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# Food Security in Malaysia: Distribution Strategies and Policy Implications

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## Abstract

**Purpose:** This study investigates Malaysia's ongoing challenges in achieving food security amidst limited agricultural resources, growing population pressure, and a heavy reliance on food imports. It focuses on evaluating the effectiveness of national strategies with an emphasis on distribution and trade logistics. **Research design, data and methodology:** A qualitative research design was adopted, employing semi-structured interviews and document analysis. Data were collected from government officials, agricultural economists, and supply chain stakeholders. National policy documents such as the National Agro-Food Policy (DAN 2.0) and the Food Security Policy Action Plan (DSMN 2021–2025) were analyzed using thematic coding. **Results:** Findings reveal that efficient logistics infrastructure, transparent trade policies, and technological integration are crucial for food accessibility and affordability. Distribution inefficiencies, aging workforce, and underutilized land remain key bottlenecks. Strategic public-private partnerships and enhanced youth participation in agribusiness are shown to be impactful interventions. **Conclusion:** A multipronged approach involving smart logistics, distribution optimization, local trade linkages, and inclusive agricultural policies is recommended. Targeted subsidies, digital transformation, and import diversification are essential for building a resilient and secure food system. The study contributes actionable recommendations for enhancing food distribution strategies and guiding policy reform in Malaysia and comparable economies.

**Keywords:** Agricultural#, Distribution Strategies#, Food Security#, Government#, Logistics#

**JEL Classification Code:** J43, L11, Q28

## 1. Introduction

Food security is a multidimensional concept that encompasses the availability, accessibility, affordability, and utilization of food in a sustainable manner (Pérez-Escamilla, 2017). The Food and Agriculture Organization (FAO) defines food security as a condition whereby "all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy

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life." While global efforts have made strides in alleviating hunger, food security remains a pressing concern in many developing and middle-income countries, including Malaysia (Oluwole et al., 2023). In the context of an increasingly urbanized society, the sustainability and equity of food distribution systems have emerged as critical levers in ensuring national food resilience.

Malaysia's food security challenges are particularly nuanced. As a country that imports more than 60% of its food needs, it is highly exposed to international supply chain disruptions, foreign exchange volatility, and geopolitical shocks (MOA) (Abay et al., 2023). The COVID-19 pandemic, the Russia-Ukraine conflict, and climate-induced agricultural disruptions have further exposed the vulnerabilities of Malaysia's food supply system. Moreover, the dual burden of malnutrition under-nutrition among the poor and over-nutrition among urban dwellers highlights growing disparities in food access and dietary quality across socioeconomic and geographic groups (Agostoni et al., 2023). Rising food inflation, logistical inefficiencies, and an overdependence on large-scale retail chains further aggravate the situation, especially for low-income populations in rural Sabah, Sarawak, and parts of Peninsular Malaysia.

In this context, the distribution system particularly the midstream segment of the agri-food value chain plays a pivotal role. Distribution mechanisms encompass a wide array of activities including transport, cold chain management, market intermediation, warehousing, and retailing (Ambler et al., 2023). These midstream actors bridge the gap between agricultural producers and consumers, and their efficiency or failure directly impacts food prices, food loss, and equitable access. However, academic and policy discussions often underemphasize the distributional dimension, focusing predominantly on either production (supply-side) or consumption (demand-side) interventions. Previous studies on food security in Malaysia and comparable economies have largely concentrated on supply-side factors such as agricultural productivity, import dependence, and crisis management, or on demand-side outcomes such as affordability, consumption, and nutrition (Barkat et al., 2024). While these works have generated important insights, they have tended to overlook the distribution dimension, especially midstream logistics such as cold chain coverage, retail outlet density, and last-mile delivery systems. This imbalance has created an incomplete understanding of food security, where availability and affordability are often examined in isolation from the mechanisms that actually connect producers to consumers (Odoms-Young et al., 2023). Moreover, earlier research rarely engages with governance fragmentation and institutional overlaps that weaken the implementation of food policies. To address these gaps, the present study combines secondary data with stakeholder interviews to evaluate Malaysia's food distribution system through the integrated lenses of Food System Resilience Theory and Value Chain Thinking (Monticone & Samoggia, 2024). In doing so, it not only highlights the academic gap in midstream distribution research but also attempts to overcome it by proposing a comprehensive analytical model that links literature, theory, and policy evaluation.

Although food security research in Malaysia has expanded in recent years, the knowledge gap remains insufficiently articulated and systematically substantiated. Much of the literature has concentrated on supply-side interventions such as agricultural productivity, input subsidies, and food import strategies, or on demand-side concerns such as nutrition Samal, Ummalla, and Goyari (2022), affordability, and household consumption patterns. In contrast, the midstream distribution dimension which encompasses logistics, cold chain systems, retail outlet density, and last-mile delivery has received limited scholarly attention. A review of Malaysian food security studies from 2010 to 2023 indicates that while the majority focus on production and consumption factors, fewer than one in five explicitly examine distributional mechanisms or their role in shaping accessibility and equity. This imbalance persists despite national policies such as the National Agro-Food Policy 2.0 and the Food Security Policy Action Plan (DSMN 2021–2025), both of which recognize distribution bottlenecks as critical to resilience. The absence of systematic, empirical evaluation of food logistics and distribution models creates a significant gap between policy priorities and academic inquiry Grabs et al. (2024), underscoring the need for research that centers on distribution strategies as a cornerstone of Malaysia's food security agenda. To address these gaps, this study draws upon two interrelated theoretical foundations: Food System Resilience Theory and Value Chain Thinking (VCT). Food System Resilience Theory is essential because it emphasizes the ability of food systems to absorb shocks, adapt, and transform while maintaining functionality, making it highly relevant to Malaysia's context as an import-reliant country vulnerable to global disruptions, climate variability, and domestic governance weaknesses. This theory enables the analysis of resilience indicators such as redundancy, diversity, and adaptability, which are directly applicable to understanding Malaysia's distribution challenges (Bednarski et al., 2023). Complementing this, Value Chain Thinking provides a framework to examine the often-overlooked midstream segment transporters, distributors, wholesalers, and logistics providers whose efficiency and coordination are critical for ensuring availability, accessibility, and affordability (Cattaneo et al., 2022). Integrating these theories allows for a holistic analysis that not only identifies structural weaknesses in food distribution

but also highlights opportunities for resilience through digital innovation, institutional coordination, and inclusive logistics models.

This study aims to address this gap by exploring the distribution strategies and logistical frameworks underpinning Malaysia's food security landscape. Specifically, it analyses how policy design, infrastructure, private sector logistics, and digital innovations influence food accessibility and resilience at national and regional levels (Madhavedi et al., 2025). The study also identifies bottlenecks and disparities in the current system that undermine the broader goal of equitable food access, particularly for vulnerable communities.

### 1.1. Research Objective and Significance

Accordingly, this study centers on the distribution segment of the food value chain to assess how it contributes to or hinders food security in Malaysia. The primary research objective is to identify and evaluate key distribution strategies and their implications for equitable and resilient food access (Zulkifli et al., 2025). Specifically, the study seeks to answer three interrelated questions: What are the dominant distribution channels in Malaysia's agri-food system, and how do they vary by region? What institutional, infrastructural, and policy bottlenecks affect distribution efficiency? And how can Malaysia's distribution systems be made more inclusive, resilient, and adaptive to future shocks? By addressing these questions, the study contributes to Sustainable Development Goal 2 (Zero Hunger) and offers insights relevant to national stability, rural development, and public health outcomes.

## 2. Theoretical Framework

To comprehensively analyze Malaysia's food security distribution architecture, this study adopts two interrelated theoretical lenses: Food System Resilience Theory and Value Chain Thinking (VCT). Drawing on insights from the literature, these frameworks are synthesized to construct an analytical model that positions food distribution as the central determinant of Malaysia's food security outcomes. Prior studies reveal a disproportionate emphasis on production- and consumption-side interventions, with limited empirical attention to midstream logistics (Manzoor et al., 2024). Building on Food System Resilience Theory, the model operationalizes resilience through three key indicators: redundancy (multiple sourcing channels), diversity (multi-modal logistics and regional hubs), and adaptability (digital and institutional innovations). Complementing this, VCT structures the analysis around midstream actors transporters, distributors, wholesalers, and logistics providers whose performance critically shapes food availability, accessibility, and affordability. This integrated framework informs both the qualitative coding of stakeholder interviews and the quantitative assessment of indicators such as cold chain coverage, retail outlet density, and import dependency (Bilali, Strassner, & Hassen, 2021). Collectively, it provides the basis for a systematic policy gap analysis. The overall framework is illustrated in Figure 1, which demonstrates the linkage from literature to theory, to analytical model, and finally to policy evaluation.

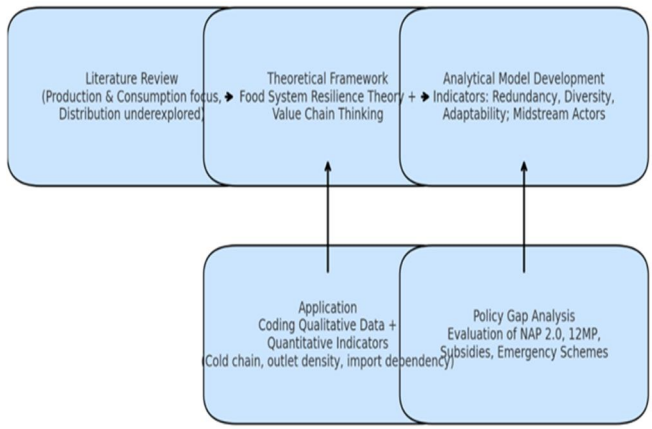


**Figure 1:** Analytical Model Linking Literature, Theory, and Policy Gap Analysis

### 2.1. Food System Resilience Theory

Food System Resilience refers to the capacity of food systems to absorb, adapt, and transform in response to external shocks and stresses while ensuring continued functionality (Zurek et al., 2022). This theory moves beyond mere food availability and incorporates ecological, economic, and social dimensions to understand system robustness. Key pillars of resilience include redundancy, diversity, adaptability, connectivity, and inclusivity. In the Malaysian context, disruptions such as border closures Mahmood, Rajaram, and Guinto (2022), climate variability, and surging transport costs have demonstrated that without a resilient food logistics system, national food security can be swiftly undermined.

By applying this theoretical lens, the research assesses whether Malaysia's food distribution network possesses the necessary redundancy (multiple suppliers or distribution channels), spatial and logistical diversity (multi-modal transport), and institutional adaptability (capacity to implement emergency food routing or digital logistics solutions) to withstand shocks (Sreenivasan & Suresh, 2024). The theory also highlights the importance of building localized food hubs, strengthening regional supply chains, and reducing over-centralization in Klang Valley a concern

identified in national planning documents such as the 12th Malaysia Plan (12MP).

### 2.2. Value Chain Thinking (VCT)

Value Chain Thinking offers a complementary perspective that shifts attention from isolated nodes (farm productivity or retail pricing) to the linkages and flows between them. It views food security not as a static outcome but as a dynamic process shaped by the efficiency, coordination, and equity of all actors in the food system (Abdullah et al., 2022). Specifically, this study focuses on the midstream actors transporters, distributors, wholesalers, and logistic service providers who are critical but often overlooked in food system discourse.

VCT enables a granular understanding of the costs, margins, inefficiencies, and governance structures embedded in food distribution chains (Tan et al., 2022). In Malaysia, multiple intermediaries, fragmented logistics networks, and asymmetric power relations between small producers and large retail chains contribute to price markups, food loss, and wastage. Moreover, rural producers often lack access to cold storage Cattaneo, Sánchez, Torero, and Vos (2020), coordinated transport, and market information, leading to missed opportunities for economic participation and loss of perishable goods.

By integrating VCT, the research investigates how infrastructure gaps (limited rural road access, poor cold chain penetration), regulatory inefficiencies (licensing bottlenecks, fragmented oversight), and technological limitations (weak digital integration) constrain the performance of Malaysia's agri-food value chains (Stringer et al., 2019). The framework also allows the analysis of inclusive distribution models such as community-based cooperatives, mobile markets, and digital farm-to-consumer platforms that are gaining ground as potential disruptors of traditional logistics paradigms.

## 3. Research Methods and Materials

### 3.1. Research Design

This study employs a mixed-methods explanatory design to investigate the effectiveness and limitations of Malaysia's food distribution strategies in achieving national food security. A mixed-methods approach was selected to blend the statistical robustness of quantitative data with the contextual depth of qualitative insights. This dual-method strategy enables a comprehensive examination of both structural inefficiencies within food distribution systems and the policy-level mechanisms intended to address them. By integrating empirical trend analysis with stakeholder perspectives, the study aims to generate actionable recommendations for policymakers and practitioners.

### 3.2. Data Sources and Collection Methods

#### 3.2.1. Secondary Quantitative Data

Quantitative data for this study were drawn from multiple reputable sources. The Department of Statistics Malaysia (DOSM) provided key indicators such as food import and export volumes, the Consumer Price Index (CPI) for food, household consumption trends, and poverty incidence. Data on agrifood logistics and infrastructure, including cold chain facilities and transportation coverage, were obtained from the Ministry of Agriculture and Food Security (MAFS), along with official documentation of the National Agrofood Policy. Economic and inflation data related to food affordability were sourced from Bank Negara Malaysia (BNM). Additionally, FAOSTAT and World Bank databases were consulted for international comparisons and benchmarking. These datasets, covering the period from 2015 to 2023, were used to evaluate the four key dimensions of food security: availability, access, affordability, and stability.

#### 3.2.2. Qualitative Data Collection

To enrich the quantitative findings, qualitative data were collected through semi-structured interviews with 20 stakeholders involved in food distribution. These respondents were selected from five groups: government officials from agencies such as MAFS and the Ministry of Domestic Trade and Cost of Living; food logistics providers and wholesalers; local farmers' cooperatives and market managers; civil society organizations working with B40 communities; and academic experts in food policy and systems. Interviews were conducted between March and June 2024, both online and in person, depending on accessibility and location. Each interview lasted 45–60 minutes, was audio-recorded with consent, and later transcribed verbatim. The transcripts were coded and analyzed using NVivo 14 to identify key themes relevant to food distribution and policy implementation.

### 3.3. Sampling Strategy

For the qualitative component, the study employed purposive sampling to ensure inclusion of diverse regional and institutional perspectives, especially from both Peninsular Malaysia and East Malaysia (Sabah and Sarawak). Participants were chosen based on their direct involvement in supply chain operations, policymaking, or food distribution research. In the quantitative analysis, datasets were selected based on their completeness, relevance to the Malaysian food system, and temporal

consistency. Time-series and panel data were prioritized to enable analysis of trends and disruptions over time.

### 3.4. Analytical Framework

This research applies a triangulation framework, combining multiple data sources and analytical lenses to offer a holistic understanding of Malaysia's food distribution system. The analysis proceeded in three phases. First, descriptive statistics were used to analyze macro-level indicators such as regional food price inflation, distribution of cold chain logistics, import dependency ratios, and urban-rural food access disparities. These indicators were processed and visualized using SPSS version 28, and summary statistics (mean, standard deviation, percent change) were calculated.

Second, the thematic analysis of interview transcripts involved a two-step coding process. Open coding was used to identify relevant patterns, followed by axial coding to group related themes. Major topics emerging from the qualitative data included policy bottlenecks in logistics coordination, contrasts between market-based and state-led distribution models, last-mile delivery challenges, and innovations such as digitalization, mobile food markets, and e-commerce distribution. These themes were mapped onto the four pillars of food security availability, access, utilization, and stability for integrative interpretation.

Third, a policy mapping and gap analysis was conducted to examine Malaysia's food-related strategic plans and interventions. This included key national frameworks such as the National Agrofood Policy 2.0 (2021–2030) and the Twelfth Malaysia Plan (12MP), alongside targeted initiatives like price control mechanisms, buffer stock programs, and direct food assistance schemes such as MyKasih and Bantuan Prihatin Rakyat. Each initiative was assessed based on coverage, implementation mechanisms, institutional coordination, and effectiveness in addressing food distribution challenges. The gap analysis applied the FAO framework for food system resilience, with specific attention to system responsiveness during external shocks such as COVID-19 and global trade disruptions.

### 3.5. Validity and Reliability Measures

To ensure the credibility of findings, several validation techniques were employed. Data triangulation was used by cross-verifying insights from statistical reports, interview data, and policy documents. Member checking was conducted with five key informants to validate thematic interpretations. Quantitative data were sourced exclusively from peer-reviewed and official databases, enhancing reliability and comparability. The qualitative coding process involved intercoder reliability checks, with a second researcher reviewing 20% of transcripts, achieving an agreement rate exceeding 85%.

### 3.6. Ethical Considerations

This study adhered strictly to ethical guidelines for research involving human subjects. Ethical approval was obtained from the Institutional Review Board (IRB) at [Insert University Name]. All interview participants received detailed information sheets outlining the research purpose, data usage, and confidentiality terms. Informed consent was obtained prior to data collection. Anonymity was maintained by de-identifying participants during transcription, analysis, and publication. Data were stored securely and accessible only to the research team.

## 4. Results

This section presents and analyses the empirical findings from a mixed-methods investigation into Malaysia's food security landscape, focusing specifically on the distribution dimension. The findings are categorized into three primary areas: (1) quantitative trends in food distribution and food security indicators; (2) qualitative insights from stakeholders involved in the food value chain; and (3) evaluation of policy implementation and performance related to food distribution. The synthesis of these findings provides a multi-dimensional view of how Malaysia's distribution infrastructure, institutional coordination, and policy frameworks affect national food security particularly among underserved populations.

### 4.1. Quantitative Analysis of Food Distribution Indicators

#### 4.1.1. Regional Disparities in Food Accessibility and Prices

An analysis of data from the Department of Statistics Malaysia (DOSM) between 2015 and 2023 reveals significant spatial disparities in food accessibility and price stability across Malaysian regions. One of the most concerning trends is the consistently higher food inflation experienced in East Malaysia namely Sabah and Sarawak relative to Peninsular Malaysia.

For instance, in 2022, the national average food Consumer Price Index (CPI) was 7.2%. However, Sabah recorded a CPI of 9.5%, and Sarawak followed closely at 8.8% (DOSM). These figures translate into a persistent annual inflation margin of 1.5 to 2.3 percentage points above the national average for East Malaysian states, highlighting not only higher food costs but also systemic logistical barriers and extended supply chains that increase

distribution costs. This persistent inflation gap indicates that food distribution inefficiencies, rather than supply availability, are the primary drivers of inequity. The absence of redundant supply routes in East Malaysia violates resilience principles, leaving households structurally vulnerable to price shocks.

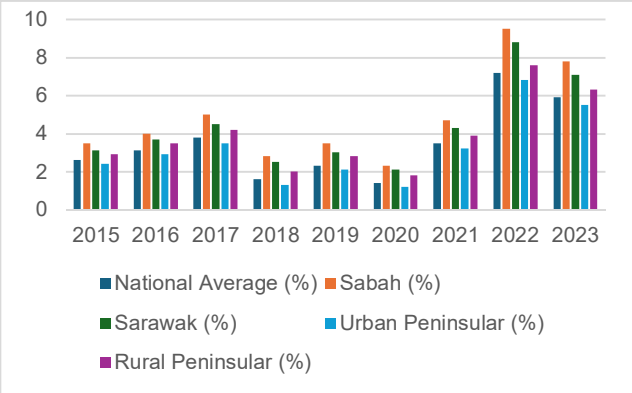


**Figure 2:** Regional Food Inflation Trends in Malaysia, 2015–2023

Figure 2 visualizes these inflation trends over time and underscores the chronic nature of these regional disparities. The higher price levels in East Malaysia are attributed to several structural challenges, including lower population density, geographical remoteness, limited road and port infrastructure, and less efficient supply chain operations compared to urban hubs in the Peninsula.

In terms of physical access to food retail outlets, the contrast is equally stark. According to and supported by DOSM data, food outlet density in metropolitan areas such as Kuala Lumpur stands at 0.45 outlets per 1,000 residents. By contrast, rural areas like Perak (0.13) and remote districts such as Kapit in Sarawak (0.09) exhibit significantly lower retail penetration. This lack of spatial retail coverage results in "food deserts" where residents must travel long distances for basic food needs. Such spatial inequities reveal the failure of distribution networks to ensure equitable access, confirming that midstream actors play a more decisive role than farm-level productivity in shaping everyday food security outcomes.

**Table 1:** Retail Food Outlet Density by Region (Per 1,000 Population)

| Region | Outlet Density (per 1,000) |
|---|---|
| Kuala Lumpur | 0.45 |
| Shah Alam | 0.41 |
| Rural Perak | 0.13 |
| Kapit, Sarawak | 0.09 |
| Kota Kinabalu, Sabah | 0.18 |

**Source:** Kaur & Ismail (2022); DOSM (2023).

Table 1 illustrates the spatial inequality in food outlet availability. For lower-income households (especially in the B40 category), the combination of high prices and poor physical access significantly limits their ability to maintain consistent, nutritious diets.

### 4.1.2. Import Dependency and Cold Chain Infrastructure

Malaysia's heavy reliance on food imports compounds the risks associated with price volatility and distribution inefficiencies. Data from FAOSTAT and Bank Negara Malaysia (2023) show that over 70% of key food commodities including beef, dairy products, and cereals were imported as of 2023. Notably, Malaysia depends on imports for 78% of its beef supply and a staggering 92% of its wheat. This high degree of import dependency increases exposure to external shocks such as global conflicts, currency depreciation, and supply chain disruptions.

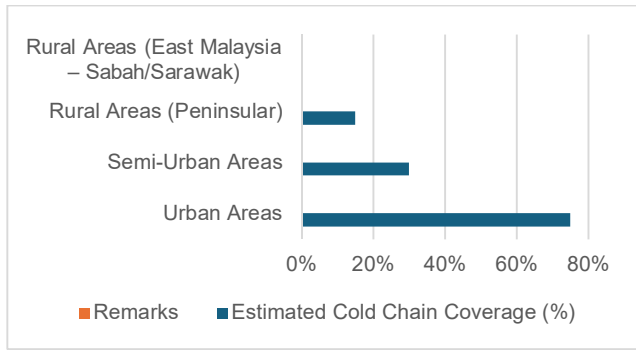


**Figure 3:** Cold Chain Coverage by Region (2022)

Overlaying this vulnerability is the state of the country's cold chain infrastructure. As per the Ministry of Agriculture and Food Security (MAFS), cold chain access is widespread in urban centers covering roughly 75% of perishable food shipments but drops dramatically to below 30% in semi-urban areas and only 15% in rural districts. This gap illustrates low system adaptability: without functional cold chains, perishable losses are amplified, directly undermining both food affordability and nutritional stability. Figure 3 highlights these coverage discrepancies, revealing the challenges rural communities face in accessing fresh produce, seafood, dairy, and meat.

Insufficient cold logistics infrastructure not only increases post-harvest losses but also compromises food safety and shelf life. This is particularly problematic for smallholder farmers and cooperatives in East Malaysia, who reported losses due to infrequent collection schedules and limited cold storage access.

### 4.1.3. Urban–Rural Food Access Disparities

The Household Income and Basic Amenities Survey (HIS, 2022) adds another dimension to this inequity. It

found that 18% of B40 households in rural Malaysia reported skipping meals at least once a week due to unavailability or unaffordability of food. By comparison, only 7.5% of urban B40 households reported similar experiences. In particularly underdeveloped districts such as Kapit (Sarawak) and Pitas (Sabah), over one-quarter of surveyed households reported regular food insecurity.

These statistics indicate that food distribution constraints are not merely logistical or economic they are human development issues with long-term health and educational consequences for vulnerable communities.

## 4.2. Thematic Insights from Stakeholder Interviews

To complement quantitative findings, the study conducted semi-structured interviews with 20 key stakeholders across various nodes of the food value chain, including farmers, cooperatives, logistics providers, civil servants, and academics. Thematic analysis of the interview data surfaced four recurring themes, summarized in Table 2.

**Table 2:** Summary of Qualitative Themes and Illustrative Quotes

| Theme | Representative Quote |
|---|---|
| Policy Bottlenecks | "One agency handles food subsidies, another transport permits. This slows things down." |
| Last-Mile Infrastructure Gaps | "We only get deliveries twice a week… too late for perishables." – Farmer, Sarawak |
| Digital Distribution Innovations | "WhatsApp orders now make up 30% of weekly sales." – Cooperative Leader, Selangor |
| State vs. Market Role | "Let private innovate, but regulate rice and chicken." – Food Policy Academic |

**Source:** Fieldwork Interviews (March–June 2024).

### 4.2.1. Policy Bottlenecks and Institutional Overlap

A persistent issue raised by stakeholders was the lack of policy coherence among various government agencies, including MAFS, the Ministry of Domestic Trade and Cost of Living (KPDN), and municipal councils. Stakeholders lamented that overlapping regulatory jurisdictions and the absence of centralized decision-making delay critical interventions. This institutional overlap not only delays emergency responses but also fragments accountability, weakening governance structures essential for resilient value chains. especially during crises such as the COVID-19 pandemic. These concerns echo findings, who described Malaysia's food governance as fragmented and prone to inertia.

### 4.2.2. Last-Mile Delivery as the Systemic Weak Link

Multiple respondents emphasized that last-mile delivery, especially to rural and inland communities, remains the weakest node in the food distribution network. Challenges include poor road access, limited transport vehicles, high fuel costs, and a lack of incentives for logistics providers to serve low-demand regions. For instance, farmers in Sarawak noted that delivery trucks only reached their areas once every three to four days, leading to significant spoilage and reduced bargaining power with buyers.

### 4.2.3. Digital Innovation: WhatsApp and Community Platforms

Interestingly, a number of interviewees pointed to the rise of grassroots digital solutions, such as WhatsApp-based ordering systems and informal Facebook marketplaces, as efficient stopgaps during movement control periods. Cooperative leaders in urban and semi-urban areas reported that up to 30% of their sales were facilitated via direct-to-consumer digital platforms, particularly during the pandemic. However, digital adoption remains low in rural areas due to poor internet access and lack of digital financial literacy.

### 4.2.4. Balancing State and Market Roles

The question of governance whether food distribution should be liberalized or state-managed elicited mixed views. While private logistics providers 23avoured deregulation, civil society groups and farmers advocated for price stabilization, subsidies, and state procurement of staples like rice and poultry. A hybrid model was frequently suggested, wherein the government ensures access to essentials, and the private sector innovates and optimizes delivery.

## 4.3. Policy Mapping and Performance Evaluation

A review of government policy documents, annual reports, and budget disbursement records revealed gaps between policy design and implementation.

### 4.3.1. National Agrofood Policy 2.0 (NAP 2.0)

NAP 2.0 (2021–2030) aims to modernize Malaysia's agro-logistics sector. However, financial execution has been poor. Between 2021 and 2023, only 38% of the RM 500 million allocated for logistics infrastructure was disbursed (MAFS, 2023). The delays were attributed to bureaucratic red tape and insufficient decentralization to local authorities.

**Table 3:** Budget Allocation vs. Disbursement under NAP 2.0 (2021–2023)

| Year | Allocation (RM mil) | Disbursed (RM mil) | Disbursement Rate (%) |
|---|---|---|---|
| 2021 | 150 | 65 | 43% |
| 2022 | 200 | 80 | 40% |
| 2023 | 150 | 45 | 30% |
| Total | 500 | 190 | 38% |

**Source:** MAFS Implementation Reports (2023).

#### 4.3.2. Twelfth Malaysia Plan (12MP)

Although the 12MP emphasizes rural development, it does not contain specific targets for improving food logistics. Stakeholders expressed concern that without measurable KPIs and a dedicated inter-agency task force, progress will remain limited.

#### 4.3.3. Strategic Food Reserves and Subsidy Programs

Subsidies for key staples like rice, cooking oil, and chicken have helped buffer inflation. However, audits in 2023 found that over 40% of subsidized goods in Sarawak did not reach their intended recipients, often due to logistical leakages or local distribution failures (National Audit Department, 2023).

#### 4.3.4. Emergency Assistance Programs

Initiatives such as Bantuan Prihatin Rakyat and MyKasih were well-received, but interviewees criticized their short-term orientation and lack of integration into broader food system strategies. Without consistent targeting and structural embedding, these programs remain reactive rather than preventive.

### 4.4. Integrated Synthesis

The findings collectively affirm that distribution is the weakest link in Malaysia's food security architecture. Despite improvements in availability via trade and increased production accessibility, stability, and utilization dimensions remain fragile, especially in remote and rural regions. The unequal spread of cold chain facilities, regional price disparities, and inefficient governance mechanisms contribute to persistent vulnerability.

Stakeholder narratives corroborate the quantitative findings and highlight both institutional inertia and untapped potential, particularly in digital innovation and community-led distribution models. National policies, though ambitious, suffer from underfunding, poor inter-agency coordination, and lack of localized delivery mechanisms.

Addressing these issues requires holistic reform: not just more investment, but smarter integration of technology, decentralization of authority, and stronger alignment between federal initiatives and local implementation.

## 5. Discussion

This section addresses the core research questions by examining the effectiveness of current food distribution strategies in ensuring food security across Malaysia's diverse regions and by identifying the structural and policy limitations that constrain equitable delivery across geographic and socio-economic contexts (Sarbani et al., 2025). Drawing on a mixed-methods approach, the study highlights critical gaps in Malaysia's distribution infrastructure and governance, particularly in rural and remote areas, while also bringing to light emerging opportunities that can strengthen system resilience. These include the potential of grassroots digital innovations, community-based logistics models, and public–private partnerships to complement existing national policies. The discussion situates these findings within the frameworks of Food System Resilience Theory and Value Chain Thinking, thereby linking empirical results to broader conceptual debates in food security research (Wang, Hou, & Shin, 2023). By doing so, it underscores both the practical and theoretical contributions of the study, demonstrating how Malaysia's experience offers valuable insights for other middle-income, import-reliant economies.

### 5.1. Distribution Weaknesses as the Central Barrier

The findings clearly confirm that distribution inefficiencies represent the weakest pillar of Malaysia's food security system. While availability has been largely ensured through increased domestic production and import liberalization Azman, Majid, and Zulkifly (2024), the dimensions of accessibility, affordability, and stability remain highly uneven, especially across rural and remote regions. This finding directly aligns with Value Chain Thinking, which highlights that bottlenecks in midstream logistics not farm-level supply are the binding constraint to equitable food security.

For example, higher food inflation rates in Sabah and Sarawak (up to 2–3 percentage points above the national average) and low retail outlet density in districts such as Kapit (0.09 per 1,000 people) point to systemic spatial inequities (Hassen & Bilali, 2024). These conditions disproportionately impact B40 households, many of whom report meal-skipping and dietary insufficiency due to supply instability and price volatility.

These findings echo and extend the work of who assert that midstream actors including transporters, cold storage operators, and wholesalers are often overlooked in food security analyses but are crucial in determining system performance (Mumah et al., 2025). In Malaysia, their limited presence outside major cities has directly constrained rural food access.

### 5.2. Policy Fragmentation and Institutional Overlap

Stakeholder interviews revealed substantial fragmentation within the institutional architecture responsible for food logistics. Multiple ministries including

MAFS, KPDN, and municipal councils operate with overlapping mandates, resulting in unclear accountability, duplicative regulations Van Der Berg and Pieterse (2024), and reactive emergency management, as was evident during the COVID-19 lockdowns.

This supports, who characterized Malaysia's food policy environment as "siloed and under-coordinated." Although national strategies such as NAP 2.0 (2021–2030) and the Twelfth Malaysia Plan (12MP) articulate food logistics modernization as a priority, real-world execution remains limited (Asmawi et al., 2025). Only 38% of the RM 500 million allocated for logistics infrastructure under NAP 2.0 was disbursed between 2021–2023, indicating bureaucratic inertia and implementation bottlenecks.

### 5.3. Vulnerability from Import Dependence

Another significant limitation revealed in this study is Malaysia's growing import dependency, especially for beef (78%) and wheat (92%) as of 2023. While such imports help maintain food availability, they also expose the country to global price volatility Galanakis et al. (2025), supply chain shocks, and foreign exchange fluctuations all of which undermine long-term food system stability. In resilience terms, overreliance on imports demonstrates a lack of redundancy. Malaysia's system functions efficiently only in stable times but collapses under shocks, exposing the fragility of current policy design.

From a resilience theory perspective, this over-reliance violates the principle of redundancy, which refers to building multiple, decentralized pathways of supply and access. Without stronger domestic logistics and diversified sourcing strategies Xiong, Wu, and Yeung (2024), Malaysia remains vulnerable to external crises like war, pandemics, or climate-related disruptions.

### 5.4. Unexpected Role of Grassroots Digital Innovation

One of the most surprising findings was the emergence of low-tech, community-driven digital solutions, particularly during the pandemic (Sekabira et al., 2023). Informal WhatsApp-based ordering systems, neighbourhood delivery groups, and direct farmer-to consumer sales via social media platforms were widely used in urban and peri-urban areas. These grassroots models outperformed formal e-commerce platforms in several instances due to their low cost, trust-based networks, and adaptability. Cooperative leaders in Selangor, for example, reported that up to 30% of their weekly revenue was derived from such platforms (Hackfort, 2023). These innovations illustrate adaptability one of the pillars of resilience by showing how informal networks can flexibly respond to crises, outperforming formal logistics structures.This reinforces the findings of who argue that digital transformation in agriculture need not be capital-intensive if supported by adequate broadband access, e-payment systems, and training.

### 5.5. The Market vs. State Debate: Toward a Hybrid Model

A recurring theme among stakeholders was the debate over the appropriate role of the state versus market in managing food distribution (Ncube, 2020). While private actors advocate for market-led innovations, others especially smallholders and civil society organizations favor price controls, subsidies, and state procurement for essential goods like rice and poultry.

This study supports a hybrid model, aligned with where the state ensures equity and access, particularly in underserved regions, while the private sector optimizes efficiency and innovation (Saranga et al., 2024). For example, cold chain development could be driven through public–private partnerships, while price stability for staples could remain under government purview.

### 5.6. Theoretical Contributions

This study makes several theoretical contributions to the field of food security and food systems resilience (Doherty et al., 2019). First, it extends the application of Food System Resilience Theory to the context of a middle-income, import-reliant country, offering a novel perspective that moves beyond the more common focus on either low-income or high-income settings. Malaysia's dual challenges of external dependence and internal inequities provide a distinctive lens through which to assess systemic fragility. Second, the research integrates midstream logistics into resilience analysis by Lin et al. (2022), incorporating detailed data on cold chain coverage, retail outlet density, and last-mile delivery. These dimensions are often overlooked in conventional resilience assessments that concentrate primarily on production or consumption. Third, the study identifies digital innovation particularly low-tech solutions such as WhatsApp-based food delivery platforms as a practical resilience mechanism that enhances redundancy and flexibility Türkeș, Stăncioiu, Băltescu, and Marinescu (2021), thereby underscoring the importance of digital inclusion in theoretical models of food system resilience. Finally, the findings demonstrate that equity, understood in spatial, economic, and institutional terms, is not simply a normative aspiration but a functional requirement for ensuring efficiency and long-term stability in food systems, consistent with the principles of value chain thinking.

### 5.7. Policy Evaluation Framework

To systematically assess existing policies, a performance matrix was developed based on field data and document review:

**Table 4:** Performance Evaluation of Key Malaysian Food Distribution Policies (2021–2023)

| Policy | Stated Goal | Performance (2021–2023) | Evaluation |
|---|---|---|---|
| NAP 2.0 | Logistics Modernization | 38% budget disbursed | Underperforming; lacks KPIs and decentralization |
| 12th Malaysia Plan | Rural Food Access | No direct KPI | Conceptually aligned but needs specific targeting |
| MyKasih, BPR | Emergency Relief | High uptake | Effective in short term; lacks systemic integration |
| Price Controls | Affordability for B40 | Partial success | Urban coverage good; rural outreach limited |

**Source:** MAFS, NAD Reports (2023) and field interviews (2024).

This framework reveals that while intentions are clear, many programs lack execution mechanisms, monitoring indicators, and inter-agency alignment Bernardo, Mamede, Barroso, and Santos (2024), which constrains their effectiveness in real-world settings.

### 5.8. Policy and Practical Implications

The study yields several actionable recommendations to strengthen food distribution and enhance food security in Malaysia. A critical priority is investment in regional cold chain hubs, particularly in underserved districts in East Malaysia, to reduce perishability and improve nutritional quality. At the governance level, the establishment of a centralized logistics task force under the Economic Planning Unit (EPU) or the National Security Council (NSC) is recommended to coordinate food logistics planning across ministries and reduce fragmentation. Expanding digital infrastructure and training is also essential, especially for smallholders and cooperatives, as rural digital inclusion can foster scalable e-commerce models that improve access and market efficiency. In addition, subsidy monitoring systems require reform through the adoption of real-time digital tools such as QR-coded vouchers and GPS-enabled logistics tracking to minimize leakages and ensure benefits reach intended recipients. Finally, public–private partnerships should be encouraged by incentivizing logistics innovation through co-financing arrangements, tax reliefs, and impact investment schemes that target rural areas. Collectively, these recommendations reflect both the theoretical principles of resilience and value chain thinking and the empirical insights generated by this study.

### 5.9. Limitations

While this study provides a robust analysis of Malaysia's food distribution system, several limitations should be acknowledged. The qualitative component was based on 20 purposively selected stakeholders, and although this sample offered valuable insights, broader participation across different ethnic groups and state-specific contexts could have provided a more comprehensive perspective. In addition, the study did not incorporate geospatial analysis, such as GIS mapping, which would have enabled a more granular understanding of food deserts, outlet coverage, and spatial inequalities in distribution. Finally, the research did not employ simulation techniques, such as agent-based modelling or system dynamics, which could further illuminate the complex interactions and trade-offs between policy measures, infrastructure development, and market dynamics.

### 5.10. Future Research

Future research could build on these limitations in several ways. Comparative studies across ASEAN nations would provide benchmarks for Malaysia's distribution models and highlight transferable policy lessons. The use of GIS tools could help identify micro-level food deserts and access gaps, supporting more targeted interventions for vulnerable communities (Yusoff et al., 2025). Further exploration of consumer behavior in response to inflation, availability, and digital innovations would also enrich the evidence base, particularly in understanding household-level coping strategies. In addition, simulation-based approaches could test the outcomes of alternative policy frameworks, offering predictive insights into how food systems might respond to shocks such as climate events, currency fluctuations, or global supply chain disruptions. Such directions would deepen the empirical foundation for designing resilient and equitable food distribution systems in Malaysia and beyond.

## 6. Conclusion

This study set out to examine the effectiveness of Malaysia's food distribution strategies in achieving equitable and sustainable food security. Using a mixed-methods design that combined longitudinal secondary data with stakeholder interviews, the research identified persistent disparities in access, affordability, and stability that stem less from production constraints than from weaknesses in midstream distribution. Regional inequalities, underdeveloped cold chain systems, limited last-mile delivery, and fragmented governance emerged as structural

barriers, while heavy reliance on food imports further exposed the system to external shocks. Although policies such as the National Agrofood Policy 2.0 and the Twelfth Malaysia Plan articulate ambitious goals, their implementation has been constrained by under-disbursement of funds and limited inter-agency coordination.

At the same time, the study highlights promising opportunities for resilience through grassroots innovations, digital inclusion, and public–private collaboration. Informal solutions such as WhatsApp-based delivery groups and farmer-led cooperatives demonstrated adaptability during crises, pointing to the value of supporting community-driven distribution alongside formal policy reforms. The findings affirm that food distribution not production represents the strategic frontier for achieving Malaysia's long-term food security.

By applying Food System Resilience Theory and Value Chain Thinking, the study makes a theoretical contribution by integrating midstream logistics and equity considerations into the analysis of food systems. Practically, it offers policy recommendations for strengthening cold chain infrastructure, improving governance coordination, expanding digital inclusion, and reforming subsidy monitoring. Ultimately, without urgent reforms that prioritize distribution efficiency and inclusivity, Malaysia's food security goals will remain only partially realized. Elevating distribution to a national strategic priority is therefore essential, not only for ensuring the availability of food but also for guaranteeing equitable and dignified access for all communities.

## 7. Policy and Practical Recommendations

Based on the empirical analysis and stakeholder perspectives, this study puts forward several targeted recommendations to enhance the efficiency, equity, and resilience of Malaysia's food distribution system. Strengthening cold chain infrastructure in underserved regions is particularly urgent, as these systems remain concentrated in urban centres, leaving rural and remote communities in Sabah, Sarawak, and interior Peninsular Malaysia vulnerable to perishability and inflated prices. Policy instruments such as tax incentives, public–private co-financing schemes, and the establishment of regional cold storage hubs along agro-industrial corridors could help reduce losses and improve nutritional quality. Supporting last-mile refrigerated transport, including shared storage cooperatives for smallholder farmers, would further extend the benefits of such investments.

At the governance level, the establishment of a centralized food logistics coordination task force under the Economic Planning Unit (EPU) or the National Security Council (NSC) is recommended to overcome the current fragmentation across ministries and agencies. This task force could harmonize policies across institutions such as MAFS, KPDN, and local councils, create unified data-sharing platforms for real-time monitoring of food flows, and establish regular policy evaluation frameworks to ensure efficient use of funds and alignment with key performance indicators.

Expanding digital infrastructure and training is another essential step to close the rural digital divide and enable inclusive participation in emerging food distribution models. Broadband connectivity and digital literacy programs tailored for smallholders and cooperatives would allow grassroots innovations such as WhatsApp delivery systems and farm-to-consumer platforms to scale more effectively. Integrating e-payment systems with national ID-linked subsidies would further encourage adoption and efficiency.

At the same time, subsidy monitoring requires reform to improve accountability and reduce leakages. Digital solutions such as QR-coded vouchers, GPS-enabled fleet tracking, and randomized audits in rural areas would strengthen transparency and ensure that subsidized food items reach B40 households and other vulnerable groups. Finally, fostering public–private partnerships (PPPs) is crucial for innovation and sustainability in food logistics. Hybrid financing models, concessional loans, and tax incentives can encourage private investment in high-risk or low-margin areas, while technology adoption such as cold storage sensors and route optimization software should be promoted among SMEs. Competitive bidding mechanisms for government-contracted rural delivery services can further stimulate efficiency and innovation.

### 7.1. Future Research Directions

This study contributes both empirically and theoretically to understanding food distribution in Malaysia, but it also highlights several avenues for future research that can support more evidence-based policymaking. One key direction is geospatial analysis, particularly the use of Geographic Information Systems (GIS) to identify food deserts, map cold chain availability, and assess proximity of retail outlets to vulnerable communities. Such approaches could help prioritize investments and interventions by pinpointing high-risk zones for post-harvest losses, delivery delays, and food access inequalities.

Comparative research across ASEAN countries represents another important frontier. Malaysia's challenges are not unique, and benchmarking its distribution models against those in Thailand, Vietnam, or Indonesia could yield valuable insights into policy innovations in last-mile delivery, cross-border logistics, and regional frameworks for emergency food supply coordination. Complementing

such work, simulation-based approaches including agent-based modeling and system dynamics could be employed to assess the outcomes of different policy scenarios. These tools would allow researchers to test the interactions between fuel prices, cold chain capacity, inflation, and climate-induced shocks, thereby offering predictive insights into policy trade-offs.

Future studies should also pay greater attention to consumer behavior and access preferences. Behavioural surveys could reveal how different groups such as B40 households, elderly populations, and youth experience food access constraints and make distribution choices. Urban–rural comparisons and assessments of trust in public versus private delivery channels would also provide important evidence for system design. In addition, the rapid growth of digital food supply chain tools, including e-commerce and mobile ordering platforms, requires more systematic evaluation. Research should examine the cost-benefit profiles of formal versus informal systems, assess user experience and delivery reliability, and conduct longitudinal studies on the scalability of grassroots e-commerce initiatives in rural areas. Collectively, these directions would strengthen the empirical foundation for reforms and contribute to the design of more resilient, inclusive, and adaptive food distribution systems in Malaysia and comparable contexts.

### 7.2. Final Reflections

As Malaysia advances toward its 2030 food security and sustainability goals, it must recognize that food distribution is the strategic bottleneck and also the greatest opportunity. A focus on equity, infrastructure, and institutional alignment, supported by rigorous research and grounded innovations, will be critical in closing the gap between national food policy goals and on-the-ground outcomes.

The future of Malaysia's food system will not be shaped by production alone but by the ability to deliver food equitably, efficiently, and resiliently to all communities, regardless of geography or income.

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