

Introduction: Rethinking Food Security Policy in Developing Economies: Why Now, Why Differently?

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Abstract

This Introduction frames a twenty-three-chapter edited volume that asks why food insecurity persists in developing economies despite decades of sustained investment in agriculture, nutrition programs, and social protection. The chapters collectively argue that the root cause is not insufficient food production but a deficit of governance: weak institutions, misaligned political incentives, fragmented decentralization, regressive subsidy regimes, undervalued marine food systems, poorly managed market chains, and inadequate policy learning mechanisms. The Introduction articulates the volume's central argument, identifies the unifying analytical thread that runs across all chapters, situates the book in relation to existing literature, and poses twenty-one organizing questions, one drawn from each chapter, that the volume seeks to answer. A chapter roadmap guides the reader through the book's four-part structure: foundational context, institutional and political economy critique, case studies and domain-specific analyses, and forward-looking policy and governance frameworks.

<https://doi.org/10.66529/book.9786277945039.2026.ch01>

Received: 15-June 2026 Revised: 30-June 2026 Accepted: 02-July 2026

Keywords: Food Security; Governance; Developing Economies; Political Economy; Institutions; Nutrition; Climate Change; Marine Food Systems; South Asia; Sustainable Development

1. Central Argument

Food insecurity in developing economies is not fundamentally an agricultural production problem. It is a governance problem. This is the argument that animates every chapter of this volume, and it runs against the grain of a long tradition in food policy that has treated hunger as primarily a shortfall of supply, a gap to be filled by more seeds, more fertiliser, more irrigation, more yield. That tradition has achieved real things: the Green Revolution increased aggregate food production by orders of magnitude, and a small number of countries have since succeeded in escaping the worst forms of chronic hunger. But the gains have been unequal, ecologically costly, and institutionally brittle. More than 733 million people remained food insecure in 2023 (FAO *et al.*, 2024). The overwhelming majority of them live in developing countries that have, in many cases, invested heavily in agriculture for decades.

The chapters in this book, contributed by scholars and researchers working across South Asia, Southeast Asia, sub-Saharan Africa, Latin America, and Europe, converge on a common diagnosis: the distance between food policy design and food security outcomes is explained by the quality, coherence, and accountability of institutions. Institutions determine whether subsidies reach farmers or are captured by intermediaries (Chapter 6). Institutions determine whether devolution produces responsive local food governance or merely displaces accountability without redistributing resources (Chapter 5). Institutions determine whether food price shocks are absorbed by well-designed safety nets or transferred as hunger to the urban poor (Chapter 8). Institutions determine whether fisheries and aquaculture are governed sustainably or depleted for short-term gain (Chapter 7). And institutions determine whether evidence actually changes policy, or whether policymakers continue with what is politically convenient regardless of what the data show (Chapter 16).

The book does not argue that production is irrelevant. Climate-smart agriculture (Chapter 12), biofortification and precision farming (Chapter 3), sustainable aquaculture (Chapter 7), and agroforestry aligned with climate commitments (Chapter 18) all have productive roles to play. But it argues that no amount of agronomic innovation will translate into sustained food security unless the institutional environment within which that innovation is deployed is capable of delivering benefits to those who need them most, the rural poor, urban households spending more than half their income on food, smallholder farmers without market access or price information, and coastal communities whose food security depends on marine ecosystems that are increasingly stressed.

Rethinking food security policy, in the spirit of this volume, means rethinking the governance of food systems. It means taking institutions seriously not as a background condition but as the primary lever of change (North, 1990; Acemoglu & Robinson, 2012). It means recognising that food security is a political achievement, not merely an agricultural one, and that sustainable progress requires political strategy, institutional investment, and systematic learning from evidence, as much as it requires better seeds and more efficient supply chains.

2. One Organizing Question from Each Chapter

The twenty-two chapters of this volume address twenty-one interconnected questions. Together they constitute the intellectual architecture of the rethinking this book proposes. The questions are posed here, with the chapter that addresses each one.

Q1. (Chapter 2 (Akram et al.) *Evolution of Food Security Policy*) How have food security policies in developing economies evolved from production-centric post-independence approaches to more holistic frameworks, and what structural constraints, governance failures, political economy pressures, and institutional weaknesses, continue to limit their effectiveness across Asia and Africa?

Q2. (Chapter 3 (Sarfraz et al.) *From Food Availability to Nutrition and Sustainable Food Systems*) What are the pathways through which food systems must transition from a calorie-quantity focus to genuine nutrition security and environmental sustainability, and what role do innovations such as biofortification, precision agriculture, smart aquaculture, and circular economy principles play in that transition?

Q3. (Chapter 4 (Akhtar et al.) *Institutional Failures and Reform Pathways*) Why do food security institutions in developing economies, illustrated with particular depth in the case of Pakistan, persistently fail to reach the most vulnerable through design failures, coordination failures, accountability failures, and adaptive failures, and what multi-horizon reform pathways are politically feasible given prevailing elite capture and IMF conditionality?

Q4. (Chapter 5 (Razaq et al.) *Decentralization and Local Food Governance*) Under what conditions, matched finance, administrative capacity, accountability systems, and national minimum standards, does the decentralization of food governance authority genuinely strengthen food security outcomes, and what design principles distinguish effective devolution from the mere displacement of responsibility without resources?

Q5. (Chapter 6 (Wahab et al.) *Political Economy of Subsidies, Procurement, and Price Controls*) Why do economically inefficient and distributionally regressive food policy instruments, fertilizer subsidies, procurement monopolies, and retail price controls, persist across widely divergent country contexts from India and Egypt to Pakistan and Nigeria, and what political economy strategies make reform feasible without harming the poor during transition?

Q6. (Chapter 7 (Aslan et al.) *Marine Food Security*) How can marine food systems, fisheries, aquaculture, and seaweed farming, with evidence from Indonesia, India, and Tanzania, be better integrated into national food security policy frameworks, and how does the proposed Global Marine Food Security Index (GMFSI) fill the most consequential gap in existing food security assessment methodologies?

Q7. (Chapter 8 (Rauf et al.) *Food Price Volatility and Policy Responses*) What are the primary drivers of food price volatility in developing economies, with particular attention to Pakistan's urban household welfare, and which policy interventions most effectively protect vulnerable populations without creating the market distortions, producer disincentives, and fiscal burdens that undermine long-run food system performance?

Q8. (Chapter 9 (Sadaf et al.), *Trade Policy, Export Bans, and Import Dependence*) How do export restrictions, import dependence, and asymmetric price transmission interact to shape food security outcomes across South Asian countries, India, Pakistan, Bangladesh, Sri Lanka, and Nepal, and what governance architectures and regional cooperation mechanisms can improve food system resilience without triggering beggar-thy-neighbor trade spirals?

Q9. (Chapter 10 (Sattar et al.) *Market Integration and Value Chain Governance*) How do physical infrastructure, market information systems, and quality standards, as structural pillars of value chain governance, jointly determine producer and consumer outcomes in developing economy food systems, and what integrated reform agenda can simultaneously reduce price spreads, raise smallholder participation, and lower consumer food costs?

Q10. (Chapter 11 (Islam et al.) *Climate Shocks and Food System Vulnerability*) Through which biophysical, socioeconomic, and institutional pathways do climate shocks, droughts, floods, heat stress, soil salinity, and cyclones, translate into food system vulnerability and nutritional deprivation, and what integrated, multi-level resilience strategies are most effective for smallholder farmers in marginal environments?

Q11. (Chapter 12 (Naqvi et al.) *Adaptive Food Security Policies under Climate Uncertainty*) How should food security governance frameworks be redesigned as adaptive rather than static systems, incorporating scenario planning, robust decision-making, early warning triggers, AI-assisted forecasting, and institutionalized feedback loops, to remain effective under the deep uncertainty that climate change imposes on agricultural planning?

Q12. (Chapter 13 (Kan et al.) *Poverty, Inequality, and Food Access*) How do structural inequalities, in assets, gender, space, and institutions, interact with poverty traps, external shocks, and global trade governance failures to reproduce food insecurity as a systemic outcome rather than a temporary shortfall, and what transformative policy frameworks address these root causes rather than their symptoms?

Q13. (Chapter 14 (Batoool et al.) *Food Security in Fragile and Conflict-Affected Contexts*) Through what mechanisms do armed conflict, political fragility, economic instability, social marginalisation, and environmental vulnerability combine to destroy the four pillars of food security in the most difficult settings illustrated through Yemen, Syria, Sudan, and Gaza and what resilience strategies are viable when governance itself has failed?

Q14. (Chapter 15 (Ahmad et al.) *Comparative Policy Lessons*) What does systematic cross-country comparative analysis using the framework $\text{Food System Outcomes} = f(\text{Policy Mix} \times \text{Institutions} \times \text{Incentives} \times \text{Resources} \times \text{Climate} \times \text{Capacity})$ reveal about which food security policies work, where they work, and under what institutional and contextual conditions, and what are the five key cross-cutting insights for policy design?

Q15. (Chapter 16 (Noor & Alam) *Adaptive and Evidence-Based Policymaking*) How can the IFPRI Kaleidoscope Model of policy change (Resnick et al., 2018), Swanson and Bhadwal's (2009) adaptive policymaking principles, and the taxonomy of single-, double-, and triple-loop organisational learning be applied to food security governance through the cases of Pakistan's Kissan Card, Brazil's CONSEA, China's policy experimentation, and Ethiopia's ATA to explain why some food security interventions endure and others collapse?

Q16. (Chapter 17 (Author TBC) *Digital Tools, Data Systems and AI*) How are remote sensing, artificial intelligence, big data analytics, and predictive modelling transforming food security monitoring and policy design, what governance and ethical challenges like digital inequality, algorithmic bias, data sovereignty, and epistemic injustice must be addressed to ensure equitable outcomes, and what institutional frameworks are needed to translate technical capability into policy impact?

Q17. (Chapter 18 (Rashid et al.) *Aligning Food Security with SDGs and Climate Commitments*) How can developing economies align their national food security policies with the Sustainable Development Goals (particularly SDG 2 and SDG 13) and the Paris Agreement's climate commitments through climate-smart agriculture, agroforestry, sustainable land management, and policy coherence frameworks, while managing trade-offs between productivity, mitigation, and adaptation?

Q18. (Chapter 19 (Razaq et al.) *National Food Security Transformation in South Asia*) What do long-run time-series analyses of food security dynamics in Pakistan, India, and Bangladesh incorporating composite index construction, volatility modelling, ARDL cointegration, and structural break analysis reveal about the trends, vulnerabilities, and policy pathways for national food security transformation in South Asia?

Q19. (Chapter 20 (Shehzadi et al.) *Food Waste among Young Consumers in Developing Countries*) What economic, behavioural, attitudinal, institutional, and sociodemographic factors drive food waste among university students in developing countries with evidence from Pakistan and what combination of targeted institutional interventions, behavioural nudges, and policy reforms can most effectively reduce food destruction in educational settings while building a culture of sustainable consumption?

Q20. (Chapter 21 (Bashir and Gogi) *Insects and Food Security in Developing Economies: Threat, Opportunity, and the Institutions That Decide Which Prevails*) How do insects simultaneously undermine and offer pathways to strengthen food security in developing economies, and what institutional conditions determine which effect dominates in each country's context?

Q21. (Chapter 22 (Hafeez et al.) *Comparative Policy Performance Across South Asia, Sub-Saharan Africa, and MENA*) How do institutional structures, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption, shape policy performance across South Asia, Sub-Saharan Africa, and MENA, and which policy innovations are transferable across these diverse governance contexts?

3. Gap in Literature: What Existing Books Miss

The scholarly literature on food security in developing economies is large, sophisticated, and growing. But it suffers from four structural gaps that this volume is specifically designed to address.

The first gap is the systematic underrepresentation of marine food systems. The overwhelming majority of food security scholarships and the vast majority of national food policy frameworks treat food security as a terrestrial phenomenon. Fisheries, aquaculture, and seaweed farming appear, when they appear at all, as specialist subsectors rather than as integral pillars of national food security. This is analytically unjustifiable: for hundreds of millions of people in coastal Indonesia, India, Tanzania, Bangladesh, and across the Pacific Island states and sub-Saharan African littoral, marine foods are the primary source of protein, micronutrients, and cash income. Chapter 8 of this volume directly addresses this gap by proposing the Global Marine Food Security Index (GMFSI) as an integrated assessment framework that treats marine food security on the same analytical footing as terrestrial food security.

The second gap is the disconnect between political economy analysis and comparative institutional analysis in food policy scholarship. We have a rich empirical literature on the effects of subsidies, export bans, public distribution systems, and procurement monopolies but relatively little systematic comparative work on why

these instruments persists despite their documented inefficiencies, and what political conditions make reform feasible. Chapters 5 and 8 of this volume fill this gap with a four-pillar political economy framework (principal-agent theory, collective action problems, institutional path dependence, and distributional coalition theory) applied comparatively across India, Egypt, Pakistan, Indonesia, Nigeria, and Brazil.

The third gap is the treatment of decentralisation as a policy intervention rather than as a governance variable. A very large literature examines what decentralisation does to service delivery in health and education; a much smaller literature examines what it does to food security. The conditions under which subnational food governance is more effective than central direction and the design principles that distinguish functional devolution from merely displaced responsibility are poorly established. Chapter 4 of this volume develops a multilevel framework for local food governance and tests it against fiscal and institutional evidence from Pakistan, India, Brazil, Kenya, Indonesia, and Ethiopia.

The fourth gap is the absence of integration across the terrestrial-marine, production-governance, and national-international divides. Most food security volumes are either primarily agronomic or primarily political economy in their orientation; either production-focused or access-focused; either concerned with individual countries or with global aggregates. This volume is unusual in spanning all of these divides simultaneously, tracing the threads connecting smallholder price transmission and global agricultural trade governance, food waste behaviour in Pakistani universities and global food system sustainability, and adaptive governance theory and the everyday institutional realities of Pakistan's PASSCO wheat scandal.

4. How This Book Fills Those Gaps

This volume fills the four gaps identified above through three design choices.

First, it integrates marine and terrestrial food security analysis within a single edited volume, treating Chapter 8 not as an appendix or specialist contribution but as a foundational chapter that challenges readers working on terrestrial food systems to take marine food governance seriously. The GMFSI framework proposed there is a methodological contribution intended to stimulate further comparative research and, ultimately, to influence the food security assessment methodologies of international organisations including FAO, WFP, and IFPRI.

Second, it places institutional and political economy analysis at the centre of every chapter. Even chapters that might appear primarily technical on price transmission (Chapter 8), market integration (Chapter 9), digital tools (Chapter 17), or food waste (Chapter 20) are organized around the question of why dysfunctional arrangements persist and what governance conditions enable better outcomes. This institutional thread is the volume's analytical spine.

Third, it adopts a genuinely multi-scale perspective, connecting analysis at the household level (food waste behaviour, household welfare effects of price volatility), the community level (local food governance, smallholder market participation), the national level (institutional reform pathways, national food security transformation), the regional level (South Asian trade policy, comparative South Asian food security dynamics), and the global level (climate commitments, SDG alignment, marine food security). Food security outcomes are jointly produced across all of these scales simultaneously, and a volume that ignores any one of them will miss essential parts of the causal story.

5. Chapter Roadmap

The volume is organised into four thematic parts.

Part I: Foundational Context (Chapters 2–3)

Chapter 2 (Akram *et al.*) provides the historical and comparative foundation for the book's argument, tracing the evolution of food security policy in developing economies across three phases: the production-centric Green Revolution era (1950s–1970s), the access-and-distribution transition phase (1980s–1990s), and the current nutrition-sensitive and sustainability-oriented phase. Drawing on comparative evidence from Bangladesh, India, and Myanmar and case analyses of Pakistan and India, the chapter documents persistent

governance constraints (institutional inefficiency, targeting failures, political economy distortions) that have limited policy effectiveness across all three phases. The key finding is that food security gains have been driven primarily by productivity improvement rather than structural changes in access and governance architecture.

Chapter 3 (Sarfaraz *et al.*) examines the conceptual and practical shift from quantitative food availability to qualitative nutrition security and environmental sustainability. It surveys the determinants of food access and utilisation, documents the rising burden of both under-nutrition and diet-related non-communicable diseases, and explores the innovations (biofortification, precision agriculture, smart aquaculture, circular economy approaches in food systems) that offer pathways toward more nutritious and sustainable food futures. The chapter emphasises that technology alone cannot drive this transition; policy and governance must create enabling conditions for nutritional and environmental objectives to be embedded throughout food systems.

Part II: Institutional and Political Economy Critique (Chapters 4–6)

Chapter 4 (Akhtar *et al.*) is the analytical centrepiece of the book, developing a four-type typology of institutional failure design failure, coordination failure, accountability failure, and adaptive failure and applying it to the governance of food security in Pakistan. Drawing on comparative evidence from Bangladesh (nutritional progress through institutional innovation), India (Aadhaar-based PDS reform), Brazil (Fome Zero and CONSEA), and Ethiopia (Productive Safety Net Programme), the chapter argues that durable food security is an institutional accomplishment and outlines a multi-horizon reform pathway calibrated to Pakistan's political economy constraints.

Chapter 5 (Razaq *et al.*) examines decentralisation as a food security governance variable, developing a multilevel framework for local food governance and comparing fiscal and institutional patterns across Pakistan, India, Indonesia, Kenya, Brazil, Bangladesh, and Ethiopia using SNG-WOFI fiscal data. It identifies five risk mechanisms unfunded mandates, elite capture, territorial inequality, fragmentation, and exclusion and proposes seven design principles for effective decentralised food governance. The chapter argues that devolution is neither a cure nor a cause of failure by itself; it is a governance design problem that requires matched authority, finance, capacity, accountability, and national minimum standards.

Chapter 6 (Wahab *et al.*) builds a comprehensive political economy framework for explaining the persistence of economically inefficient food policy instruments such as fertilizer subsidies, procurement monopolies, and retail price controls across India, Egypt, Pakistan, Indonesia, Nigeria, and Brazil. Grounding the analysis in principal-agent theory, collective action problems, institutional path dependence, and distributional coalition theory, the chapter explains why reform is politically costly even when economically beneficial, and identifies the conditions like fiscal crisis, technocratic capacity, alternative social protection, and political leadership under which reform has succeeded. It concludes with a sequenced reform roadmap and ten policy recommendations.

Part III: Case Studies and Domain-Specific Analyses (Chapters 7–15)

Chapter 7 (Aslan *et al.*) addresses the volume's most consequential gap in existing food security literature: the systematic underrepresentation of marine food systems. Drawing on comparative evidence from Indonesia (the world's largest seaweed producer), India (the world's largest fishing employment base), and Tanzania (Africa's leading seaweed economy), the chapter proposes the Global Marine Food Security Index (GMFSI) a multidimensional framework integrating availability, accessibility, utilisation, and sustainability dimensions alongside a Seaweed Security Sub-Index as a novel analytical tool for assessing marine food security performance. Policy solutions spanning ecosystem-based fisheries management, sustainable aquaculture, seaweed integration into national nutrition programmes, and blue economy governance are evaluated.

Chapter 8 (Rauf *et al.*) provides a PRISMA-protocol systematic review of the drivers and consequences of food price volatility in developing economies, with particular attention to Pakistan. Drawing on household-level welfare studies using GARCH/IGARCH models and fixed-effect pseudo-panel approaches, the chapter

documents the persistently negative effects of price instability on household welfare, dietary diversity, and nutrition outcomes for vulnerable urban populations. It evaluates trade policies, subsidies, price controls, and social safety nets as stabilisation instruments and concludes that no single instrument is adequate; an integrated policy framework combining market infrastructure development, social protection, and institutional strengthening is required.

Chapter 9 (Sadaf *et al.*) examines the complex relationship between trade policy instruments and food security outcomes in South Asia. Drawing on price transmission analysis (von Cramon-Taubadel, 1998), welfare economics, and comparative evidence on export bans and import dependence across India, Pakistan, Bangladesh, Sri Lanka, and Nepal, the chapter documents how export restrictions during the 2007–08 and subsequent food crises amplified rather than dampened price volatility for importing countries. It analyses the structural causes of South Asian import dependence and proposes strategic recommendations for regional food reserve mechanisms, rules-based export restriction frameworks, and diversified import sourcing strategies.

Chapter 10 (Sattar *et al.*) investigates market integration and value chain governance (Gereffi *et al.*, 2005), deploying six econometric methods, Johansen cointegration, VECM, NARDL, OLS with fixed effects, Propensity Score Matching, and Heckman selection models, to demonstrate that road quality is the single strongest predictor of farm-gate prices ($\beta = 0.312$), that captive governance chains impose a 38% consumer welfare cost relative to competitive alternatives, and that full governance integration combining infrastructure, information, and inclusive standards raises smallholder market participation from 22% to 74%. The chapter argues for a coordinated five-pillar reform agenda: rural road investment, ICT-based market information systems, inclusive standards design, contract enforcement, and governance restructuring.

Chapter 11 (Islam *et al.*) maps the pathways through which climate shocks (drought, flooding, soil salinity, heat stress, and tropical cyclones) translate into food system vulnerability and nutritional deprivation. Drawing on the IAEA Technical Meeting framework and case evidence from the 2012–2016 California drought, Cyclone Amphan, Pakistan's 2022 floods, sub-Saharan African chronic drought systems, and South Asian heatwaves, the chapter documents the biophysical, socioeconomic, and gender dimensions of climate-food system interactions and identifies biotechnological innovations, climate-smart agriculture practices, and early warning systems as priority interventions.

Chapter 12 (Naqvi *et al.*) moves from the diagnosis of climate vulnerability to the design of adaptive policy responses. It argues that conventional static food security policies premised on stable climate and predictable supply-demand relationships are structurally inadequate under deep uncertainty. Drawing on adaptive governance theory, scenario-based planning, Robust Decision-Making (RDM; Lempert *et al.*, 2019), trigger-based policy mechanisms, and AI-assisted forecasting, the chapter outlines how decision-making processes, learning systems, institutional agility, and specific policy tools (dynamic food reserves, flexible subsidies, climate-indexed insurance, scalable safety nets) must be redesigned for adaptive food security governance.

Chapter 13 (Kan *et al.*) analyses food insecurity as a structural outcome of multidimensional poverty, inequality, and external shocks rather than as a temporary shortfall. Drawing on Sen's (1981) entitlement approach, the Sustainable Livelihoods Framework, and distributional coalition theory, the chapter documents how asset inequality (particularly land), gender inequality, spatial inequality (rural-urban divide), institutional inequality (elite capture), and global trade governance failures interact to reproduce food insecurity across generations. The chapter proposes transformative political economy frameworks rights-based approaches, pro-poor land reform, gender-sensitive extension services, and restructured social protection as alternatives to the market-efficiency paradigm that has dominated food policy for four decades.

Chapter 14 (Batool *et al.*) examines food security in its most challenging context: fragile and conflict-affected states. Drawing on recent evidence from Sudan, Syria, Yemen, Gaza, and Lebanon (2022–2026), the chapter documents how armed conflict, political fragility, economic instability, social marginalisation, and environmental fragility jointly destroy each of the four pillars of food security (FAO, 2006). It develops a conceptual framework integrating conflict, market systems, and governance dynamics, reviews resilience strategies from diverse fragile contexts, and analyses the interplay between geopolitical wars and global food

price crises including the Russian invasion of Ukraine's impact on wheat exports and the Middle East conflicts' effects on regional food access.

Chapter 15 (Ahmad *et al.*) synthesises evidence from cross-country comparative analysis using the framework Food System Outcomes = f(Policy Mix × Institutions × Incentives × Resources × Climate × Capacity). The chapter identifies five cross-cutting insights: that policy coherence is essential (fragmented initiatives produce contradictory incentives); that institutional capacity is the binding constraint on policy effectiveness; that political economy factors shape both policy design and uptake; that integrated approaches outperform sectoral interventions; and that adaptive learning is indispensable under uncertainty. It proposes a context typology linking policy appropriateness to institutional capacity levels and identifies the conditions for policy success drawing on experiences from Rwanda, Vietnam, Indonesia, Brazil, Ethiopia, Bangladesh, and India.

Part IV: Forward-Looking Policy and Governance Frameworks (Chapters 16–22)

Chapter 16 (Noor & Alam) provides the volume's most theoretically sophisticated analysis of food security governance reform, applying the IFPRI Kaleidoscope Model of policy change (Resnick *et al.*, 2018), Swanson and Bhadwal's (2009) seven adaptive policymaking principles, and the taxonomy of single-, double-, and triple-loop organisational learning to four national case studies: Pakistan's Kissan Card Subsidy Programme, the institutionalisation and dismantling of Brazil's CONSEA, China's regional policy experimentation approach, and Ethiopia's Agricultural Transformation Agency (ATA). The chapter argues that policies achieving true durability are those anchored in institutions capable of sustained double and triple-loop learning, continuously questioning not just how policies are implemented but whether the right goals are being pursued and whether the learning mechanisms themselves are structured appropriately.

Chapter 17 (Author TBC) examines how remote sensing, artificial intelligence, big data analytics, and predictive modelling are transforming food security monitoring, early warning, and policy design. Drawing on sociotechnical systems theory, digital sovereignty frameworks, and evidence-to-policy translation models, the chapter documents both the transformative potential and the governance challenges of digital food security tools: a consistent digital divide concentrates technological benefits in high-income countries while the most food-insecure populations generate fewer of the digital signals these systems process; crop monitoring algorithms are frequently not available for independent review; and the majority of AI and remote sensing food security research is conducted by Global North institutions about Global South populations, constituting what the chapter terms 'epistemic injustice.'

Chapter 18 (Rashid *et al.*) maps the interfaces between food security, the SDGs (United Nations, 2015), and global climate commitments particularly SDG 2 (Zero Hunger), SDG 13 (Climate Action), and the Paris Agreement. It evaluates climate-smart agriculture, agroforestry, sustainable land and water management, and food loss and waste reduction as policy instruments that simultaneously advance food security and climate objectives. Drawing on evidence from Nationally Determined Contributions and National Adaptation Plans across developing economies, the chapter identifies institutional fragmentation as the primary barrier to SDG-climate alignment and argues that policy coherence across agriculture, trade, water, energy, and finance ministries is the critical enabling condition for achieving the synergies between food security and climate action that individual sectoral policies cannot produce alone.

Chapter 19 (Razaq *et al.*) provides the most technically sophisticated empirical analysis in the volume, constructing a six-dimensional National Food Security Index for Pakistan, India, and Bangladesh using time-series data from 2000 to 2025. Drawing on ARDL cointegration, NARDL asymmetry analysis, VAR/VECM models, GARCH volatility modelling, and structural break analysis, the chapter documents the trends, volatility patterns, and structural shifts in South Asian food security over a quarter century including the impacts of the 2007–08 global food price crisis, COVID-19, and the Ukraine war and derives policy pathways calibrated to each country's specific institutional and resource context.

Chapter 20 (Shehzadi *et al.*) continues with an analysis of food waste among young consumers in developing countries, focusing on university students in Pakistan. Drawing on the economic theory of consumer

behaviour, the Theory of Planned Behaviour (TPB; Ajzen, 1991), institutional theory, and behavioural economics, the chapter documents the drivers of plate waste in institutional dining settings portion sizes, subsidised pricing, attitudinal factors, social norms, and structural institutional practices and evaluates the effectiveness of trayless dining programmes, mindfulness campaigns, portion control initiatives, and waste auditing systems. The chapter is a reminder that food security is not only about getting food to people who lack it; it is also about not wasting the food that reaches people who have it.

Chapter 21 (Bashir and Gogi) turns to a domain that food security scholarship has generally treated as peripheral: insects. Drawing on the desert locust upsurge of 2019–2021, the spread of fall armyworm across Asia and Africa, and the slow institutionalization of insect farming and entomophagy in countries such as Thailand, the chapter develops the Insect-Mediated Food Security Framework (IMFSF), modelling net food security impact as the difference between institutionally mediated losses avoided and value captured. Applied to Pakistan, the framework shows how weak extension delivery, pesticide subsidy distortions, fragmented quarantine authority, and an absent regulatory pathway for insect-based food and feed constrain both sides of the ledger, and the chapter closes with governance recommendations on surveillance, integrated pest management, and regulatory reform.

Chapter 22 (Hafeez *et al.*) closes the volume with a comparative analysis of policy performance across South Asia, Sub-Saharan Africa, and MENA. Drawing on Institutional Theory and the Worldwide Governance Indicators framework, the chapter evaluates six governance dimensions, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption, to show that policy success depends on institutional capacity and local adaptation as much as design. It finds that South Asia benefits from democratic participation and digital transformation, Sub-Saharan Africa innovates despite institutional constraints, and MENA leverages centralized planning, concluding that effective policy transfer requires institutional compatibility and context-specific adaptation rather than a single universal model.

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Declaration: AI-assisted tools (LLMs) were used to improve the language and grammar of this chapter. The authors reviewed and approved all content and assume full responsibility for its accuracy.