivist political economy, regime complex theory, food sovereignty, and legal history. Cluster T2 relies on agricultural economics, employing recursive-dynamic partial equilibrium, static stochastic computable general equilibrium (CGE), complex trade networks, threshold error correction, time-varying vector autoregression, and causal process tracing, alongside one neoliberal regime critique. Cluster T3 pairs autoregressive distributed lag (ARDL) price econometrics with doctrinal analysis of the right to regulate under the AoA and GATT. Cluster T4 mobilizes public international law on social rights justiciability, substantive equality, inter-legality, and regime fragmentation. Overall, 12 studies use legal analysis, 7 use quantitative models, and 9 use qualitative case or process-tracing methods; notably, zero studies combine doctrinal legal analysis with econometric modelling.

Empirical objects cluster around the same fault lines: India and Indonesia as defenders of public procurement and domestic market stabilization; Russia, Ukraine, and Kazakhstan as pivotal Black Sea grain exporters; China as a major importer managing bilateral trade uncertainty; and net food-importing economies in Central Asia, the South Caucasus, Jordan, and the Middle East and North Africa (MENA) as shock absorbers. Legal analysis focuses on AoA subsidy formulas, GATT Article XI quantitative restrictions, fisheries subsidies, the Trade Facilitation Agreement, and Article 11 of the International Covenant on Economic, Social and Cultural Rights (ICESCR).

Across two analytical dimensions (multilateral regimes in T1 and T4 versus domestic policy in T3; legal rules in T1 and T3 versus market impacts in T2), the four clusters are functionally interdependent. Cluster T2 supplies the causal premise for the entire literature: because export bans, concentrated trade networks, and war blockades inflict severe price and micronutrient shocks on import-dependent states, developing countries demand policy space in T1 and T3 and invoke human rights in T4. Conversely, T4 explains why rights claims appear in WTO diplomacy (T1): weak judicial enforceability pushes actors from courts into political bargaining. Reflecting this division, T2 contains the most cited articles(Ben Hassen & El Bilali, 2022; Fellmann et al., 2014; Zhang et al., 2021; Svanidze et al., 2019), whereas T4 represents the newest legal frontier.

Table 1
Studies included in the systematic review, findings and relation to propositions P1 to P5.

Study and title	Theory or concept; method	Main finding	Propositions
T1. WTO rule-making, norms and regime contestation			
Margulis (2021). Intervention by international organizations in regime complexes	Regime complex; illustrative case studies	FAO, WFP and OHCHR secretariats intervened to alter WTO decisions by mobilising states, shaming and invoking other law.	P3+, P4+
Margulis (2024). Rights redux: The return of human rights at the WTO	Norm mobilisation; comparative case study	G33 invoked the right to food to reframe public stockholding; rights now expand developing-country policy space.	P2+, P3+, P4-
Fakhri (2022). Human rights principles for trade	Food sovereignty; normative essay	The Agreement on Agriculture failed poorer countries; dignity, self-sufficiency and solidarity are proposed as trade principles.	P2+, P3+, P4+
McMahon (2024). Negotiations on food security at the WTO: A never-ending story?	Doctrinal; WTO documents, 1996–2024	No real progress in twenty years; stockholding, safeguard and export-restriction disciplines remain unresolved.	P1+, P3-, P5+
Sharma (2025). Evolving trade regimes: Multilateral stalemates and emerging challenges in agricultural trade	Policy space; legal and policy review	Fixed reference prices restrict stockholding; rule-making migrates to trade agreements and unilateral measures.	P1+, P2+, P5+
Krishnan & Gopalakrishnan (2025). Indian fisheries, growth and environmental sustainability in the context of WTO regulations	Sustainable development; secondary data synthesis	Fisheries-subsidy talks stall over differential treatment; artisanal fishers who sustain food security are exposed.	P2+, P5+
T2. Trade shocks and export restrictions as transmission channels			
Ben Hassen & El Bilali (2022). Impacts of the Russia-Ukraine war on global food security: Towards more sustainable and resilient food systems?	Resilience; narrative review	The war triggered cascading shocks; countries restricting food exports rose from 3 to 26.	P1+, P2+
Fellmann et al. (2014). Harvest failures, temporary export restrictions and global food security: The example of limited grain exports from Russia, Ukraine and Kazakhstan	Partial equilibrium simulation	Export restrictions raise world prices for net importers but lower prices in the restricting exporter.	P1+, P2-
Zhang et al. (2021). Risk of global external cereals supply under the background of the COVID-19 pandemic: Based on the perspective of trade network	Trade network analysis	Cereal trade concentrates on core exporters; most countries face medium or higher external supply risk.	P1+, P2-
Svanidze et al. (2019). Food security and the functioning of wheat markets in Eurasia: A comparative price transmission analysis for the countries of Central Asia and the South Caucasus	Price transmission; error correction models	Central Asian wheat markets are weakly integrated and volatile; self-sufficiency should complement trade.	P1+, P2+

Note. Studies are ordered by citation count within each thematic cluster. A plus sign (+) indicates that the study supports the proposition; a minus sign (-) indicates that the study contradicts or qualifies the proposition.

Study and title	Theory or concept; method	Main finding	Propositions
T1. WTO rule-making, norms and regime contestation			
Yıldırım & Önen (2024). Vulnerabilities of the neoliberal global food system: The Russia-Ukraine war and COVID-19	Neoliberal food regime critique; qualitative	Export restrictions expose dependence created by liberalisation; food sovereignty is examined as a safeguard.	P1+, P2+, P4+
Kapelista et al. (2023). The impact of the Russian-Ukrainian war on global food and environmental security	Food security indicators; descriptive	The war cut Ukrainian exports and transmitted insecurity to import-dependent states.	P2+
Tanaka et al. (2021). Short-term implications of climate shocks on wheat-based nutrient flows: A global “nutrition at risk” analysis through a stochastic CGE model	Stochastic general equilibrium model	Partial export restrictions raise the probability of nutrient shocks at least fivefold.	P1+, P2-
Yang et al. (2024). Analysis of the impact of U.S. trade policy uncertainty on China’s grain trade	Trade policy uncertainty; time-varying VAR	United States trade policy uncertainty has time-varying, grain-specific effects on Chinese grain trade.	P2+, P5-
Serova & Yanbykh (2023). The food price situation in Central Asia	Descriptive price analysis	Central Asian states used every trade tool; a lasting turn to self-sufficiency is expected.	P1+, P2+, P5+
Ashour et al. (2025). Managing import dependency risks in contexts of polycrises: The case of Jordan	Trade facilitation; causal process tracing	Trade facilitation is necessary but insufficient for food security in import-dependent Jordan.	P2-, P5-
T3. National policy space under WTO disciplines			
Narayanan (2015). Food security in India: The imperative and its challenges	Policy analysis of domestic support rules	India's apparent subsidy breach stems from the 1986-88 reference price; blanket protection is unnecessary.	P1+, P2-
Ruspayandi et al. (2022). Market-approach-based policy to achieve rice price stability in Indonesia: Can it be a complement?	Price stabilisation; ARDL econometrics	A larger state-enterprise market share lowers rice prices; international prices do not reach Indonesian consumers.	P1-, P2+
Putra et al. (2024). Agreement on Agriculture WTO: Discourse on Indonesia's food security in a global context	Right to regulate; normative juridical	Indonesia attained neither food security nor food sovereignty; WTO commitments restrain regulation.	P2+, P3+, P4+
Sarna et al. (2020). After the trade dispute: Is Indonesian food sovereignty threatened?	Food sovereignty; normative case analysis	Indonesian import restrictions breached GATT Article XI; national policy had to be adjusted.	P1+, P2+, P4+
T4. Right to food and fragmented international legal regimes			
Hailes (2023). From guano to green hydrogen: Food security and fertilizer disputes in international energy law	Energy law framework; legal history	Resource-entitlement rules descend from fertiliser disputes; dispute settlement sidelines food security.	P4+, P5+
Fillol Mazo (2020). The protection of access to food for civilians under international humanitarian law: Acts constituting war crimes	Humanitarian law; legal-sociological	Humanitarian law prohibits starvation and criminalises denial of access to food.	P4+

Note. Studies are ordered by citation count within each thematic cluster. A plus sign (+) indicates that the study supports the proposition; a minus sign (-) indicates that the study contradicts or qualifies the proposition.

Study and title	Theory or concept; method	Main finding	Propositions
T1. WTO rule-making, norms and regime contestation			
Domingo-Cabarrubias (2023). The right to food and substantive equality as complementary frameworks in addressing women's food insecurity	Substantive equality; doctrinal	The right to food alone cannot remove gender-specific barriers to access.	P4+
Abdurrahaman & Kurniasari (2023). The impact of the right to food on international trade in the Russia-Ukraine war	Inter-legality; doctrinal	The right to food justified the Black Sea Grain Initiative; a binding treaty is urged.	P3+, P4+, P5+
Kunz (2024). "Eradicating hunger through climate litigation?" An assessment of the opportunities and challenges of enforcing the human right to food through courts	Justiciability; case-law analysis	Courts enforce the right to food only partially; jurisdiction and admissibility limit litigation.	P4+
Fernández-Aller (2020). Any chance for the enforceability of the human right to subsistence?	Social rights theory; legal-sociological	The right to food is clear in content but weak in enforceability; socio-political routes are most promising.	P3+, P4+
De Gasperis (2025). The impact of genome editing on the right to adequate food, food safety and the preservation of biodiversity	Right to adequate food; comparative doctrinal	Gene editing can help or harm the right to food; states must balance innovation and access.	P4+
Nguyen & Tran (2024). Legal challenges in international trade of genetically modified food for developing countries: Navigating a fragmented landscape	Fragmentation; doctrinal	Rules on trade in genetically modified food are fragmented across human rights, environmental and trade law.	P2+, P4+

Note. Studies are ordered by citation count within each thematic cluster. A plus sign (+) indicates that the study supports the proposition; a minus sign (-) indicates that the study contradicts or qualifies the proposition.

4.2 How the findings connect

Convergence on export restrictions and shock transmission. Across the review, econometric and qualitative studies converge on a clear finding: temporary export restrictions by major grain exporters stabilize domestic prices at home only by magnifying price spikes and micronutrient losses for net food-importing countries abroad. Simulating a repeat of the 2010 Russian, Ukrainian, and Kazakh harvest failure with the AGLINK-COSIMO model,Fellmann et al. (2014) show that harvest shortfalls raise world wheat prices by 23% and coarse grain prices by 15%, while subsequent export bans, quotas, and taxes push domestic prices in exporting Ukraine below baseline at the expense of grain importers. Extending this to nutrition with a stochastic world CGE model, Tanaka et al. (2021) estimate that productivity shocks cut household intake by up to 18% for protein, 33.1% for zinc, and 37.4% for magnesium, while Black Sea export controls multiply the probability of severe nutrient deprivation at least fivefold across MENA and Central Asia. The 2020–2022 polycrisis bore out these simulations: as Ben Hassen and El Bilali (2022) document, the February 2022 Russia-Ukraine war atop COVID-19 disruptions raised the number of countries restricting food exports from 3 to 26, covering 40 items, halting Black Sea shipments, inflating fertilizer costs, and transmitting acute hunger to import-reliant states (Kapelista et al., 2023; Yıldırım & Önen, 2024).

Cluster T2 also maps the structural channels of shock transmission. Using network analysis during COVID-19,Zhang et al. (2021) show that global cereal flows concentrate around seven communities and a small exporter core, leaving 60% of states at medium-to-high dependence, 50% with concentrated suppliers, 70% exposed to supplier pandemic shocks, and 80% of net food-importing developing countries at high composite supply risk as global risk surged 65%. Using threshold error correction, Svanidze et al. (2019) show that South Caucasus wheat markets (Georgia) integrate better with Black Sea exporters than landlocked Central Asian markets (Uzbekistan), where transport bottlenecks and informal border payments amplify volatility. Using time-varying vector autoregression (2003–2022), Yang et al. (2024) show that United States trade policy uncertainty destabilizes China's grain and soybean imports. Testing the WTO Trade Facilitation Agreement in Jordan

(importing 90% of staples) via hoop-test process tracing, Ashour et al. (2025) find that customs facilitation is insufficient without domestic coordination, port capacity, and strategic reserves. Consequently, across Central Asia, Serova and Yanbykh (2023) document how shock-exposed states deploy export quotas, subsidies, tax exemptions, and price controls while pivoting toward domestic self-sufficiency.

Convergence on asymmetric policy-space constraints. Reading T2 alongside T1 and T3 exposes a core legal paradox: WTO law strictly disciplines the defensive instruments of food-importing developing countries while leaving the crisis-magnifying export restrictions of major suppliers largely unchecked. On the export side,McMahon (2024) traces WTO agricultural talks from 1996 through the 2024 Abu Dhabi Ministerial (MC13) and finds zero substantive tightening of GATT Article XI:2(a) or AoA Article 12 on export restrictions. The main multilateral response since 2008, the 2022 Ministerial Decision exempting World Food Programme humanitarian purchases from export prohibitions, is a narrow carve-out that leaves commercial export restrictions untouched (World Trade Organization [WTO], 2022). On the import and subsidy side, WTO rules bite hard. Analyzing Indonesia's loss in WTO disputes DS477 and DS478 brought by New Zealand and the United States, Sarna et al. (2020) show that GATT Article XI:1 findings forced Indonesia to dismantle horticultural and animal import licensing enacted for food sovereignty. Similarly, Narayanan (2015) and Sharma (2025) show that developing states such as India risk breaching the 10% Amber Box de minimis cap because the AoA measures administered support against a frozen 1986–1988 reference price without inflation adjustment, while Putra et al. (2024) show that rigid AoA rules and resistance to G33 Special Products and Special Safeguard proposals constrain Indonesian food policy.

This legal asymmetry extends to fisheries and emerging trade forums. Examining the 2022 WTO Agreement on Fisheries Subsidies, Krishnan and Gopalakrishnan (2025) show that negotiations stalled over special and differential treatment: modest livelihood support for artisanal fishers in India faces discipline, whereas historic industrial subsidies caused stock depletion. As WTO talks deadlock,Sharma (2025) shows that agricultural rule-making is shifting to bilateral and regional free trade agreements and unilateral deforestation regulations that risk penalizing Global South smallholders. These venues do not neutralize the asymmetry; they relocate it. The EU Deforestation Regulation conditions market access for cattle, cocoa, coffee, oil palm, rubber, soya, and wood on geolocated due diligence whose compliance costs risk excluding smallholders from high-value supply chains without adequate price premiums (Regulation (EU) 2023/1115; Zhunusova et al., 2022). Such unilateral standards are adopted outside WTO negotiation and reach multilateral scrutiny only after the fact, through litigation that exporting states must initiate and sustain. Indonesia's challenge to the EU's palm-oil biofuel rules illustrates the point: the panel accepted the legitimacy of the EU's climate framework while finding that aspects of the measures' design and implementation breached WTO rules, more than five years after the dispute began (WTO, 2025). Investment treaties extend the same pattern by protecting fertilizer and energy entitlements through investor-state arbitration that sidelines food security (Hailes, 2023).

Convergence on the right to food as a political bargaining resource. Clusters T1 and T4 converge on how actors contest this legal imbalance. Challenging the view that Northern states champion human rights in trade while Southern states resist them,Margulis (2024) shows through the G33 public stockholding campaign and the TRIPS waiver that developing states have become the primary protagonists of human rights at the WTO, invoking the right to food under ICESCR Article 11 to reframe public grain procurement from a subsidy breach into a human rights duty. Margulis (2021) further demonstrates that FAO, WFP, and OHCHR secretariats actively intervened in WTO negotiations by mobilizing states, public shaming, and proposing human rights frameworks to counter restrictive trade rules. Normatively, Fakhri (2022) argues for reconstructing trade law around dignity, self-sufficiency, and solidarity, while Abdurrahaman and Kurniasari (2023) show that the right to food, rather than WTO rules, anchored the 2022 Black Sea Grain Initiative.

The eight studies in T4 explain why actors mobilize the right to food politically at the WTO rather than in court. First, even bureaucratic activism faces retaliation, as when WTO members blocked the reappointment of the WFP Executive Director (Margulis, 2021). Second, judicial enforcement remains partial:Kunz (2024) shows that climate litigation faces strict jurisdiction, standing, attribution, and inter partes hurdles, while Fernández-Aller (2020) shows that constitutional recognition rarely yields court remedies compared with political mobilization via UN special procedures and municipal policy. Third,

adjacent regimes subordinate food rights to commercial interests: Domingo-Cabarrubias (2023) shows that formal equality fails rural women without substantive equality under the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW); Fillol Mazo (2020) documents enforcement gaps against wartime starvation under humanitarian law and the Rome Statute; Hailes (2023) traces fertilizer and energy disputes from guano arbitrations and Chorzów Factory (1927) to green hydrogen to show how investment arbitration sidelines food security; De Gasperis (2025) warns that seed patents restrict smallholder access to genome-edited crops without farmers' exemptions; and Nguyen and Tran (2024) show that weak interplay among human rights, the Cartagena Protocol, and WTO rules exposes developing states to trade pressure over genetically modified food.

4.3 Opposition and contradiction

Beneath these convergences lie four sharp oppositions. First, scholars clash over the remedy for trade-induced food insecurity. Examining Eurasian and Black Sea export controls, economic modellers(Fellmann et al., 2014; Tanaka et al., 2021; Zhang et al., 2021) prescribe deeper trade openness, supplier diversification, and stricter WTO disciplines on export bans. Conversely, critical political economists and legal scholars (Fakhri, 2022; Putra et al., 2024; Yıldırım & Önen, 2024) interpret the 2020–2022 crises as proof that reliance on neoliberal global markets is the root vulnerability, prescribing domestic self-sufficiency, buffer stocks, and food sovereignty. One camp sees crisis as too little trade liberalization; the other sees it as trade dependence itself, while Ashour et al. (2025) bridge both by pairing trade facilitation with national reserves in Jordan.

Second, scholars divide over how to reform WTO public stockholding rules.Sharma (2025), Putra et al. (2024), and Margulis (2024) argue that developing states require an unconditional permanent solution beyond the Bali Peace Clause, alongside Special Products and a Special Safeguard Mechanism. By contrast, Narayanan (2015), while agreeing that the AoA's frozen 1986–1988 reference price artificially inflates India's subsidy calculations, argues that blanket exemptions are unnecessary because India's National Food Security Act can fit within existing AoA rules through a technical revision of the reference price baseline.

Third, scholars disagree on the efficacy of human rights mobilization.Margulis (2024) judges the G33 stockholding and TRIPS waiver campaigns successful in returning human rights to the WTO agenda and securing the Bali Peace Clause, while Abdurrahaman and Kurniasari (2023) credit the right to food with brokering the Black Sea Grain Initiative and propose a binding anti-blockade treaty. Conversely, McMahon (2024) finds that 28 years of WTO agricultural talks have yielded zero permanent legal reforms on stockholding or export restrictions, concluding that only a full AoA renegotiation can succeed. Rights claims thus succeed in agenda-setting and temporary waivers (Margulis, 2024) but fail to produce permanent treaty law (McMahon, 2024) or overcome judicial enforceability barriers (Fernández-Aller, 2020; Kunz, 2024).

Fourth, empirical findings diverge on price transmission. Using an ARDL model of Indonesian rice markets,Ruspayandi et al. (2022) find that global rice prices have no statistically significant short- or long-run effect on domestic consumer prices, and that expanding the state logistics agency (BULOG) lowers retail prices. While this contrasts with strong cross-border shock transmission across Eurasia and MENA (Fellmann et al., 2014; Svanidze et al., 2019; Tanaka et al., 2021), the divergence is institutional: Indonesia insulated domestic rice prices precisely through state trading (BULOG), buffer stocks, and import controls, the very instruments challenged under GATT Article XI and AoA rules (Putra et al., 2024; Sarna et al., 2020).

Tensions also operate inside individual studies, reflecting the collective action dilemma of food trade.Fellmann et al. (2014) show that export bans lower domestic prices for the restricting exporter while inflating world prices for importers, capturing a prisoner's dilemma between national political rationality and global welfare. Similarly, Svanidze et al. (2019) and Zhang et al. (2021) advocate open grain trade while advising import-dependent states to build domestic self-sufficiency as a hedge against exporter bans, and Putra et al. (2024) critique WTO constraints on Indonesia while recommending deeper WTO diplomacy.

Synthesizing these debates reveals a consistent meta-theoretical pattern (Fig. 8): policy prescriptions follow the author's theoretical paradigm rather than the crisis studied. Equilibrium and network modellers consistently prescribe freer trade and

export disciplines; critical agrarian and sovereignty scholars prescribe domestic self-sufficiency and buffer stocks; and human rights lawyers prescribe normative integration or new treaties. Because no study conducts a head-to-head empirical test across rival paradigms, identical crises from 2008 to 2022 are cited to support opposite remedies.

4.4 Actors and roles

Across the 28 studies, 13 actor categories structure the regime (Table 2). Core exporters (Russia, Ukraine, Kazakhstan) trigger supply shocks via export controls and war blockades, while agricultural complainants (the United States, New Zealand) challenge import licensing and subsidy carve-outs. Net food-importing developing countries (MENA, Central Asia, Sub-Saharan Africa, Jordan) absorb price and nutrient shocks, while China navigates bilateral uncertainty as a systemic importer. Developing coalitions (G33, African Group), led by India and Indonesia, defend public stockholding and state trading enterprises (BULOG) alongside intervening UN secretariats (FAO, WFP, OHCHR, UN Special Rapporteur) and peasant movements. Meanwhile, agribusiness, seed, fertilizer, and energy corporations rely on patent and investment law, courts exercise bounded review, and women, smallholders, and artisanal fishers bear the sharpest vulnerability.

Table 2
Actors and roles identified in the reviewed studies.

Actor	Role	Studies
Developing-country coalitions (G33, African Group)	Demandeurs of policy space; mobilise the right to food	Margulis, 2024; McMahon, 2024; Sharma, 2025; Putra et al., 2024
India	Leader of the G33; defender of public procurement and small-scale fisheries subsidies	Margulis, 2024; Narayanan, 2015; Sharma, 2025; Krishnan & Gopalakrishnan, 2025
Indonesia	Respondent in disputes; G33 member; operator of a state trading enterprise (BULOG)	Sarna et al., 2020; Putra et al., 2024; Ruspayandi et al., 2022
United States and New Zealand	Complainants; opponents of expanded subsidy flexibility	Sarna et al., 2020; Margulis, 2024
Russia, Ukraine, Kazakhstan	Core grain exporters; users of export bans, quotas and taxes	Fellmann et al., 2014; Tanaka et al., 2021; Svanidze et al., 2019; Ben Hassen & El Bilali, 2022; Abdurrahaman & Kurniasari, 2023
Net food-importing countries (MENA, Central Asia, sub-Saharan Africa, Jordan)	Bearers of price and supply shocks	Ben Hassen & El Bilali, 2022; Kapelista et al., 2023; Zhang et al., 2021; Svanidze et al., 2019; Serova & Yanbykh, 2023; Yıldırım & Önen, 2024; Ashour et al., 2025
China	Large importer exposed to partner trade policy uncertainty	Yang et al., 2024
WTO (members, Committee on Agriculture, dispute settlement)	Rule-making and enforcement forum; target of intervention	McMahon, 2024; Sharma, 2025; Sarna et al., 2020; Ashour et al., 2025
FAO, WFP, OHCHR secretariats; UN Special Rapporteur on the right to food	Interveners in WTO decision-making; norm entrepreneurs	Margulis, 2021; Margulis, 2024; Fakhri, 2022; Abdurrahaman & Kurniasari, 2023
Food sovereignty movement and NGOs	Contest the trade regime; lend legitimacy to developing-country claims	Fakhri, 2022; Margulis, 2024; Yıldırım & Önen, 2024
Courts and tribunals (human rights courts, ICJ, ICC, investment tribunals)	Limited enforcers of food-related entitlements	Kunz, 2024; Fillol Mazo, 2020; Hailes, 2023; Fernández-Aller, 2020
Corporations (biotechnology, energy, fertiliser, agribusiness)	Holders of patents and investment protection; drivers of disputes	De Gasperis, 2025; Nguyen & Tran, 2024; Hailes, 2023
Women, small-scale farmers and fishers	Rights-holders least protected by formal rules	Domingo-Cabarrubias, 2023; Krishnan & Gopalakrishnan, 2025; Fakhri, 2022

5. Conceptual Framework and Propositions

Synthesizing findings across the four clusters yields an integrated conceptual framework built on five testable propositions (Fig. 9).

P1, asymmetric discipline. Multilateral trade law disciplines import barriers (GATT Article XI:1) and domestic price support (AoA Amber Box formulas tied to 1986–1988 reference prices) far more strictly than export restrictions (GATT Article XI:2(a) and AoA Article 12), even though temporary export controls by major suppliers are the primary trade mechanism amplifying world price spikes and micronutrient losses for net food importers(11 studies support; Ruspayandi et al., 2022 qualify where state trading insulates domestic markets).

P2, vulnerability feedback. Recurrent external supply shocks, concentrated cereal trade networks, and bilateral trade uncertainty push import-dependent and developing states toward self-sufficiency, public stockholding, and food sovereignty policies that collide with WTO subsidy and market-access rules (14 studies support; 5 studies contest whether self-sufficiency or blanket exemptions improve welfare).

P3, rights as bargaining resource. Within international trade governance, the human right to food functions primarily as a political and normative bargaining resource mobilized by developing coalitions (G33) and UN secretariats (FAO, WFP, OHCHR) to defend policy space rather than as a judicially enforced entitlement(6 studies support; McMahon, 2024 qualifies its failure to yield permanent treaty reform).

P4, enforcement asymmetry and regime fragmentation. International trade and investment obligations carry compulsory adjudication and arbitral remedies, whereas human rights, humanitarian, environmental, and gender-equality norms protecting food access remain weakly justiciable and fragmented across non-hierarchical regimes(Hailes, 2023; Kunz, 2024; Nguyen & Tran, 2024; 13 studies support; Margulis, 2024 qualifies by noting soft-law bargaining influence at the WTO).

P5, stalemate and forum shifting. Prolonged WTO deadlock over public stockholding, special safeguards, fisheries subsidies, and export controls shifts effective food security governance toward bilateral and regional trade agreements, unilateral sustainability standards, investment arbitration, and ad hoc deals such as the Black Sea Grain Initiative, venues that reproduce rather than resolve the asymmetry in P1(Abdurrahaman & Kurniasari, 2023; Hailes, 2023; Sharma, 2025; 6 studies support; Ashour et al., 2025 and Yang et al., 2024 qualify).

Propositions P1 to P5 form a closed institutional feedback loop (Fig. 9). Loose WTO rules on export restrictions paired with strict rules on import barriers and domestic support (P1) allow harvest, pandemic, and war shocks to inflict severe price and micronutrient vulnerability on net importers. That exposure drives importing states toward self-sufficiency, state trading, and public stockholding policies that collide with WTO rules (P2). Because food rights lack hard judicial enforceability across fragmented regimes (P4), developing coalitions and UN secretariats channel their defense into political rights mobilization at the WTO (P3). When consensus rules produce stalemate and temporary waivers, governance shifts to preferential agreements, unilateral standards, investment arbitration, and ad hoc deals (P5). These venues close the loop back to P1: they add new market-access conditions on Southern exports, shield investors' entitlements through arbitration, and leave the legality of powerful members' measures to slow, costly, after-the-fact litigation, so the core asymmetry is reproduced rather than resolved.

The propositions carry scope conditions. The review evidence is densest for staple grains during acute shock episodes, so P1 and P2 apply most strongly to low- and middle-income net importers exposed to concentrated supplier networks. For a high-income importer such as Japan, simulated export quotas by rice suppliers cause little welfare loss(Tanaka & Hosoe, 2011), which implies that vulnerability, and hence the self-sufficiency pressure in P2, depends on income and supplier concentration rather than on import dependence alone. Likewise, Indonesia's price insulation through state trading (Ruspayandi et al., 2022) shows that the transmission mechanism in P1 weakens where governments retain instruments that WTO law increasingly constrains.

6. Discussion

6.1 Relating the review to the bibliometric map

Comparing the bibliometric map (n = 218) with the systematic review (n = 28) clarifies scope and generalizability. Whereas the bibliometric corpus covers all Scopus-indexed articles retrieved by the query for 2000 to 2025, the review synthesizes the 28 verified English open-access full texts. Because open-access publishing expanded recently, 25 of the 28 reviewed studies (89%) appeared in 2020–2025, compared with 46% of the bibliometric corpus, positioning P1 to P5 as direct syntheses of the accessible literature and testable hypotheses for paywalled studies.

Substantively, the two stages align closely. The four review clusters mirror the post-2008 and post-2020 conceptual shifts in Fig. 6 and the specialist abstract vocabularies in Fig. 7: export restrictions and price shocks anchor T2; post-Bali public stockholding and AoA disputes anchor T1 and T3; and the surge in right-to-food scholarship anchors T4. Similarly, India and Indonesia lead post-2013 publication growth (Fig. 4) and anchor T1 and T3, while Matias E. Margulis leads overall authorship (Fig. 5a) and anchors T1.

The representativeness checks qualify but do not overturn this alignment. Included and non-included records do not differ in citation impact, whether measured by raw citations (median 4 versus 6; Mann-Whitney $p = 0.50$) or by citations per year since publication ($p = 0.22$). Within 2020–2025, 22 of the 25 tracked concepts appear at statistically indistinguishable rates in included and non-included records (Fisher exact $p > 0.05$). The three exceptions, food prices, the Russia-Ukraine war, and justiciability, are over-represented in the review, so the T2 and T4 evidence leans toward acute-crisis scholarship. The lower share of trade liberalization and Doha Round vocabulary in the review relative to the full corpus is therefore a temporal effect of open-access availability rather than thematic selection within the recent literature.

The abstract-level check of the 15 most-cited records outside the review, which together account for 54% of all citations to non-reviewed records, points the same way. Three records fall outside the trade-law nexus (Long et al., 2010; Olawuyi, 2020; Tomlinson, 2013), and one predates the export-restriction problem by framing the multifunctionality debate over Northern farm support (Potter & Burney, 2002). None of the remaining 11 contradicts P1, P3, P4, or P5. Götz et al. (2013), Rutten et al. (2013), and Brooks (2014) corroborate P1; Burnett and Murphy (2014), McMichael (2015), Rosset (2000), Rutten et al. (2013), and Sowman and Cardoso (2010) corroborate P2; Edelman and James (2011), Margulis (2013), and Narula (2006) support P3 or P4; andMcMichael (2015) anticipates the forum shift in P5 toward the Committee on World Food Security. The two records that contest P2, Brooks (2014) and Tanaka and Hosoe (2011), argue from the liberal-policy and equilibrium-modelling paradigm identified in Section 4.3, which reinforces rather than weakens the meta-theoretical finding. Tomlinson (2013), although peripheral to trade law, makes a parallel point for food security discourse in the United Kingdom, where headline statistics serve prior ideological framings.

6.2 Theoretical contribution

The framework speaks to three debates. First, it extends regime-complex theory.Alter and Meunier (2009) argue that overlapping, non-hierarchical regimes generate forum shopping and feedback effects across venues, and Margulis (2013) applied that lens to food security. Our synthesis specifies the direction of those feedbacks: regime shifting (Helfer, 2004) runs two ways at once. Developing coalitions, UN secretariats, and peasant movements shift claims into the language and forums of human rights, from right-to-food arguments at the WTO to the Committee on World Food Security, where norms are strong but enforcement is weak (P3, P4; Edelman & James, 2011; McMichael, 2015). Powerful members and investors shift rule-making outward into preferential, unilateral, and arbitral venues, where enforcement is strong but participation is narrow (P5). The asymmetry in P1 persists because the two movements never meet in a forum that combines broad legitimacy with hard enforcement. Second, the findings refine the paradigm-mix thesis of Daugbjerg et al. (2017): the Agreement on Agriculture is resilient not only because it blends liberal and exceptionalist ideas, but also because the costs of that blend fall on actors whose claims are channelled into weaker forums. Third, the meta-theoretical finding that prescriptions track paradigms rather than evidence identifies a methodological source of the field's stalemate, which mixed-method designs can address directly (Section 7).

6.3 Policy implications

Three implications follow for negotiators. First, the asymmetry in P1 can be narrowed without reopening the whole Agreement on Agriculture: the logic of the 2022 exemption for World Food Programme purchases (WTO, 2022) could be extended to commercial purchases by least-developed and net food-importing developing countries, and AoA Article 12 could acquire time limits and prior notification for export restrictions on staple grains, as model-based evidence on export controls implies (Fellmann et al., 2014; Tanaka et al., 2021). Second, updating the 1986–1988 external reference price would remove the accounting artefact that places public stockholding programmes in apparent breach of support

limits(Narayanan, 2015; Sharma, 2025), lowering the stakes of a permanent solution. Third, unilateral sustainability standards could avoid reproducing the asymmetry through transition support for smallholders, jurisdictional or landscape approaches, and explicit protection for indigenous peoples and local communities (Zhunusova et al., 2022). The window for such reforms remains open but narrow: the Fourteenth Ministerial Conference in Yaoundé (March 2026) closed without any agricultural decision, leaving public stockholding and the special safeguard mechanism unresolved (Sengupta, 2026), while the EU Deforestation Regulation is scheduled to apply to large and medium operators from 30 December 2026 (Regulation (EU) 2025/2650).

6.4 Limitations

Several limitations remain. The corpus relies on one database and one English-language query, so records that discuss export bans, GATT disciplines, or agricultural trade policy without the anchor terms are not captured, and restricting the subject area to Social Sciences may omit records indexed only in economics or agricultural science. The systematic review covers only open-access full texts; although the checks above show no impact bias and little thematic bias within the recent literature, the abstract-level check of non-retrieved landmarks cannot substitute for full-text coding. Finally, proposition coding is interpretive, and the verbatim evidence and coding matrices released with this article allow other researchers to audit and contest each decision.

7. Research Agenda

Six priorities emerge for future research. First, resolving the paradigm deadlock requires empirical models that test trade liberalization and domestic buffer-stock strategies head-to-head under identical shocks, measuring household micronutrient intake (protein, zinc, iron, magnesium) rather than border prices alone(Tanaka et al., 2021). Second, addressing the prisoner's dilemma of export controls requires political economy studies of the domestic electoral and lobbying incentives driving exporting governments to ban exports, informing incentive-compatible reforms of GATT Article XI:2(a) and AoA Article 12.

Third, reconciling Margulis (2024) and McMahon (2024) on human rights efficacy requires measuring impact separately across agenda-setting, binding treaty text, and domestic compliance. Fourth, Indonesia's price insulation through BULOG (Ruspayandi et al., 2022) amid WTO legal constraints (Putra et al., 2024; Sarna et al., 2020) calls for mixed-methods studies combining doctrinal law and econometrics to evaluate the fiscal cost and spillovers of state trading enterprises and public stockholding.

Fifth, Proposition P5 calls for comparative mapping of how bilateral free trade agreements, unilateral deforestation rules(Sharma, 2025), fertilizer and energy investment treaties (Hailes, 2023), and ad hoc arrangements such as the Black Sea Grain Initiative (Abdurrahaman & Kurniasari, 2023) regulate food security relative to WTO rules. Sixth, closing the field's representation gap requires centering research in underrepresented net food-importing regions (MENA, Central Asia, Sub-Saharan Africa) and assessing impacts on women, smallholders, and artisanal fishers (Domingo-Cabarrubias, 2023; Fakhri, 2022; Krishnan & Gopalakrishnan, 2025).

Each proposition is open to falsification with existing sources. P1 can be tested by matching WTO notifications of export restrictions under AoA Article 12 to price and nutrient outcomes in importing states; P2 with panel data on stockholding and self-sufficiency spending after shock episodes; P3 and P4 with coded negotiating submissions, ministerial texts, and case law; and P5 with the agricultural and sustainability chapters of preferential agreements concluded since 2008, together with WTO disputes over unilateral sustainability standards.

8. Conclusion

Between 2000 and 2025, food security in international trade law evolved from a secondary debate over farm multifunctionality into a central struggle over how global rules allocate survival risk during compounding crises. Combining a bibliometric map of 218 Scopus-indexed articles with a consensus-coded systematic review of 28 full-text studies shows

that scholarship surged alongside food price spikes, WTO Ministerial standoffs, COVID-19, and the Russia-Ukraine war, with 46% of output published since 2020. Leadership expanded from Northern policy bodies toward Global South centers led by India and Indonesia, while the vocabulary pivoted from trade liberalization to export restrictions, public stockholding, food sovereignty, and the right to food. At the heart of the synthesis lies a structural asymmetry: WTO law tightly disciplines import controls and public stockholding in food-importing developing states, yet leaves temporary export restrictions by major grain exporters largely unconstrained despite converging model-based and econometric evidence that export bans magnify world price spikes and micronutrient deprivation. Our five propositions explain why this imbalance endures: supply shocks drive quests for self-sufficiency and policy space; weak judicial enforceability across fragmented legal regimes channels those claims into political rights bargaining at the WTO; and multilateral deadlock pushes governance into bilateral, unilateral, arbitral, and ad hoc forums that reproduce the original asymmetry. Because the field's prescriptions track paradigms more than evidence, ending this stalemate is as much a methodological task as a diplomatic one. Escaping this cycle requires pairing binding multilateral disciplines on food export restrictions with modernized subsidy baselines and enforceable protections for vulnerable populations.

Declarations

Author Contribution

Yenis Contesa: Conceptualization, methodology, investigation, data curation, formal analysis, visualization, writing – original draft, and writing – review & editing.Rizal Dhiyas Resindra: Conceptualization, supervision, validation, methodology, writing – review & editing, and project administration.Both authors contributed to the development of the manuscript, critically reviewed the final version, and approved the manuscript for submission and publication.

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Figures

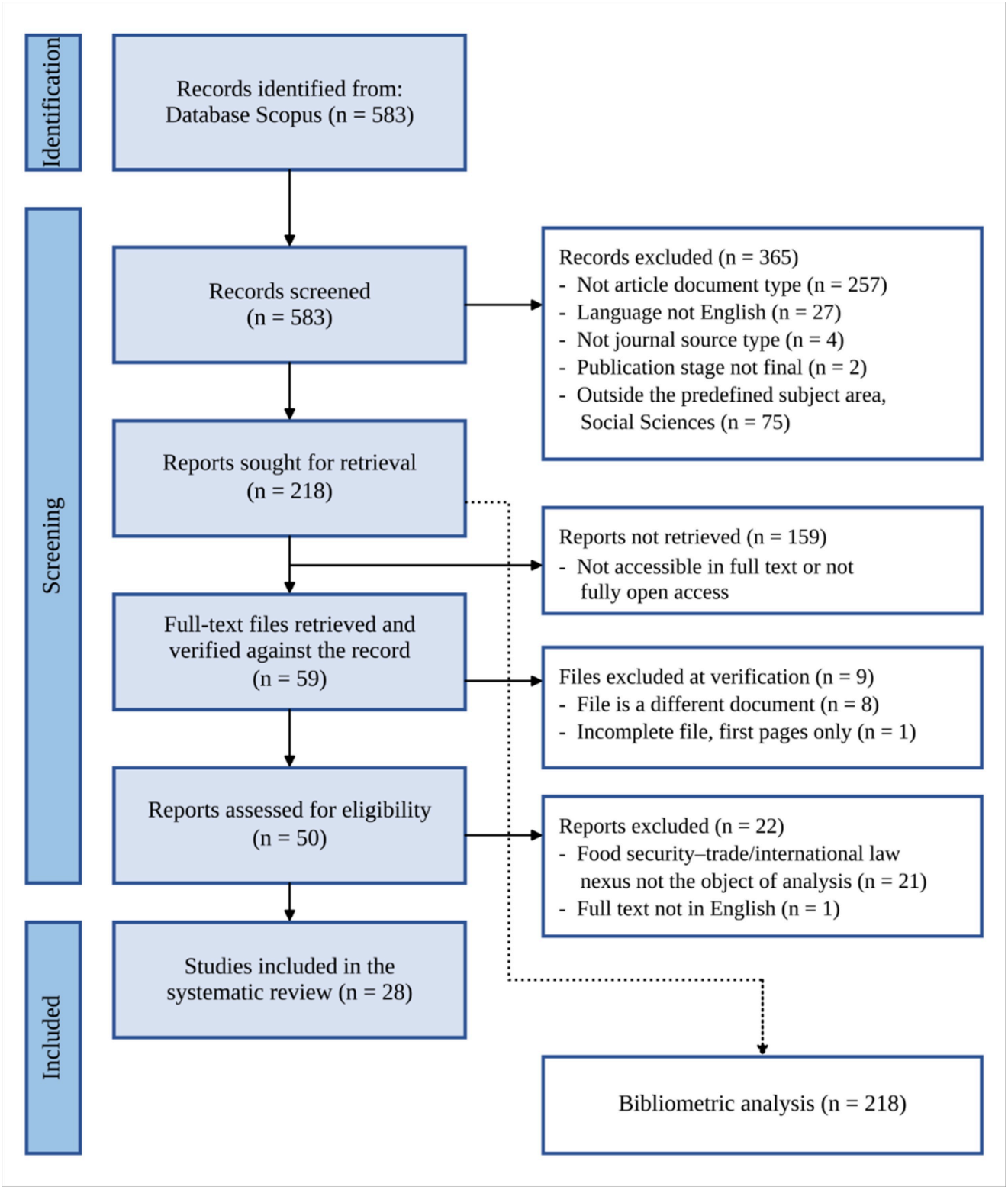


Figure 1

PRISMA flow of records for the bibliometric analysis and the systematic review.

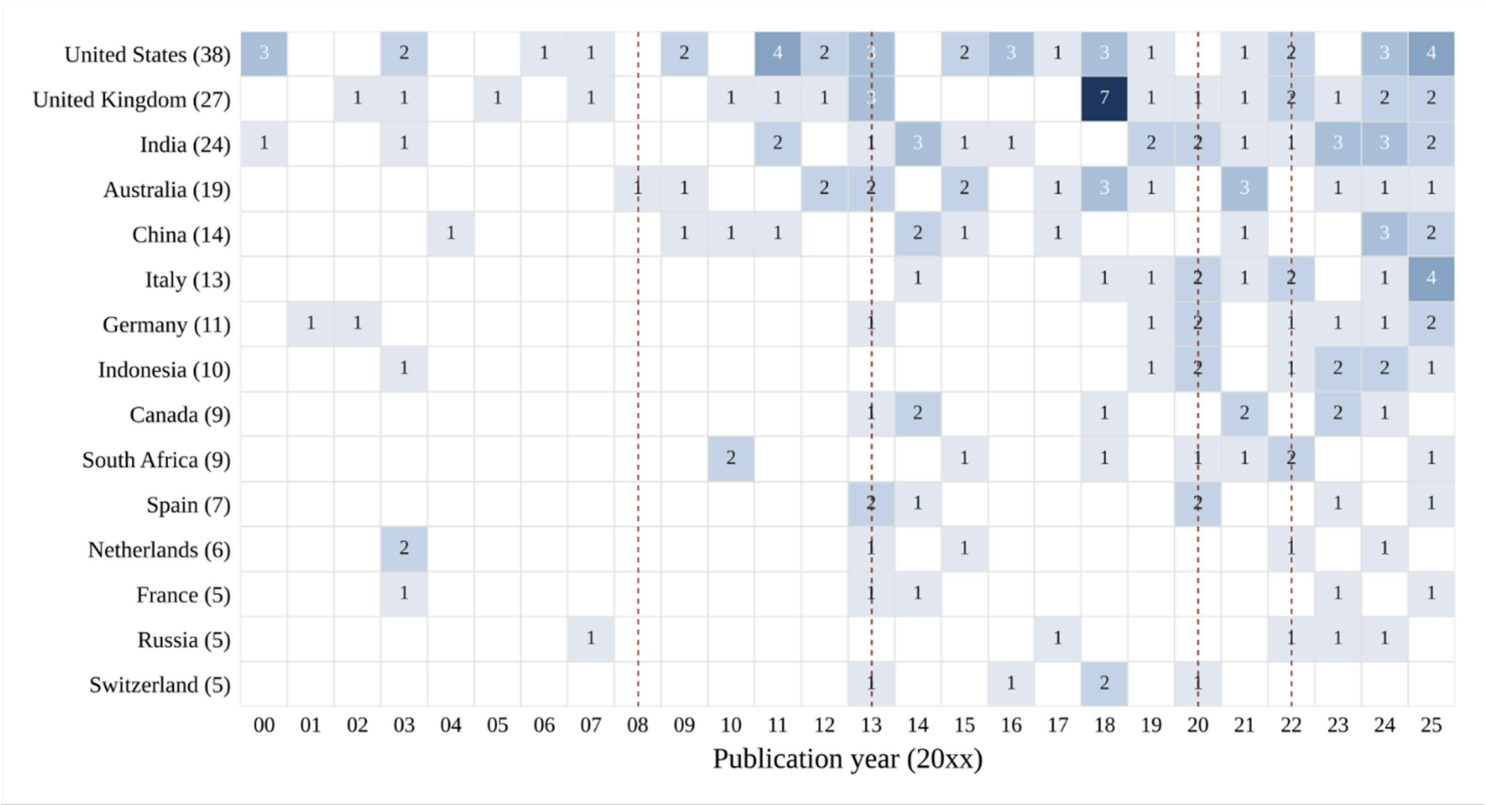


Figure 4

Documents per year for the 15 most productive countries (totals in parentheses). Dashed lines: 2008, 2013, 2020 and 2022.

	2000–2007 (n = 25)	2008–2013 (n = 43)	2014–2019 (n = 49)	2020–2025 (n = 101)
Trade liberalisation / free trade [Policy concept]	60% (15)	12% (5)	14% (7)	8% (8)
Policy space / special and differential treatment [Policy concept]	24% (6)	0% (0)	6% (3)	3% (3)
Multifunctionality / non-trade concerns [Policy concept]	12% (3)	0% (0)	2% (1)	2% (2)
Doha Round [Legal instrument]	16% (4)	7% (3)	14% (7)	3% (3)
Food regime [Theory lens]	0% (0)	5% (2)	4% (2)	1% (1)
Economic modelling (CGE, PE, price transmission) [Method]	4% (1)	9% (4)	6% (3)	5% (5)
Agreement on Agriculture [Legal instrument]	24% (6)	14% (6)	18% (9)	17% (17)
Subsidies / domestic support [Legal instrument]	16% (4)	21% (9)	8% (4)	17% (17)
Food crisis / food prices [Event-driven topic]	4% (1)	21% (9)	18% (9)	12% (12)
Intellectual property / TRIPS [Legal instrument]	4% (1)	12% (5)	4% (2)	8% (8)
Neoliberalism [Theory lens]	4% (1)	2% (1)	8% (4)	4% (4)
Food sovereignty [Normative concept]	4% (1)	12% (5)	20% (10)	14% (14)
Norms / discourse / ideas [Theory lens]	8% (2)	5% (2)	24% (12)	13% (13)
Export restrictions [Legal instrument]	0% (0)	19% (8)	14% (7)	16% (16)
Human rights [Normative concept]	8% (2)	19% (8)	18% (9)	25% (25)
Right to food [Normative concept]	8% (2)	16% (7)	16% (8)	27% (27)
Dispute settlement [Legal instrument]	4% (1)	2% (1)	8% (4)	9% (9)
Regime complex / fragmentation [Theory lens]	0% (0)	5% (2)	2% (1)	7% (7)
Climate change [Event-driven topic]	0% (0)	7% (3)	8% (4)	15% (15)
Public stockholding [Legal instrument]	0% (0)	2% (1)	10% (5)	10% (10)
Justiciability / litigation [Normative concept]	0% (0)	0% (0)	4% (2)	4% (4)
Resilience [Theory lens]	0% (0)	0% (0)	4% (2)	5% (5)
Russia–Ukraine war [Event-driven topic]	0% (0)	2% (1)	2% (1)	12% (12)
Sustainable development / SDGs [Normative concept]	0% (0)	2% (1)	2% (1)	14% (14)
COVID-19 [Event-driven topic]	0% (0)	0% (0)	0% (0)	13% (13)

Figure 6

Share of documents per period that mention each topic, concept or theory lens (counts in parentheses).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryDataFoodSecurityTradeLaw20261116v4.xlsx