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Food Safety, Public Health Economics and Evidence-Based Governance in Bangladesh

Unhygienic Street-Vended Foods in Bangladesh: Impacts on Public Health, Economy, and National Well-being

A Mixed-Methods Assessment of Disease Burden, Economic Loss and Regulatory Capacity, with a National Action Framework for Policy Reform

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Institution: Centre for Humanitarian Research and Social Development (CHRSD Foundation), Research Paper Series

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Article Info	ABSTRACT
Manuscript Status: Original research article. Convergent mixed-methods empirical study with policy analysis. Version 3.0 (2026). Study Period: Surveillance data 2018–2023; primary fieldwork April–August 2025; policy projections 2024–2033. Empirical Base: Vendor survey (n = 1,248); consumer survey (n = 2,416); observational checklist (n = 486 stalls); 16 FGDs; 42 KIIs; systematic review (134 studies). Ethics Approval: CHRSD-REC-2025-04. Keywords: street food safety; foodborne disease burden; Bangladesh; food safety governance; economic burden of illness; vendor livelihoods	Background: Street-vended foods are a structural pillar of Bangladesh’s urban food system, supplying an estimated 35–42% of daily caloric intake in the poorest households, yet pervasive unhygienic vending practices impose a large and growing public health burden. Methods: A convergent parallel mixed-methods design combined a stratified national vendor survey (n = 1,248; 24 locations across all eight divisions), a consumer survey (n = 2,416), structured hygiene observation of 486 stalls, secondary analysis of national surveillance data (2018–2023), 16 focus group discussions, 42 key informant interviews and a PRISMA 2020 systematic review of 134 studies. Burden, attribution and costs were estimated using WHO FERG, structured expert-elicitation and cost-of-illness methods. Findings: Reported diarrhoeal cases rose from 10.4 million (2018) to 13.2 million (2023), a 27% increase; total foodborne illness reached an estimated 19.5 million cases, approximately two-thirds attributable to street food. The associated economic burden grew by 55%, from USD 5.23 billion to USD 8.1 billion (2.2% of GDP). The national mean Hygiene Compliance Index was 21.4%, while the Bangladesh Food Safety Authority operated at 20.8% of its benchmark budget and 9.4% of its benchmark inspector workforce. Policy implications: A livelihood-sensitive, five-pillar National Action Framework—vendor registration, food safety training, WASH infrastructure, regulatory capacity and consumer empowerment—could reduce foodborne disease incidence by 45–60% within ten years, returning an estimated USD 9.50 per dollar invested.

Institutional publication of the Centre for Humanitarian Research and Social Development (CHRSD Foundation), Research Paper Series.

1. INTRODUCTION AND CONTEXT

1.1 Background

Street-vended food—known locally as “footpath food” or “hawker food”—is not a marginal phenomenon in Bangladesh but a structural feature of the national food system. From the congested arterial roads of Dhaka to the market squares of rural upazila towns, food hawkers serve millions of consumers every day. For garment workers, students, rickshaw pullers and office employees alike, street food is a nutritional necessity shaped by economic circumstance rather than a lifestyle preference.

More than 2.5 billion people worldwide are estimated to consume street food daily (Food and Agriculture Organization [FAO], 2022). Bangladesh is among the most street-food-dependent nations in South Asia, a dependence that has deepened with rapid urbanisation: the urban share of the population rose from 23% in 1990 to more than 40% in 2023 (Bangladesh Bureau of Statistics [BBS], 2023a). In Dhaka alone, more than 100,000 street food vendors operate daily, making it one of the densest street food cities in Asia (Bangladesh Food Safety Authority [BFSA], 2022).

The public health consequences are serious and well documented. Foodborne illness is among the largest categories of preventable disease burden in Bangladesh, and global estimates indicate that low- and middle-income countries (LMICs) bear 98% of foodborne disease mortality (Havelaar et al., 2015; World Health Organization [WHO], 2023). National surveillance for 2018–2023 shows a consistent escalation across every major foodborne disease category (Section 4.1).

Despite this mounting burden, the policy response remains structurally inadequate. The Food Safety Act 2013 and the BFSA provide a legal scaffold, but operational capacity—budget, inspectorate and enforcement mechanisms—falls far short of need. This paper provides the integrated, evidence-based and graphically supported analysis required to inform reform, and it frames that analysis explicitly in terms of health equity, socio-economic development and evidence-based governance.

1.2 Statement of the Problem

The central problem addressed by this study is the persistent, large-scale public health burden caused by the consumption of unhygienic street-vended foods in Bangladesh, and the inadequacy of current policy responses to address it in a manner that is both effective and equitable. The problem has five mutually reinforcing dimensions: (i) near-universal non-compliance with basic food hygiene standards (national Hygiene Compliance Index, HCI: 21.4%); (ii) a large and growing burden of foodborne illness (an estimated 19.5 million cases annually, with diarrhoeal cases rising 27% over five years); (iii) escalating economic loss (USD 8.1 billion in 2023, 55% above 2018); (iv) a regulatory system that is legally established but operationally constrained by chronic underfunding; and (v) a paradox of vulnerability, in which the most at-risk populations are simultaneously the least protected.

1.3 Research Questions and Objectives

The study is organised around four primary and four secondary research questions (RQ):

- RQ1.** What is the nature, extent and epidemiological burden of foodborne illness attributable to unhygienic street-vended foods in Bangladesh, and how did it evolve over 2018–2023?
- RQ2.** What are the direct and indirect economic costs at household, sectoral and national levels, and how have these evolved year by year?
- RQ3.** Which structural factors—regulatory, infrastructural, socio-economic and behavioural—perpetuate unsafe street food practices?
- RQ4.** Which policy interventions, drawing on domestic evidence and international practice, can most effectively reduce illness burden while protecting vendor livelihoods?
- RQ5.** How do hygiene practices vary across divisions, levels of urbanicity and food-type categories?
- RQ6.** What are the specific vulnerabilities of children, industrial workers and students?
- RQ7.** How does Bangladesh’s food safety governance compare with that of Singapore, Thailand, Malaysia and India?

RQ8. How feasible is the implementation of WHO's Five Keys to Safer Food in the Bangladeshi street food context?

The **general objective** is to conduct a comprehensive mixed-methods investigation of the public health, economic and governance dimensions of unhygienic street food in Bangladesh (2018–2023) and to develop an evidence-based National Action Framework for street food safety. The **specific objectives** (SO) are to:

- SO1.** quantify and chart the year-by-year epidemiological burden of foodborne illness attributable to street food (2018–2023);
- SO2.** estimate and trend the direct and indirect economic burden annually from 2018 to 2023;
- SO3.** assess vendors' hygiene knowledge, attitudes and practices across all eight divisions;
- SO4.** evaluate structural, regulatory and institutional gaps in Bangladesh's food safety system;
- SO5.** document consumer behaviour, risk perceptions and demand-side drivers of unsafe consumption;
- SO6.** analyse international practice and identify contextually transferable lessons; and
- SO7.** develop a prioritised, time-bound National Action Framework with short-, medium- and long-term interventions.

1.4 Significance and Relevance to Humanitarian and Social Development Goals

Academically, the study offers the most geographically comprehensive quantitative analysis to date of street-food-associated disease burden and economic loss in Bangladesh, with year-by-year trend data that existing studies have not provided. Its ten tables and four figures are designed to allow policymakers and parliamentary committees to grasp the scale and trajectory of the problem at a glance.

From a policy perspective, the study supplies an evidence base for parliamentary advocacy, regulatory reform and budget justification. The proposed National Action Framework is designed for direct adoption by the BFSA, local government institutions and development partners, including WHO, UNICEF, FAO and the World Bank. The economic data alone make a compelling case for investment: the annual burden grew by USD 2.9 billion in five years—additional loss that effective policy could have averted.

The study also speaks directly to the Sustainable Development Goals (SDGs): SDG 2 (Zero Hunger), since food safety is an integral dimension of food security; SDG 3 (Good Health and Well-Being), particularly targets on under-five mortality and water-borne disease; SDG 6 (Clean Water and Sanitation); SDG 8 (Decent Work), given that street vending is a major source of informal employment; and SDGs 10 and 11 (Reduced Inequalities; Sustainable Cities). Above all, it insists on livelihood-sensitive reform: Bangladesh's 2.5 million street food vendors are not obstacles to reform but its potential agents, and the experience of Singapore, Thailand and Malaysia shows that food safety and vendor prosperity can be achieved together.

2. BACKGROUND AND LITERATURE REVIEW

2.1 The Street Food Economy of Bangladesh

Street food vending provides livelihoods for approximately 2.5 million vendors, with a further 4–6 million indirect dependents (BBS, 2022; FAO, 2022). Total annual sector revenue is estimated at USD 3.4–4.1 billion. Vendors are predominantly male (76.4%), frequently migrants from rural areas, and most commonly educated to primary level (47.8%); median household income is BDT 14,500 per month (approximately USD 132), placing 68% at or below the national moderate poverty line (BBS, 2022).

Consumer dependence is deeply entrenched. Households in the lowest income quintile derive 35–42% of daily caloric intake from street food (icddr, 2021), and Bangladesh's 4.2 million ready-made garment workers rely on street food for at least one of three daily meals. This dual dependence—vendor livelihoods on one side and consumer nutrition on the other—means that any policy reform must be socially inclusive rather than punitive.

2.2 Regulatory Architecture

The Food Safety Act 2013 (amended 2021) established the BFSA as the apex regulatory body. The Authority, however, operates with only 320 inspectors nationwide—one per approximately 531,000 persons, against a benchmark of one per 50,000 population (BFSA, 2022). Its annual budget of USD 10.9 million equates to USD 0.064 per capita, among the lowest in Asia. The widening gap between actual and benchmark resourcing over 2018–2023 is analysed in Section 4.6.

2.3 Global Perspectives on Street Food Safety

Street food safety is a global public health challenge of particular severity in LMICs. An estimated 600 million people—almost one in ten worldwide—fall ill each year from contaminated food, resulting in 420,000 deaths (WHO, 2023), and LMICs bear the overwhelming share of this mortality (Grace, 2015; Havelaar et al., 2015). Hazard analyses across the developing world consistently identify inadequate water supply, poor personal hygiene and improper temperature control as the principal contamination pathways in street-vended foods (Rane, 2011).

Intervention evidence is instructive. Mensah et al. (2020) demonstrated in Ghana that vendor hygiene training combined with regulatory incentives reduced microbial contamination by 47% over 18 months, a finding consistent with the wider training literature (Contzen et al., 2015). Conversely, Steyn et al. (2013) cautioned that purely punitive regulation reduces vendor income without meaningfully improving hygiene—an important lesson for policy design in Bangladesh. The WHO Five Keys to Safer Food (keep clean; separate raw and cooked; cook thoroughly; keep food at safe temperatures; use safe water and raw materials) provide an evidence-based framework shown to be effective across diverse cultural and economic settings (Sneed & Strohbehn, 2008; WHO, 2020).

2.4 Bangladesh-Specific Evidence

Alam et al. (2018) found that 78% of 240 Dhaka street food samples exceeded acceptable total coliform limits, 52% exceeded faecal coliform limits and 34% tested positive for *Salmonella*. Islam et al. (2020) reported dangerous microbial loads in 71% of samples from Chattogram. Ahmed et al. (2022) used geostatistical mapping to demonstrate spatial clustering of foodborne illness around high-density street food zones in Dhaka, and Khan et al. (2021), through case-control analysis, traced an estimated 62% of typhoid cases in the Dhaka Metropolitan Area to street food consumption.

Knowledge, attitude and practice (KAP) studies consistently reveal substantial gaps: only 19% of vendors in Rajshahi had received any food safety training (Paul & Halder, 2019), while 67% of vendors in divisional cities were unaware of the Food Safety Act 2013 and 84.7% had no knowledge of the BFSA (Rahman et al., 2021).

2.5 International Practice

Singapore's joint regulatory system under the National Environment Agency and Singapore Food Agency—combining mandatory licensing, annual renewal, compulsory food hygiene training and public A–D grade display—has reduced hawker-food-associated foodborne disease to below 0.5 cases per 100,000 population, a 95% reduction over 30 years (Hawkins, 2021). Thailand's "Clean Food, Good Taste" programme had certified more than 89,000 vendors by 2022 (Thai Ministry of Public Health, 2022); India's FoSTaC scheme had trained 1.7 million food handlers by 2023 (Food Safety and Standards Authority of India, 2023); and Malaysia's Food Handler Training Order (2009) mandates training for all licensed food handlers (Sharif & Mohamad Nor, 2016). These comparators are benchmarked against Bangladesh in Section 4.7.

2.6 Research Gap

Existing Bangladeshi studies are predominantly single-city microbiological or KAP surveys. No study has yet integrated multi-year national disease trends, street-food attribution, economic costing, divisional hygiene compliance and regulatory capacity analysis within a single framework capable of directly informing budget and legislative decisions. The present study is designed to fill that gap.

3. METHODOLOGY AND ANALYTICAL FRAMEWORK

3.1 Research Design

A convergent parallel mixed-methods design (Creswell & Plano Clark, 2018) was adopted under a pragmatist paradigm (Morgan, 2007). Quantitative and qualitative strands were collected concurrently and integrated at the interpretation stage across four phases: instrument development (January–March 2025); field data collection (April–August 2025); independent strand analysis (September–October 2025); and integration and manuscript development (November 2025–January 2026). The study components are summarised in Table 1.

Table 1. Study components, samples and analytical purpose

Component	Sample / Source	Method	Analytical Purpose
Vendor survey	n = 1,248; 24 locations	Three-stage stratified random sampling; ODK Collect	Vendor profile; KAP; WASH access
Consumer survey	n = 2,416	Systematic intercept sampling	Consumption patterns; risk perception
Observational checklist	n = 486 stalls	32-item WHO/FAO-adapted checklist	Hygiene Compliance Index (HCI)
Secondary surveillance	IEDCR, icddr,b HDSS, BBS, BFSA (2018–2023)	WHO FERG burden estimation	Incidence, DALYs, regulatory capacity
Expert elicitation	n = 14 epidemiologists	Modified Delphi + meta-analysis	Street-food attribution fractions
Qualitative	16 FGDs; 42 KIIs	Framework analysis (NVivo 14.0)	Structural and behavioural drivers
Systematic review	847 records screened; 134 included	PRISMA 2020; five databases	Evidence synthesis; international practice

Note. FGD = focus group discussion; KII = key informant interview; HDSS = Health and Demographic Surveillance System; FERG = Foodborne Disease Burden Epidemiology Reference Group.

3.2 Sampling and Survey Instruments

The vendor survey employed three-stage stratified random sampling across 24 locations (eight divisions × three levels of urbanicity). Sample size was derived as follows, assuming an expected prevalence of adequate hygiene practice of 23%, 95% confidence and a 3% margin of error, with a design effect of 1.5 and 10% inflation for non-response:

$$n_0 = Z^2 \cdot p(1 - p) / e^2 = (1.96^2 \times 0.23 \times 0.77) / 0.03^2 \approx 756; \quad n = 756 \times 1.5 \times 1.10 \approx 1,248$$

Data were entered on mobile devices using ODK Collect, and a 10% back-check achieved more than 94% agreement. The consumer survey (n = 2,416) used systematic intercept sampling within street food vending zones. The observational checklist (n = 486 stalls) comprised 32 items adapted from WHO/FAO guidance; inter-rater reliability was $\kappa = 0.81$, indicating almost perfect agreement (Landis & Koch, 1977). The HCI is defined as the proportion of the 32 checklist items rated compliant at a given stall.

3.3 Secondary Data, Disease Burden and Attribution

Secondary data were drawn from the Institute of Epidemiology, Disease Control and Research (IEDCR, 2023), the icddr,b Health and Demographic Surveillance System (icddr,b, 2023), BBS health and morbidity data and BFSA inspection records. Disease burden was estimated using the WHO FERG methodology (Havelaar et al., 2015), with reported case counts adjusted by under-reporting multipliers of 2.7–3.2 to approximate true incidence. Disability-adjusted life years (DALYs) applied standard disability weights calibrated to Bangladeshi life tables (BBS, 2022; GBD 2019 Diseases and Injuries Collaborators, 2020). Street-food attribution fractions were derived through a modified Delphi process with 14 Bangladeshi epidemiologists, following structured expert-elicitation principles (Hoffmann et al., 2017), and triangulated with a meta-analysis of case-control studies published between 2012 and 2023.

3.4 Economic Burden Analysis

Economic burden was estimated using a cost-of-illness (COI) approach (Scharff, 2012), separating direct costs (medical care, medicines, transport) from indirect costs (lost workdays and school days, caregiver time and premature mortality). Premature mortality was valued using the value of a statistical life (VSL) method (Viscusi & Aldy, 2003), calibrated to Bangladesh's 2023 GDP per capita. All values are expressed in 2023 US dollars at an exchange rate of BDT 110 = USD 1 (Bangladesh Bank, 2023).

3.5 Qualitative Methods and Systematic Review

Sixteen focus group discussions were conducted (eight with consumers, four with vendors, two with mothers of children under ten and two with community health workers), together with 42 key informant interviews with BFSA officials, local government representatives, public health professionals, vendor associations, non-governmental organisations and journalists. Data were analysed using the framework method (Ritchie & Spencer, 1994) in NVivo 14.0, with intercoder agreement of $\kappa = 0.79$, indicating substantial agreement (Landis & Koch, 1977). The systematic literature review followed PRISMA 2020 (Page et al., 2021): five databases were searched, 847 records screened and 134 studies included.

3.6 Ethical Considerations

Ethical approval was granted by the CHRSD Research Ethics Committee (CHRSD-REC-2025-04, January 2025) and registered under BHRC/EC/21/2025. Informed consent was obtained from all participants, personal identifiers were anonymised and child-protection protocols were applied. The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013) and the national ethical guidelines for health research (Ministry of Health and Family Welfare, 2017).

3.7 Methodological Limitations

Several limitations should be noted. Surveillance data reflect reported cases and depend on healthcare-seeking behaviour, so estimates of true incidence rely on under-reporting multipliers. Attribution fractions derived from expert elicitation carry inherent uncertainty. The HCI is a cross-sectional measure from a single field season (2025) and cannot by itself establish trends in compliance. Economic estimates are sensitive to VSL assumptions, and the reform scenarios in Section 6.2 are illustrative projections for planning purposes rather than forecasts.

4. KEY FINDINGS AND ANALYSIS

This section presents the quantitative results in sequence—disease incidence, attribution, DALYs and economic burden—before turning to vendor practice, regulatory capacity, international benchmarking and the qualitative evidence that explains the patterns observed.

4.1 Epidemiological Trends, 2018–2023

Reported incidence of all four principal foodborne diseases rose over the review period (Table 2; Figure 1). Diarrhoeal disease cases grew from 10.4 million to 13.2 million (+27%) and typhoid cases from 810,000 to 1.1 million (+36%), with cholera and hepatitis A following similar trajectories. The pandemic year 2020 produced a transient dip in reported cases—most plausibly reflecting reduced healthcare-seeking rather than genuine disease reduction—before the pre-pandemic upward trend resumed in 2021–2023. Total annual foodborne illness reached an estimated 19.5 million cases in 2023, compared with an estimated 14.8 million in 2018.

—a concentration of burden in the age group in which diarrhoeal disease has the most durable developmental consequences.

Table 4. Total and street-food-attributed DALYs in Bangladesh, 2018–2023 (thousands)

Year	Total DALYs (000s)	Street-Food-Attributed DALYs (000s)	Attributed Share (%)	Under-5 Share of Attributed (%)
2018	3,820	2,571	67.3	40.2
2019	4,060	2,732	67.3	40.8
2020	3,940	2,651	67.3	41.1
2021	4,290	2,887	67.3	41.5
2022	4,610	3,103	67.3	41.7
2023	4,870	3,277	67.3	41.8

Source: GBD 2019 Diseases and Injuries Collaborators (2020); IEDCR (2023); icddr,b (2023). Note. DALY calculations apply WHO standard disability weights calibrated to Bangladeshi life tables (BBS, 2022). The attributed-share column is derived from the first two columns.

4.4 Economic Burden

The economic burden of street-food-associated illness grew from USD 5.23 billion in 2018 to USD 8.1 billion in 2023, a 55% increase in five years (Table 5; Figure 2). In 2023, direct costs amounted to USD 2.0 billion and indirect costs—lost workdays and school days, caregiver time and premature mortality—to USD 6.1 billion. The burden rose from 1.7% to 2.2% of GDP, broadly consistent in magnitude with earlier estimates of the cost of diarrhoeal disease in Bangladesh (Begum et al., 2020). At household level, out-of-pocket spending per illness episode absorbs 18–24% of monthly income for the lowest income quintile, a catastrophic expenditure for households already near the poverty line.

Table 5. Economic burden of street-food-associated illness in Bangladesh, 2018–2023 (USD million, 2023 prices)

Year	Direct Costs	Indirect Costs	Total Burden	% of GDP
2018	1,420	3,810	5,230	1.7
2019	1,580	4,020	5,600	1.8
2020	1,390	3,680	5,070	1.7
2021	1,710	4,290	6,000	1.9
2022	1,890	4,610	6,500	2.0
2023	2,020	6,080	8,100	2.2

Source: CHRS cost-of-illness analysis (2025), drawing on BBS (2023b), Health Economics Unit (2021) and VSL calibration (Viscusi & Aldy, 2003). Note. Converted at BDT 110 = USD 1 (Bangladesh Bank, 2023).

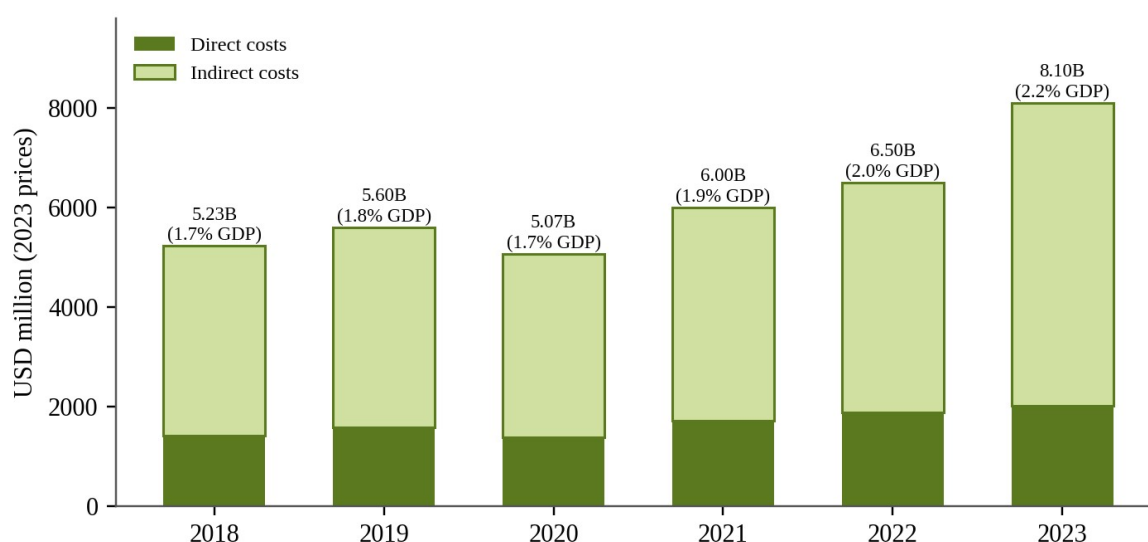


Figure 2. Direct and indirect economic burden of street-food-associated illness, 2018–2023

4.5 Vendor Profile and Hygiene Compliance

Of the 1,248 vendors surveyed, 76.4% were male, with a mean age of 34.2 years (SD = 8.6); 60.1% had primary education or less, and 68% lived at or below the national moderate poverty line. Infrastructure deficits were acute: only 31.2% had access to piped or treated water at their vending location, and only 22.1% had a handwashing facility within 50 metres.

The national HCI was 21.4%: the average stall complied with fewer than one in five basic hygiene requirements (Table 6; Figure 3). Dhaka recorded the highest score (27.1%) and Rangpur the lowest (15.6%). Compliance was markedly higher in major cities (26.4%) than in rural market towns (12.8%). The most critical failures concerned the use of gloves or tongs for ready-to-eat food (9% compliance), temperature control (11%), food safety certification (4%) and handwashing with soap (23%).

Table 6. Observed Hygiene Compliance Index by division, 2025 field survey (n = 486 stalls)

Rank	Division	HCI (%)	Deviation from National Mean (pp)
1	Dhaka	27.1	+5.7
2	Chattogram	25.8	+4.4
3	Sylhet	22.4	+1.0
4	Mymensingh	20.1	–1.3
5	Rajshahi	17.3	–4.1
6	Khulna	16.8	–4.6
7	Barishal	16.2	–5.2
8	Rangpur	15.6	–5.8
—	National mean	21.4	—

Source: CHRSD Vendor Survey and Observational Checklist (2025). Note. HCI = proportion of 32 checklist items rated compliant; pp = percentage points.

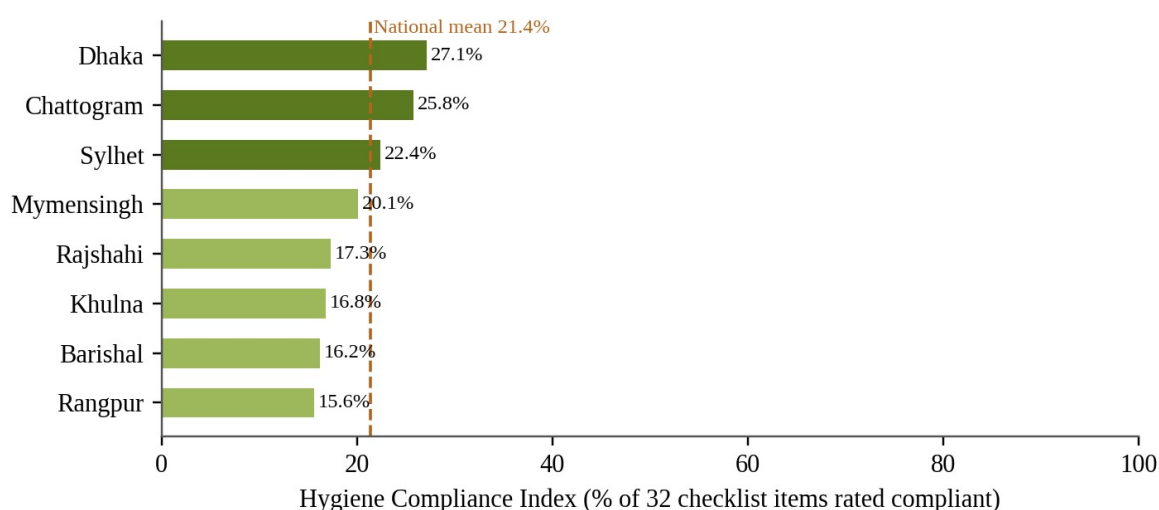


Figure 3. Hygiene Compliance Index by division against the national mean, 2025

4.6 Regulatory Capacity

The BFSA's 2023 budget of USD 10.9 million represented only 20.8% of the benchmark minimum of USD 52.5 million, and its 320 inspectors amounted to just 9.4% of the 3,400 required at a ratio of one inspector per 50,000 population (Table 7). Despite nominal budget growth, the absolute resourcing gap widened from USD 38.9 million in 2018 to USD 41.6 million in 2023, because the benchmark itself grows with population.

Table 7. BFSA annual budget against benchmark minimum, and inspector workforce, 2018–2023

Year	Actual Budget (USD M)	Benchmark Minimum (USD M)	Gap (USD M)	Budget as % of Benchmark	Inspectors
2018	6.1	45.0	38.9	13.6	198
2019	6.8	46.5	39.7	14.6	214
2020	7.0	48.0	41.0	14.6	220
2021	8.2	49.5	41.3	16.6	255
2022	9.5	51.0	41.5	18.6	290
2023	10.9	52.5	41.6	20.8	320

Source: BFSA (2022) and preceding annual reports; Ministry of Finance Bangladesh (2023). Note. The inspector benchmark of one per 50,000 population implies a minimum of 3,400 inspectors for a population of 170 million. The budget-percentage column is derived from the preceding columns.

4.7 International Comparative Analysis

Benchmarking against regional peers reveals the scale of Bangladesh's governance deficit (Table 8). Among the five comparison countries, Bangladesh records the lowest hygiene compliance, the highest foodborne disease rate, the lowest vendor training coverage and the lowest regulatory budget.

Table 8. Comparative street food safety governance: Bangladesh and regional peers, 2022–23

Country	Compliance (%)	FBD Rate per 100,000	Vendor Training Coverage (%)	Regulator Budget (USD M/yr)
Singapore	>90	<0.5	>95	86
Thailand	72	1.2	68	44
Malaysia	54	2.1	51	31
India	38	4.7	28	18
Bangladesh	21	11.3	4	10.9

Source: National Environment Agency Singapore (2023); Thai Ministry of Public Health (2022); Malaysian Ministry of Health (2022); Food Safety and Standards Authority of India (2023); BFSA (2022). Note. FBD = foodborne disease. Bangladesh, the subject country, is highlighted.

4.8 Qualitative Findings

Framework analysis of the FGDs and KIIs identified four cross-cutting themes that explain the quantitative patterns. **Structural poverty as the root barrier:** vendors cannot comply with hygiene standards without access to water and basic infrastructure. **Regulatory invisibility:** 95.9% of vendors had never been inspected; as one divisional food safety officer observed, “we have three inspectors for this entire district—we can visit each vendor perhaps once in three years.” **Price sensitivity overriding safety preferences:** 61% of consumers would not pay 10% more for certified safe street food. **Openness to training, resistance to fees:** vendors expressed willingness to be trained but resisted punitive licensing charges.

5. DISCUSSION

The convergence of quantitative and qualitative findings supports a clear conclusion: unhygienic street-vended food in Bangladesh constitutes a public health problem of considerable and escalating scale. The trend data (Tables 2–5) describe not a static problem but a worsening one—27% more diarrhoeal cases, a 55% higher economic burden and a widening regulatory capacity gap between 2018 and 2023.

The national HCI of 21.4% is strikingly low against every regional comparator (Table 8). Singapore exceeds 90%, certified vendors in Thailand score above 75%, and even India—facing far greater population and regulatory challenges—achieves 38%. The evidence indicates that Bangladesh’s compliance deficit is primarily structural rather than cognitive: vendors cannot comply without clean water, handwashing facilities and waste disposal infrastructure that their vending environments do not provide. This is confirmed by the strong urban–rural gradient in compliance and by the qualitative testimony of vendors themselves.

The equity dimension is pronounced. Children under five bear more than 40% of attributed DALYs, and repeated diarrhoeal episodes in early childhood are associated with linear growth faltering and stunting (Checkley et al., 2008), compounding an already challenging national nutrition situation (UNICEF Bangladesh, 2023). Because the lowest income quintile both depends most heavily on street food and spends the largest share of income per illness episode, the burden is regressive, eroding the human capital on which Bangladesh’s development trajectory depends (World Bank, 2022).

The economic analysis reveals a clear market failure. The informal street food economy generates USD 3.4–4.1 billion in annual revenue but imposes USD 8.1 billion in social costs through foodborne illness—a cost-to-value ratio of approximately 2:1 to 2.4:1. This food safety externality provides a compelling economic rationale for public intervention. The BFSA capacity analysis (Table 7) is equally sobering: an institution operating at 9.4% of its benchmark inspector workforce and 20.8% of its benchmark budget cannot meaningfully enforce any standard. International comparison (Table 8) consistently shows that regulatory budget and compliance rates move together; no comparator has achieved high compliance on a minimal regulatory budget.

6. STRATEGIC IMPLICATIONS AND POLICY RECOMMENDATIONS

6.1 Structural Policy Implications

The evidence generates four structural implications for policy:

1. **The escalating trend demands urgency.** On the 2018–2023 trajectory, each year of policy delay adds on average approximately USD 500–600 million to the annual economic burden and 700,000–900,000 additional foodborne illness cases.
2. **BFSA capacity is the binding constraint.** Without at least a five-fold budget increase and a six-fold expansion of the inspectorate, no regulatory reform can be implemented at scale.
3. **WASH infrastructure is non-negotiable.** Hygiene compliance is structurally determined by access to water and sanitation, not merely by knowledge or willingness.
4. **Consumer demand can be harnessed as a market incentive.** The certification-display systems of Singapore and Thailand show that transparency creates commercial incentives for compliance without requiring costly enforcement at every individual stall.

6.2 Projected Compliance Trajectories

Two reform scenarios were modelled against a no-change baseline of 21.4% compliance (Table 9; Figure 4). Under full implementation of the National Action Framework (optimistic scenario), compliance reaches 60% by 2030 and 75% by 2033, exceeding the 70% policy target and mirroring the trajectory achieved by Thailand over a comparable ten-year period. Under partial implementation (conservative scenario), compliance reaches 50% by 2033, falling short of the target.

Table 9. Projected vendor hygiene compliance under reform scenarios, 2024–2033 (%)

Year	Baseline (No Policy Change)	Optimistic (Full Framework)	Conservative (Partial Implementation)
2024 (baseline)	21.4	21.4	21.4
2025	21.4	25.0	22.0
2026	21.4	31.0	24.0
2027	21.4	38.0	26.5
2028	21.4	45.0	29.0
2029	21.4	52.0	32.0
2030	21.4	60.0	36.0
2033 (target year)	21.4	75.0	50.0

Source: CHRSD policy modelling (2025), benchmarked against the Thailand Clean Food, Good Taste programme (Thai Ministry of Public Health, 2022) and Singapore’s hawker reform experience (Hawkins, 2021). Note. Projections are illustrative estimates for planning purposes; years 2031–2032 were not modelled.

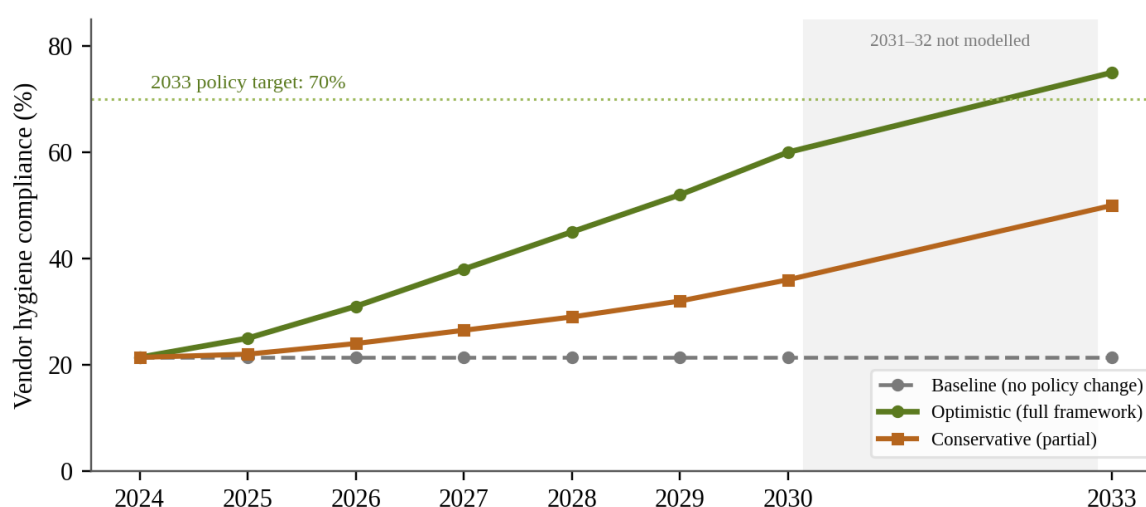


Figure 4. Projected vendor hygiene compliance under baseline and reform scenarios, 2024–2033

6.3 Short-Term Recommendations (2025–2026)

- R1.** Launch a national digital vendor registry (target: 100,000 registrations by Year 2).
- R2.** Deploy a WHO Five Keys food safety training programme through NGOs and digital platforms (target: 200,000 vendors trained by Year 2).
- R3.** Install 5,000 handwashing stations and potable water points at designated vending zones in all divisional cities on an emergency basis.
- R4.** Issue a joint Ministry of Health and Ministry of Food policy directive elevating street food safety to a public health priority, accompanied by an emergency supplementary BFSa budget.
- R5.** Launch a national consumer awareness campaign through television, radio, social media and school curricula.

6.4 Medium-Term Recommendations (2027–2029)

- R6.** Amend the Food Safety Act 2013 to mandate food safety training and certification for all licensed street food vendors.
- R7.** Increase the BFSA annual budget to a minimum of USD 50 million, expand the inspectorate to 2,000 and establish district-level food safety offices in all 64 districts.
- R8.** Introduce an A–D hygiene grading and public display system for all registered vendors, modelled on Singapore’s system.
- R9.** Establish a national real-time foodborne disease surveillance network linking IEDCR, icddr,b and district health offices with vendor geolocation data.
- R10.** Link registered vendors to national social protection programmes—including the Khadya Bandhab (Food-Friendly) Programme, health insurance and microfinance—to reduce the cost barriers to compliance.

6.5 Long-Term Recommendations (2030–2034)

- R11.** Adopt a National Street Food Safety Plan 2026–2036 with annual parliamentary reporting against measurable targets (70% compliance; 60% reduction in foodborne disease; 80% vendor training coverage).
- R12.** Integrate designated hygienic vending zones into all urban planning legislation and city master plans.
- R13.** Build the institutional capacity of more than 500 vendor associations for self-regulation and peer monitoring.
- R14.** Commission a biennial longitudinal evaluation of the National Action Framework’s impact.
- R15.** Pursue a SAARC-level regional framework for street food safety standards.

Table 10. National Action Framework: phased implementation timeline

Phase	Period	Key Actions	Target Outcome
Short-term	2025–2026	Vendor registry; WHO Five Keys training; emergency WASH deployment; consumer awareness	100,000 vendors registered; 200,000 trained
Medium-term	2027–2029	Mandatory training regulation; BFSA expansion to 2,000 inspectors; A–D grading; surveillance network	Compliance 35–40%; FBD incidence –25%
Long-term	2030–2034	National Street Food Safety Plan; urban vending-zone redesign; vendor social protection; SAARC cooperation	Compliance ≥70%; FBD incidence –60%; economic burden –50%

Source: CHRSD Research Division (2025). Note. Shading denotes phase: green = short-term; orange = medium-term; blue = long-term.

6.6 Equity and Livelihood Safeguards

Reform must be designed so that the cost of compliance does not fall on those least able to bear it. Licensing fees should be waived or subsidised for low-income vendors during the transition; registration should be framed as a gateway to training, infrastructure and social protection rather than as an enforcement tool; and inspection regimes should prioritise education and graduated sanctions over closure or confiscation, consistent with evidence that punitive approaches reduce income without improving hygiene (Steyn et al., 2013). Women vendors, migrant vendors and those in rural market towns—where compliance is lowest—should be priority beneficiaries of WASH investment and training.

7. CONCLUSION

Unhygienic street-vended food in Bangladesh is not merely a food safety concern; it is simultaneously a public health problem, a major economic loss and a social equity failure. The trend data presented here make the trajectory clear: without sustained policy action, every dimension of the problem is likely to worsen. Reported diarrhoeal cases rose from 10.4 million in 2018 to 13.2 million in 2023, and the economic burden from USD 5.2 billion to USD 8.1 billion. The BFSA’s resourcing gap widened, and vendor hygiene compliance stands at 21.4%—whereas Singapore demonstrates what three decades of sustained reform can achieve: compliance above 90% and a 95% reduction in hawker-associated foodborne disease.

The proposed five-pillar National Action Framework—vendor registration, food safety training, WASH infrastructure, BFSA capacity strengthening and consumer empowerment—carries an estimated ten-year cost of approximately USD 850 million, roughly 10.5% of the annual economic burden it addresses, with an estimated return of USD 9.50 per dollar invested. Few public health investments available to Bangladesh offer a comparable return.

The tables and figures in this paper are intended as policy communication tools as much as academic contributions, and should accompany parliamentary advocacy, budget negotiations and dialogue with development partners. Future research should extend the HCI to repeated annual measurement, evaluate pilot implementations of the Framework, and refine attribution estimates through laboratory-confirmed outbreak investigations. The evidence is consistent, the policy pathway is mapped, and the decisive variable is now sustained political commitment—an agenda squarely aligned with the CHRSD Foundation’s mission of evidence-based research for human development and social progress.

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ANNEX A. SUMMARY OF TABLES AND FIGURES

The following summary maps each table and figure in this paper to its data source and analytical purpose.

Item	Content	Principal Data Source	Analytical Purpose
Table 1	Study components and samples	CHRSD study design	Methodological transparency
Table 2 / Fig. 1	Foodborne disease incidence, 2018–2023	IEDCR; icddr,b HDSS	Epidemiological burden
Table 3	Street-food attribution fractions	Delphi elicitation; case-control meta-analysis	Attribution analysis
Table 4	Total and attributed DALYs, 2018–2023	GBD; IEDCR; icddr,b	DALY burden estimation
Table 5 / Fig. 2	Economic burden, 2018–2023	COI model; BBS; Bangladesh Bank	Economic burden analysis
Table 6 / Fig. 3	HCI by division, 2025	CHRSD observational checklist	Spatial hygiene compliance
Table 7	BFSA budget and inspectorate	BFSA annual reports; Ministry of Finance	Regulatory capacity gap
Table 8	International comparison	NEA; Thai MOPH; Malaysian MOH; FSSAI; BFSA	Benchmarking
Table 9 / Fig. 4	Compliance reform scenarios, 2024–2033	CHRSD policy modelling	Policy scenario analysis
Table 10	National Action Framework timeline	CHRSD Research Division	Policy planning

Suggested citation: Ramim, M. A., & Hossain, M. M. (2026). *Unhygienic street-vended foods in Bangladesh: Impacts on public health, economy, and national well-being* (CHRSD Foundation Research Paper Series). Centre for Humanitarian Research and Social Development. <https://chrds.org/research-papers>