

Received: 04-05-2026 | Approved: 01-06-2026 | DOI: <https://doi.org/10.23882/emss26335>

DIVERGENCE BETWEEN AGRICULTURAL PRODUCTIVE PERFORMANCE AND FOOD AND NUTRITION SECURITY IN MOROCCO: A CRITICAL ANALYSIS OF INSTITUTIONAL AND SOCIO-ECONOMIC TRAJECTORIES

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Abstract:

Background: Over the past two decades, Morocco has achieved significant agricultural modernisation, notably through the Green Morocco Plan (2008-2018), which multiplied agricultural GDP by a factor of 1.6 and export revenues by 2.4. However, this productive success has not translated into improved food and nutrition security for the majority of the population, which continues to face a triple burden of malnutrition characterised by the coexistence of persistent undernutrition, micronutrient deficiencies, and rapidly rising obesity rates.

Objective: This article analyses the structural and socio-economic causes of the divergence between agricultural productive performance and food and nutrition security in Morocco, and examines why the modernisation of the primary sector has not sufficed to guarantee a food environment conducive to public health.

Methods: A critical and integrative review of institutional reports and peer-reviewed academic literature published between 2008 and 2025 was conducted, cross-referencing supply-side macroeconomic data with distribution dynamics and household-level demand realities along the food value chain.

Results: The analysis reveals three interacting structural dysfunctions: an export-biased agricultural modernisation that has decoupled productive gains from domestic food sovereignty; an opaque intermediation system capturing on average 34% of the final consumer price, systematically inverting the quality-price relationship at the point of consumer choice; and structural income inequality compounded by inflationary shocks forcing households into nutritional arbitrage, substituting dietary quality for caloric accessibility.

Conclusion: Productive performance alone is insufficient to ensure nutritional security. The evidence calls for integrated food governance that aligns agricultural, commercial, and public health policies around shared nutritional outcome indicators, replacing the current silo-based institutional architecture with a coherent systemic response.

Keywords: Food and nutrition security; Agricultural policy; Market intermediation; Nutritional transition; Morocco

INTRODUCTION

Nutrition security has emerged as a central pillar of sustainable human development in Morocco, yet the nature of the nutritional challenge has undergone a profound transformation over the past two decades. The current food issue has evolved into a challenge of unprecedented complexity: the "triple burden" of malnutrition, designating the paradoxical coexistence of persistent undernutrition, micronutrient deficiencies, and a rapid rise in overweight and obesity (Ministère de la Santé et de la Protection Sociale, 2023; World Health Organization [WHO], 2007). The economic cost of this burden is massive: iron deficiency alone costs 2 billion dirhams annually, losses in productivity linked to micronutrient deficiencies represent 5% of gross domestic product, and obesity has been estimated to cost 24 billion dirhams, approximately 3% of gross domestic product (Ministère de la Santé et de la Protection Sociale, 2023).

A striking paradox emerges in Moroccan public policy. The Green Morocco Plan (2008-2018) successfully increased agricultural gross domestic product from 77 to 125 billion dirhams and multiplied export revenues by a factor of 2.4 (MAPMDREF, 2020; African Scientific Journal, 2025). Yet over 80% of the population cannot afford a nutritionally adequate diet, food inflation exceeded 12% in July 2023, and the chronic agricultural trade deficit has averaged 13.3 billion dirhams annually since 2000 (Haut-Commissariat au Plan [HCP], 2024; Direction des Etudes et des Previsions Financieres [DEPF], 2019). This gap between productive success and nutritional outcomes reflects three interacting structural dysfunctions: an export-biased agricultural modernisation that has decoupled productive gains from domestic food sovereignty; excessive market intermediation through the "chennaqa" phenomenon that distorts food prices and restricts access to healthy food (Conseil Economique, Social et Environnemental [CESE], 2021); and structural income inequality compounded by inflationary pressure that forces households to substitute nutritional quality for caloric accessibility (HCP, 2024; Landais et al., 2014).

The objective of this article is to analyse the structural and socio-economic causes of this divergence between agricultural performance and nutrition security in Morocco, based on a critical and integrative review of institutional reports and academic literature published between 2008 and 2025. The article is structured along the food value chain, examining successively Strategic Supply Dynamics: Decoupling Agricultural Growth from Nutritional Sovereignty, Market Intermediation and Distribution Barriers: the Contextual Bottleneck, and Consumer Demand and Economic Pressure: the Budgetary Erosion of

Nutritional Quality, before engaging in a discussion that formalises the systemic nature of the documented failure and derives implications for integrated food governance.

METHODS AND ANALYTICAL FRAMEWORK

The analytical approach adopted in this article reflects the complexity of the research question. Explaining the structural divergence between agricultural productive performance and nutrition security in Morocco cannot be achieved through a single disciplinary lens: it requires a methodology capable of articulating macroeconomic supply data, distribution dynamics, and household-level demand realities within a unified analytical architecture.

- ***Study Design and Literature Corpus***

This article is based on a critical and integrative review of institutional and academic literature published between 2008 and 2025. The corpus mobilised combines two complementary categories of sources. Institutional reports constitute the primary empirical foundation, including publications from the Haut-Commissariat au Plan (HCP), the Conseil Economique, Social et Environnemental (CESE), the Institut Royal des Etudes Strategiques (IRES), the Ministere de l'Agriculture (MAPMDREF), the Conseil de la Concurrence, the Cour des Comptes, and international bodies including the World Bank, the United Nations Development Programme (UNDP), and the Food and Agriculture Organization (FAO). Academic literature provides the theoretical and comparative frameworks, drawing on peer-reviewed studies in food systems, nutritional economics, and agricultural policy published in indexed journals over the same period.

- ***Analytical Framework and Reading Grid***

The analytical framework organises the review along the three successive levels of the food value chain: agricultural supply, market intermediation and distribution, and consumer demand. This supply-to-demand reading grid, inspired by the food systems approach of the High Level Panel of Experts on Food Security and Nutrition (HLPE, 2017) and the multi-level ecological framework of Story et al. (2008), allows each structural dysfunction to be located at its specific level in the chain while capturing the interactions between levels. This systemic approach deliberately contrasts with sectoral analyses that examine agricultural policy, commercial regulation, or consumer behaviour in isolation, and which have historically failed to account for the cumulative and mutually reinforcing nature of the dysfunctions documented in this article.

- ***Critical Confrontation Between Policy Objectives and Measured Outcomes***

The critical dimension of the review consists in systematically confronting the stated objectives of Moroccan public policies, including the Green Morocco Plan, the Generation Green strategy, and the National Multisectoral Nutrition Strategy 2023-2030, with the empirical outcomes documented by national surveys and institutional audits. This confrontation between policy ambition and measured reality constitutes the analytical core of the article and the basis for the discussion of integrated food governance developed in Section 4.

- ***Limitations***

This approach carries inherent limitations that must be acknowledged. The review depends on the availability and methodological comparability of institutional data sources, whose collection periodicity does not always allow for the capture of recent inflationary shocks. The absence of primary data prevents the direct quantification of the relative weight of each structural dysfunction on observed nutritional outcomes. These limitations open onto the future empirical research directions identified in Section 4.4.

RESULTS

The results are presented along the three successive levels of the food value chain. Each sub-section documents the empirical findings specific to its level, supported by quantified indicators drawn from the institutional and academic corpus.

- ***Strategic Supply Dynamics: Decoupling Agricultural Growth from Nutritional Sovereignty***

Morocco's agricultural supply system has undergone profound structural transformation over the past two decades. While macroeconomic indicators signal undeniable productive progress, a critical reading of the underlying dynamics reveals a systematic decoupling between export-oriented agricultural growth and domestic food sovereignty, whose nutritional implications are documented in this section.

- ***Macroeconomic Achievements of the Green Morocco Plan (2008-2018)***

Launched in April 2008, the Green Morocco Plan was structured around two complementary pillars: Pillar I targeting modern, high-value, export-oriented agriculture; and Pillar II, known as solidarity agriculture, aimed at the productive reconversion of smallholder family farming through aggregation models (MAPMDREF, 2008; Akesbi, 2011). By aggregate macroeconomic indicators, the Plan's results over 2008-2018 are

substantial. Agricultural GDP increased from 77 to 125 billion dirhams. Export revenues grew from 15.2 to 36.3 billion dirhams, a multiplication by a factor of 2.4. Labour productivity rose by 68%, and the area equipped with drip irrigation expanded by a factor of 3.7, reaching 550,000 hectares (African Scientific Journal, 2025; World Bank, 2020).

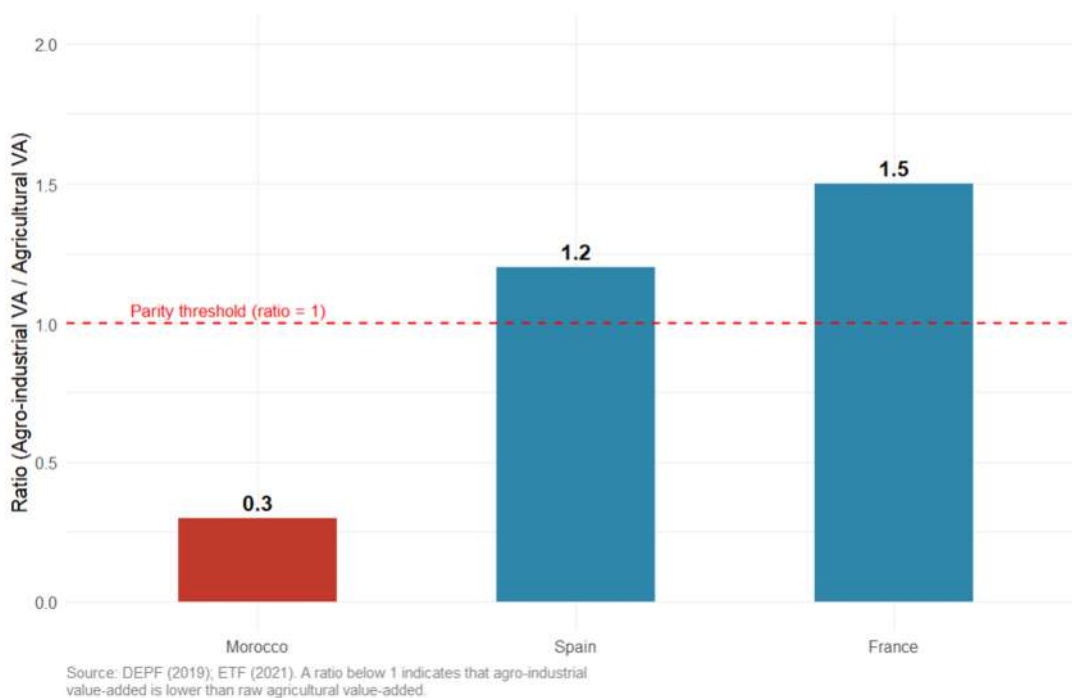
Table 1: Key Performance Indicators of the Green Morocco Plan (2008-2018)

Indicator	2008	2018	Change
Agricultural GDP (billion MAD)	77	125	+62% (×1.6)
Agricultural exports (billion MAD)	15.2	36.3	+139% (×2.4)
Labour productivity (index base 100)	100	168	+68%
Drip irrigation area (000 ha)	149	550	×3.7
Annual water savings (billion m³)	0	2	Target met
Cumulative investment (billion MAD)	0	104	61% private
Beneficiaries of solidarity agriculture	0	2.7 million	989 projects
Employment creation	Target set	Partially met	Less than 25% of target

Source: Compiled from African Scientific Journal (2025), MAPMDREF (2008), and World Bank (2020). MAD = Moroccan Dirham.

However, a critical reading exposes structural asymmetries. Employment creation reached fewer than one quarter of announced objectives. The ratio of agro-industrial value-added to agricultural value-added stands at only 0.3 in Morocco, compared to 1.2 in Spain and 1.5 in France (DEPF, 2019; ETF, 2021). On 78% of the 11.4 million tonnes of fruits and vegetables produced in 2018, products are commercialised without transformation on the local market, while only 4% feed national transformation industries (DEPF, 2019). Figure 1 illustrates the agro-industrial integration deficit in international comparative perspective.

Figure 1: Agro-industrial Value-Added Ratio: Morocco vs. Mediterranean Comparators



○ *The "Reconversion" Downside: Erosion of Cereal Self-Sufficiency*

Irrigated agriculture, concentrated in the plains of Gharb, Souss, Tadla, and Haouz, represents only 16% of utilisable agricultural area yet generates 45% of agricultural value-added and 75% of sectoral export revenues (DEPF, 2019). The remaining 84% of rainfed agricultural area is dominated by cereal cultivation, which occupies 59% of utilisable agricultural area and serves primarily the domestic market under conditions of severe climatic vulnerability (DEPF, 2019; IRES, 2024a).

Table 2: Structural Asymmetry Between Irrigated and Rainfed Agriculture in Morocco

Indicator	Irrigated agriculture	Rainfed agriculture
Share of utilisable agricultural area	16%	84%
Contribution to agricultural value-added	45%	55%
Contribution to exports	75%	25%
Dominant crops	Citrus, early vegetables, market gardening	Cereals, livestock, arboriculture
Primary market orientation	Export (European market)	Domestic market and self-consumption (~30%)
Climatic vulnerability	Moderate	Very high (up to 70% productivity loss in drought years)

Source: Compiled from DEPF (2019), MAPMDREF (2008), and IRES (2024a).

The country's chronic agricultural trade balance deficit has averaged 13.3 billion dirhams annually since 2000 (DEPF, 2019). In 2020, over 17% of Morocco's cereal requirements were sourced from Russia and Ukraine, a geopolitical vulnerability exposed by the 2022 crisis (IRES, 2024b). At the household level, soft wheat has progressively displaced durum wheat and barley, reducing the fibre and micronutrient density of daily staple foods (Allali, 2017). Rural households increasingly sell their higher-quality agricultural production, including legumes and fresh vegetables, to purchase cheaper but nutritionally inferior substitutes on local markets (El Rhazi, 2010).

○ *The Hydraulic Bottleneck: Structural Water Scarcity as a Production Constraint*

The agricultural sector consumes approximately 85% of the country's total renewable water resources, while per capita water availability fell from 2,560 cubic metres per year in 1960 to approximately 600 cubic metres in 2020, approaching the United Nations absolute water stress threshold of 500 cubic metres per person per year (UNDP, 2021; Del Vecchio and Kuper, 2021). The massive deployment of drip irrigation paradoxically exacerbated this constraint by inducing intensification of water-intensive crops, creating a boomerang effect that maintains sustained pressure on groundwater tables (Del Vecchio and Kuper, 2021). Drought years can reduce cereal productivity by up to 70%, with direct macroeconomic repercussions (IRES, 2024a). This hydraulic bottleneck acts on the food environment through three mechanisms: it limits domestic food availability; it raises production costs through non-conventional water mobilisation; and it contributes to food price volatility that weighs directly on household purchasing power (IRES, 2024a, 2024b).

• *Market Intermediation and Distribution Barriers: The Contextual Bottleneck*

The availability of agricultural products on markets constitutes a necessary but insufficient condition for household food security. Between producer and consumer intervenes a set of circuits, actors, and mechanisms whose configuration determines effective food prices and the concrete conditions under which Moroccan households make their daily food choices. This section documents the structural dysfunctions of Morocco's food distribution system and their direct consequences on consumer access to nutritionally adequate food.

○ *The CESE Diagnostic: Structural Dysfunctions and the "Chennaqa" Phenomenon*

Morocco's food distribution landscape is organised around two circuits. The traditional circuit, comprising 828 weekly rural markets, 38 wholesale fruit-and-vegetable markets, and thousands of neighbourhood retailers, accounts for an estimated 90 to 95% of market share (CESE, 2021; Mission Agrobiosciences, 2020). The modern distribution circuit holds only 5 to 10% of market share, compared to 75% in Northern Mediterranean countries, reflecting substantial geographic and economic access barriers (Mission Agrobiosciences, 2020).

Before reaching the final consumer, an agricultural product may transit through six to seven successive intermediaries. The process begins with the "Guerraj," a local collector who exploits the financial weakness of farmers to purchase harvests below their economic value. The product then passes through a storage operator, a wholesale market agent, a wholesaler, and a retailer, each stage adding a commercial margin without generating commensurate real value-added (CESE, 2021). Intermediaries capture on average 34% of the final consumer price, with farm-to-retail price ratios of three to four for key staples. A kilogram of potatoes purchased from a producer at 2 dirhams reaches the consumer at 6.4 dirhams, a multiplication factor of 3.2 (CESE, 2021; Conseil de la Concurrence, 2024). This phenomenon, known as "Chennaqa," has been consistently identified as the primary driver of food price distortion yet has resisted durable reform across successive policy cycles (CESE, 2021).

Table 3: Structural Barriers of Food Intermediation in Morocco and Their Dual Impact

Barrier identified	Mechanism	Impact on producer	Impact on consumer
Chain multiplication (6–7 actors)	Sequential margin stacking	Revenue loss; farm-gate prices below economic value	+34% intermediary capture of final price on average
Guerraj dominance	Liquidity exploitation of indebted farmers	Financial dependence; harvest undervaluation	Price ratio ×3 to ×4 between farm and retail
Storage speculation	Oligopolistic control of cold chain	Revenue volatility	Sudden price surges during retention periods
Regulatory vacuum (fruits and vegetables)	No specific licensing law for intermediaries	No legal recourse	No consumer price protection mechanism
Oligopolistic concentration (red meat)	Approximately 18 actors can disrupt national market	Price unpredictability	Persistent price volatility for a key protein source
Price transparency deficit	Opacity in price formation at wholesale markets	Inability to negotiate on informed basis	Difficulty in assessing fair product value
Public compensation cost	MAD 12.67 billion subsidy burden (August 2021)	Structural inefficiencies indirectly subsidised	Cost shifted to taxpayer without structural resolution

Source: Compiled from CESE (2021), Conseil de la Concurrence (2024), and UNDP (2021). MAD = Moroccan Dirham.

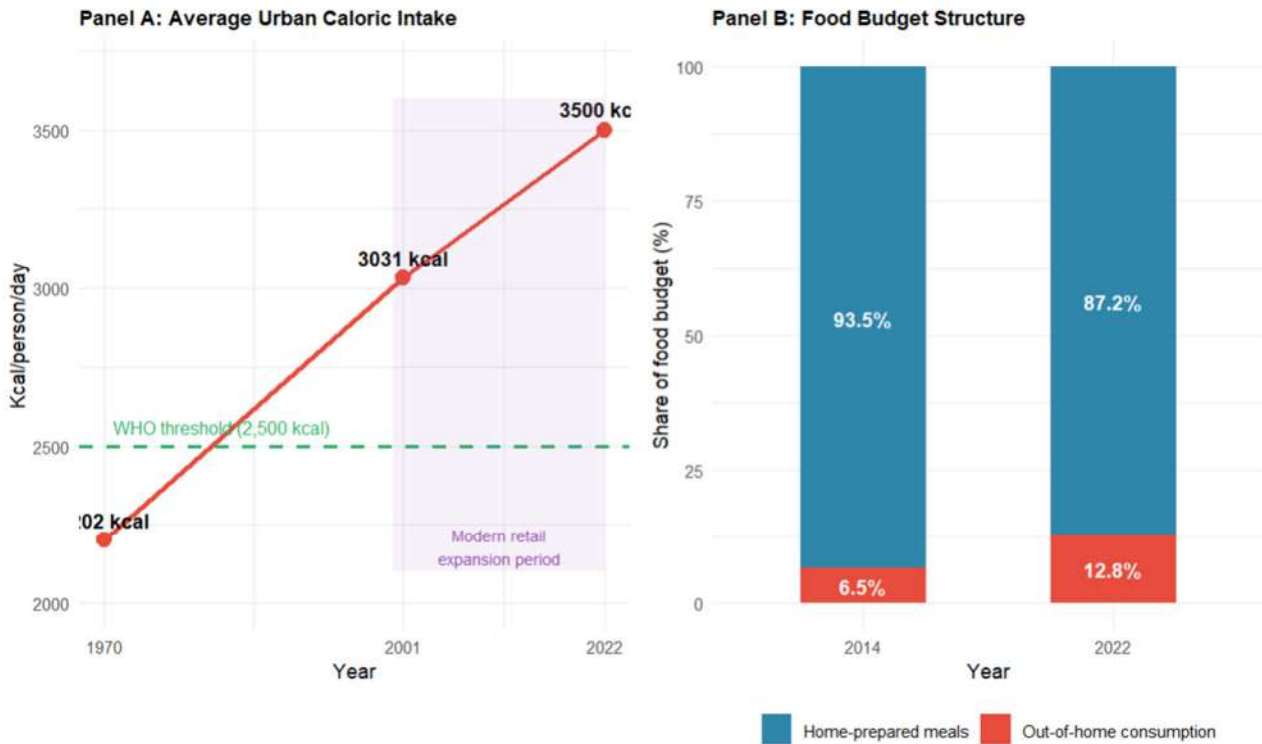
Speculative behaviour further amplifies these distortions. In the red meat sector, approximately 18 identified operators can disrupt pricing dynamics across the entire national market (Conseil de la Concurrence, 2024). The wheat milling sector presents an additional dysfunction: 75% of cereal importers are affiliated with milling enterprises, creating vertical integration that undermines competition and price transparency in bread and cereal products consumed daily by all Moroccan households (Conseil de la Concurrence, 2024).

○ *Impact on Consumer Choice: The Industrial vs. "Beldi" Competitive Gap*

The structural distortions of the intermediation system directly shape consumer food choice by creating what this article terms the "industrial versus Beldi competitive gap." "Beldi" products, the traditional locally-produced fresh foods that form the nutritional foundation of the Moroccan Mediterranean diet, transit systematically through the traditional intermediation chain before reaching the consumer. Industrial products, by contrast, largely bypass this chain through vertical integration and direct retail distribution, reaching consumers at comparatively lower and more stable prices (Allali, 2017; WHO, 2007). This price asymmetry inverts the quality-price relationship at the point of consumer choice,

making nutritionally superior foods systematically more expensive in relative terms than ultra-processed alternatives. Figure 2 illustrates this competitive gap through the evolution of urban caloric intake alongside food budget structure.

Figure 2: Urban Caloric Intake Trend and Shift in Food Budget Structure (1970-2022)



Source: Allali (2017); HCP (2024). The purple zone marks the modern retail expansion period.

Table 4: Key Indicators of the Industrial vs. Beldi Competitive Gap and Its Nutritional Consequences

Indicator	Value	Trend	Nutritional interpretation
Average farm-to-retail price ratio (fresh produce)	×3 to ×4	Persistent	Structural price premium on nutritionally dense traditional foods
Intermediary margin on final consumer price	34% on average	Structural	Systematic competitive disadvantage of Beldi products
Average urban caloric intake (1970)	2,202 kcal/person/day	Below WHO threshold	Pre-transition baseline
Average urban caloric intake (2001)	3,031 kcal/person/day	Exceeds WHO threshold	Driven by ultra-processed food normalisation
Share of out-of-home food expenditure (2014)	6.5% of food budget	Rising sharply	Shift away from home-prepared traditional meals
Share of out-of-home food expenditure (2022)	12.8% of food budget	Doubled in 8 years	Structural advantage of industrial convenience foods
Adults consuming less than 5 fruit/vegetable portions daily	76% of adult population	Persistent	Price and access barrier to fresh produce
Per capita fish consumption	6 kg/year	Below regional average of 8.4 kg	Distribution cost premium on marine products
Post-harvest losses (fruits and vegetables)	20 to 40%	Persistent	Systemic inefficiency raising final food prices
Population without access to nutritionally adequate diet	Over 80%	Structural	Cumulative effect of intermediation distortions and income constraints

Source: Compiled from Allali (2017), HCP (2024), Ministère de la Santé (2020), CESE (2021), and Conseil de la Concurrence (2024).

- ***Consumer Demand and Economic Pressure: The Budgetary Erosion of Nutritional Quality***

The structural dysfunctions documented at the supply and distribution levels do not operate in a socioeconomic vacuum. They interact with, and are amplified by, patterns of household income distribution, inflationary shocks, and territorial disparities that collectively force a majority of Moroccan households into systematic trade-offs between nutritional quality and caloric accessibility. This section documents the demand-side dynamics that constitute the third level of the food system failure.

- *Structural Realities of Living Standards*

Food remains the primary expenditure item for Moroccan households, accounting for 38.2% of total budget on average (HCP, 2024). This makes Moroccan consumers structurally sensitive to price fluctuations. As shown in Table 5, this burden is

disproportionately distributed across income groups, with the lowest-income quintile allocating approximately half of its resources to food, leaving virtually no margin for nutritionally premium products. Over 80% of the population does not have sufficient financial means to afford a nutritionally adequate diet (HCP, 2024). Underlying structural vulnerabilities compound this income fragility: 71% of agricultural holdings have fewer than five hectares collectively controlling only 23% of utilisable agricultural area; 78.3% of agricultural workers hold no educational qualification; and approximately 60% of salaried agricultural workers remain in total informality without social protection (ETF, 2021; Expertise France, 2022; World Bank, 2020).

Table 5: Share of Food Expenditures in Total Household Budget by Income Quintile (2022-2023)

Income quintile	Share of food in total budget (%)	Margin for nutritionally premium products
Quintile 1 (lowest income)	~50%	Virtually none
Quintile 2	~43%	Very limited
Quintile 3	~38%	Limited
Quintile 4	~33%	Moderate
Quintile 5 (highest income)	~25%	Significant
National average	38.2%	Low for majority of population

Source : Compiled from HCP (2024).

○ *The Inflationary Shock and Nutritional Arbitrage*

Food inflation exceeded 12% in July 2023, and a further 1.1% increase was recorded in a single month in August 2025, primarily affecting staples (HCP, 2024). This inflationary pressure forces what this article terms "nutritional arbitrage": when purchasing power is threatened, households maintain their caloric intake by favouring cheaper, energy-dense foods, while reducing consumption of nutritionally rich but relatively expensive fresh products (Landais et al., 2014). This mechanism is empirically traceable: the share of cereals in food expenditure fell from 20.4% in 2001 to 12.5% in 2022 (HCP, 2024); the share of lipids in total energy intake rose from 16% in 1970 to 24% in 2001 (Allali, 2017); and one third of Moroccan adolescents consume sweetened beverages daily (Ministere de la Sante, 2019). This nutritional arbitrage directly fuels the triple burden of malnutrition by simultaneously maintaining caloric adequacy while accelerating the consumption of nutritionally deficient processed alternatives.

○ *Regional Disparities and Urban Exposure*

The budgetary erosion of nutritional quality operates through a spatially differentiated geography. In rural areas, undernutrition and micronutrient deficiencies predominate: child stunting reaches 20.5% in rural areas compared to 15.1% nationally, and food insecurity affected 25.6% of the population in 2021 (Ministere de la Sante, 2020; HCP, 2023). In urban areas, particularly peripheral low-income districts, overweight and chronic diseases dominate, driven by the high availability of cheap ultra-processed foods (Ministere de la Sante, 2019; El Rhazi, 2010). Out-of-home food consumption reaches 14.8% of the urban food budget compared to only 7.9% in rural areas (HCP, 2024). Recent research documents that nearly 23% of the adult population in rural-urban transition zones faces high cardiovascular risk directly linked to these lifestyle changes (Talha et al., 2024).

Table 6: Double and Triple Burden of Malnutrition in Morocco: Key Indicators

Dimension	Indicator	Prevalence	Reference population	Source
Undernutrition	Stunting (national)	15.1%	Children under 5 years	Ministère de la Santé (2020)
Undernutrition	Stunting (rural)	20.5%	Children under 5 years	Ministère de la Santé (2020)
Undernutrition	Iron-deficiency anaemia	34.4%	Women 15–49 years	Ministère de la Santé (2020)
Undernutrition	Vitamin D deficiency	31.3%	Women 15–49 years	Ministère de la Santé (2020)
Undernutrition	Food insecurity (2021)	25.6%	General population	HCP (2023)
Overnutrition	Overweight (adults 20+)	28.0%	Adults	Ministère de la Santé (2019)
Overnutrition	Obesity (adults 20+)	16.1%	Adults	Ministère de la Santé (2019)
Overnutrition	Overweight (women of reproductive age)	57.6%	Women 15–49 years	Ministère de la Santé (2020)
Overnutrition	At least one chronic disease	21.0%	General population	Ministère de la Santé (2019)
Overnutrition	Type 2 diabetes (declared)	4.8%	Adults	Ministère de la Santé (2019)
Micronutrient deficiency	Cost of iron deficiency	2 billion MAD/year	National economy	MSPS (2023)
Micronutrient deficiency	Productivity losses linked to deficiencies	5% of GDP	National economy	MSPS (2023)
Micronutrient deficiency	Economic cost of obesity	24 billion MAD (3% GDP)	National economy	MSPS (2023)

Source : Compiled from Ministère de la Santé (2019, 2020), HCP (2023), and Ministère de la Santé et de la Protection Sociale (2023). MAD = Moroccan Dirham.

The geographic differentiation of nutritional risk confirms that the triple burden does not distribute uniformly across the territory. Undernutrition, micronutrient deficiencies, and overnutrition coexist as spatially distinct yet structurally interconnected expressions of the same food system dysfunction, calling for differentiated policy responses calibrated to address simultaneously all three dimensions across their specific geographic and social contexts.

DISCUSSION

The results documented across the three levels of the food value chain converge toward interrelated analytical findings that this section interprets, positions within the international food systems literature, and translates into policy implications.

- ***Formalisation of a Systemic Failure: The Three-Level Causal Cascade***

The three structural dysfunctions documented in the results are most analytically significant not for their individual severity, but for their mutually reinforcing character, which produces a causal cascade whose terminal expression is the triple burden of malnutrition.

At the supply level, export-biased agricultural modernisation under the Green Morocco Plan generated macroeconomic gains concentrated in the irrigated export sub-sector, while the domestic cereal sector, covering 84% of utilisable agricultural area, remained structurally underinvested (DEPF, 2019; IRES, 2024b). The agro-industrial integration deficit, with a value-added ratio of 0.3 compared to 1.2 in Spain and 1.5 in France, confirms that productive gains did not translate into domestic food system development (ETF, 2021). At the distribution level, the intermediation chain capturing 34% of the final consumer price amplifies the supply dysfunction by imposing a systematic price premium on fresh traditional products, while industrial ultra-processed foods bypass the chain through vertical integration and reach consumers at comparatively lower prices (CESE, 2021; Conseil de la Concurrence, 2024). At the demand level, structural income inequality combined with food inflation exceeding 12% in July 2023 forces what "The Inflationary Shock and Nutritional Arbitrage" documents as nutritional arbitrage: households rationally substitute nutritional quality for caloric accessibility under budgetary constraint (Landais et al., 2014; HCP, 2024).

The terminal expression of this cascade is the triple burden: iron-deficiency anaemia at 34.4% of women of reproductive age and child stunting at 15.1% nationally coexist with

adult obesity at 16.1% and 21% of the population declaring at least one chronic disease (Ministere de la Sante, 2019, 2020). An additional institutional dimension reinforces this cascade. Morocco's food governance is characterised by structural fragmentation, with Agriculture, Industry, Health, and Commerce operating without a shared vision for the food system as a whole (Cour des Comptes, 2019; Expertise France, 2022). This silo management explains why the three dysfunctions have persisted across successive policy cycles despite their systematic identification by institutional audits.

Table 7: Synthesis of Value Chain Disconnects and Their Measured Nutritional Effects

Level	Structural dysfunction	Causal mechanism	Measured nutritional effect
Supply	Export-biased agricultural modernisation	Productive gains concentrated in irrigated export sub-sector	Chronic trade deficit: 13.3 billion MAD/year; 17% cereal import dependence
Supply	Agro-industrial integration deficit	Ratio 0.3 vs 1.2 in Spain and 1.5 in France; 78% of fruits and vegetables sold without transformation	Post-harvest losses of 20 to 40%
Distribution	Chennaqa intermediation chain	6–7 actors capturing 34% of final price; ratio ×3 to ×4 farm to retail	Price premium on fresh nutritious foods; structural advantage of ultra-processed alternatives
Distribution	Regulatory vacuum	No licensing law for fruit and vegetable intermediaries; 75% of cereal importers affiliated to milling enterprises	Speculative behaviour; public compensation cost of 12.67 billion MAD
Demand	Structural income inequality	38.2% food share of budget; quintile 1 at ~50%; over 80% unable to afford adequate diet	Nutritional arbitrage: caloric adequacy prioritised over dietary quality
Demand	Inflationary shock	Food inflation over 12% in July 2023	Cereals budget share fell from 20.4% in 2001 to 12.5% in 2022
Outcome	Triple burden of malnutrition	Cumulative effect of three interacting dysfunctions	Stunting 15.1%; anaemia 34.4%; obesity 16.1%; 5% GDP productivity losses

Source: Compiled from DEPF (2019), CESE (2021), Conseil de la Concurrence (2024), HCP (2024), Ministère de la Sante (2019, 2020), and Ministère de la Sante et de la Protection Sociale (2023).

- ***Dialogue with the International Food Systems Literature***

- *On nutritional transition theory*

Morocco's trajectory positions it in Phase 4 of Popkin's nutritional transition model in fewer than forty years, compared to multiple generations in industrialised countries (Popkin, 1993; El Rhazi, 2010). The results identify a specific acceleration mechanism not fully accounted for by the canonical model: price distortions generated by intermediation make nutritionally superior traditional foods structurally more expensive than processed alternatives even for households whose income growth would theoretically allow dietary diversification. This mechanism operates independently of, and in addition to, the income and urbanisation drivers central to Popkin et al. (2012).

- *On food environment theory*

The "Industrial vs. Beldi Competitive Gap" contributes to the ecological framework of Story et al. (2008) and Glanz et al. (2005) by demonstrating that intermediation-driven price distortions produce food environments as nutritionally hostile as those created by direct policy failures. Consumer food choice in Morocco is not conducted in a nutritionally neutral environment, but in one where structural price asymmetries systematically disadvantage nutritionally superior options. Information-based nutritional interventions are structurally insufficient when the price environment itself is biased against healthier choices (HLPE, 2017).

- *On the triple burden*

The co-occurrence of undernutrition and overnutrition within the same demographic groups extends the framework of Tzioumis and Adair (2014) by revealing its specific causal mechanism: the food system simultaneously fails to deliver nutritional quality, producing deficiency-related undernutrition, while promoting caloric surplus through the structural affordability of energy-dense ultra-processed foods. The analytical addition of micronutrient deficiencies as a third distinct dimension is substantiated by their documented economic cost: 2 billion dirhams annually for iron deficiency alone and 5% of GDP in productivity losses (Ministere de la Sante et de la Protection Sociale, 2023).

- *On the political economy of reform*

The Chennaqa phenomenon has been systematically documented by "The CESE Diagnostic: Structural Dysfunctions and the Chennaqa Phenomenon" and successive institutional reviews, yet persists across policy cycles. The public compensation fund, at 12.67 billion dirhams, treats the symptom of high food prices without addressing the

structural cause, while subsidising the market inefficiencies that generate those prices. This institutional trap, where reform costs are concentrated among politically organised intermediary interests while benefits are dispersed across a large consumer population, constitutes a collective action problem whose resolution requires political will beyond technical regulatory capacity (Reardon and Timmer, 2007; Swinnen, 2011).

• ***Policy Implications: From Sectoral Interventions to Integrated Food Governance***

No single-sector intervention can resolve a multi-level systemic failure. Effective responses must be coordinated across the three levels of the food value chain simultaneously, with shared indicators tracking nutritional outcomes rather than sectoral production metrics alone.

○ *At the agricultural strategy level*

Generation Green's recentring on human capital is necessary but insufficient without an explicit domestic food sovereignty mandate. Evaluation frameworks must incorporate nutritional outcome indicators alongside macroeconomic metrics, specifically tracking domestic cereal self-sufficiency rates and agro-industrial integration ratios. Partial reorientation of investment flows toward cereal and legume value chains serving the domestic market is indicated by the structural dependence documented in "The Reconversion Downside: Erosion of Cereal Self-Sufficiency" (DEPF, 2019; IRES, 2024b).

○ *At the distribution level*

Structural reform of the intermediation system carries the highest cross-level impact potential. Specific legislative regulation of the fruit and vegetable intermediary profession is a prerequisite, filling the regulatory vacuum documented in "The CESE Diagnostic" (CESE, 2021). Digitalisation of wholesale price discovery would reduce opacity and speculative behaviour. Antitrust enforcement in oligopolistically concentrated sectors, particularly red meat with approximately 18 dominant actors and the milling sector with 75% of cereal importers affiliated to milling enterprises, is indicated by the Conseil de la Concurrence (2024) diagnostic. Partial reallocation of the 12.67 billion dirham compensation fund toward structural distribution reform would produce higher long-term nutritional returns per dirham spent.

○ *At the demand level*

Universal subsidy instruments treat caloric adequacy without addressing nutritional quality. More targeted instruments, including conditional nutrition transfers linked to

fresh food purchase and subsidised fresh produce access in low-income urban areas, are indicated by the geographic differentiation of nutritional risk documented in "Regional Disparities and Urban Exposure." The rural-urban transition zones identified by Talha et al. (2024) as areas of high cardiovascular risk constitute priority targets for spatially differentiated interventions.

- *At the governance level*

A dedicated intersectoral food system coordination mechanism bringing together Agriculture, Health, Commerce, and Finance around shared nutritional outcome indicators is a structural prerequisite. The operational integration of Generation Green's productive objectives with the National Multisectoral Nutrition Strategy 2023-2030 targets, through shared performance indicators and cross-ministerial accountability frameworks, represents the most immediate reform available within the existing policy framework (MAPMDREF, 2020; Ministère de la Santé et de la Protection Sociale, 2023). Reinforcement of the ONSSA's operational capacity, estimated to require approximately 1,900 additional agents by the Cour des Comptes (2019), is necessary to correct the sanitary protection asymmetry between export products and domestic market products.

- ***Limitations and Future Research Directions***

This review's conclusions carry specific methodological limitations. The analysis relies on institutional sources whose collection periodicity does not always capture rapid changes: the most recent national nutrition survey dates to 2019-2020, the 2016 General Agricultural Census was not fully published, and the full nutritional consequences of the 2023-2025 inflationary shock remain unmeasurable from the available corpus (Expertise France, 2022). The review documents robust associations between the three structural dysfunctions and observed nutritional outcomes, but cannot quantify their relative weight, a limitation that requires primary data collection to resolve.

Four directions for future research follow from these constraints. Household-level surveys in urban-rural transition zones would provide the micro-level evidence base required to calibrate targeted interventions. Longitudinal studies tracking the nutritional consequences of the 2023-2025 inflationary shock across income quintiles would document nutritional arbitrage dynamics in real time. Systematic comparative analyses with Tunisia, Egypt, Jordan, and Turkey would test the generalisability of the mechanisms identified in the Moroccan case. Finally, quasi-experimental impact evaluations of existing instruments, including the compensation fund and school canteen

programs, would provide the evidence base necessary to prioritise among the policy recommendations identified in "Policy Implications: From Sectoral Interventions to Integrated Food Governance."

CONCLUSION: TOWARDS INTEGRATED FOOD GOVERNANCE

This article demonstrates that productive performance, however impressive in macroeconomic terms, constitutes a necessary but fundamentally insufficient condition for nutritional security when the food system architecture is structurally misaligned with population nutritional needs. Three interacting dysfunctions collectively produce Morocco's triple burden: export-biased agricultural modernisation that deepens domestic food sovereignty erosion; an opaque intermediation system that systematically inverts the quality-price relationship at the point of consumer choice; and structural income inequality compounded by inflationary shocks that forces households into nutritional arbitrage. These dysfunctions form a mutually reinforcing causal cascade whose terminal expression is the coexistence of iron-deficiency anaemia at 34.4%, child stunting at 15.1%, adult obesity at 16.1%, and micronutrient-related productivity losses at 5% of GDP (Ministere de la Sante, 2019, 2020; Ministere de la Sante et de la Protection Sociale, 2023).

Sectoral approaches cannot individually resolve a failure that is systemic in nature. Integrated food governance, operationalised through shared nutritional outcome indicators across Agriculture, Health, Commerce, and Finance, structural reform of the intermediation system, spatially differentiated demand-side instruments, and the operational alignment of Generation Green with the National Multisectoral Nutrition Strategy 2023-2030, constitutes the only policy architecture proportionate to the documented challenge (MAPMDREF, 2020; Ministere de la Sante et de la Protection Sociale, 2023; Cour des Comptes, 2019). The evidence reviewed here suggests that Morocco's food transition requires not more sectoral ambition, but greater systemic coordination.

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