



Research Article

Sanitary Survey of Food and Drinking Establishments in Mettu Town Southwest, Ethiopia

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Abstract

Food safety is a critical determinant of public health, as contaminated food and infected animal products can trigger severe food borne infections. This cross-sectional survey, conducted from February to March 2025, assessed the sanitary conditions of public food and drinking establishments in Mettu town, southwest, Ethiopia. Utilizing pre-tested questionnaires, observational checklists, physical check-ups, and stool examinations of food handlers, the study evaluated both infrastructure and hygiene practices. The results revealed that while 96.6% of the establishments were privately owned and 86% were owner-managed, 38.9% operated without a formal license and 54.4% were in rented buildings. Physical infrastructure was largely deficient; only 23.6% of the 123 establishments with kitchens achieved a "good" sanitary rating, though formally licensed venues consistently outperformed informal ones. Notably, routine oversight proved highly effective, as establishments inspected within the past year were significantly safer in storing ready-to-use equipment (OR = 6.53; 95% C.I. [3.07, 13.86]). However, health screenings exposed critical vulnerabilities, with 34.5% of tested food handlers testing positive for worm infections. Ultimately, the overall sanitary conditions were unsatisfactory, creating a high risk for food contamination. To mitigate these risks, integrated intervention is required from local health sectors, the municipality, and the Ministry of Trade, Industry, and Tourism. Immediate recommendations include enforcing strict legal licensing, establishing regular sanitary inspections, and implementing proper waste handling systems, and providing structured training for catering managers to ensure rigorous supervision of food handlers.

Keywords

Food Safety, Sanitary Conditions, Food Handlers, Public Health, Mettu Town

1. Introduction

Background

Food is a fundamental determinant of human health, nutritional security, and socio-economic development [1]. However, when mismanaged, it transforms into a highly volatile vector for disease transmission. Food serves as an optimal culture medium for microbial proliferation and toxin production; consequently, the consumption of contaminated foods or prod-

ucts derived from infected animal hosts frequently leads to severe food borne infections. These range from chronic systemic conditions like tuberculosis and diphtheria to acute gastrointestinal illnesses, including typhoid fever, salmonellosis, bacillary dysentery, cholera, infectious hepatitis, and diverse intestinal parasitic infestations [2].

Globally, food borne illness imposes a staggering public

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health and economic burden on both developed and developing nations [3]. In industrialized countries, epidemiological data indicates that approximately one-third of the population suffers from food borne diseases annually, resulting in mortality rates as high as 20 individuals per million [4]. In the United States alone, the Centers for Disease Control and Prevention (CDC) estimates that food borne pathogens cause 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths each year, incurring substantial annual economic losses between \$10 billion and \$83 billion due to medical expenditures and lost productivity [5].

The crisis is markedly amplified in less developed nations, where procuring safe food is compromised by systemic structural constraints. In these settings, lower aesthetic standards, poor physical facilities, and neglected environmental sanitation mean that food and water supplies are chronically exposed to pathogens [1]. Although the true burden of food borne illness in developing countries is indisputably more severe than in industrialized nations due to fractured food safety frameworks, its exact epidemiological magnitude remains largely un quantified, as the vast majority of cases go unrecognized and unreported [6].

In Ethiopia, while centralized surveillance data quantifying food borne diseases remains sparse, structural assessments across urban centers consistently reveal high rates of insanitary conditions within public mass catering establishments, directly undermining consumer safety [7-11]. Crucially, helminthic infections, gastritis, dysentery, and acute diarrheal diseases consistently rank among the leading causes of outpatient medical consultations nationwide—morbiditys that are entirely preventable through the enforcement of safe food handling and reliable water supplies [12].

This public health challenge is heavily pronounced in rapidly urbanizing environments like Mettu town. Driven by population growth, rural-to-urban migration, and expanding commercial activity, the town has seen a dramatic proliferation of public mass catering establishments, particularly local eateries ("*Migbi Bet*"). Despite their critical role in feeding the urban workforce, the structural and sanitary status of these establishments, alongside the behavioral compliance of their staff, has historically remained unexamined.

To bridge this critical knowledge gap, this study builds upon an analytical framework that evaluates food safety through three interlocking determinants: the physical condition of the premises, human behavioral compliance, and regulatory oversight. Investigating these variables is critical; food handlers often act as primary vectors for contamination via skin, hair, and digestive tracts [3, 15, 17]. While time-temperature abuse and substandard waste management further accelerate pathogen transmission [13, 18, 19, 22]. Resolving these issues requires data-driven regulatory oversight [1, 19, 20]. By evaluating these variables, this study establishes an empirical baseline to guide local health sectors, the municipality, and trade regulatory bodies in designing targeted inspections, en-

forcing legal licensing, and implementing structural interventions to safeguard public health.

Therefore, the objective of this study was to assess the sanitary conditions, structural facilities, licensing status, and food handling practices, alongside the health status of food handlers, within public food and drinking establishments in Mettu town, southwest, Ethiopia.

2. Materials and Methods

Study Area and Period

The study was conducted in Mettu town, the administrative capital city of the Illu Ababora Zone within the Oromia Region, Ethiopia. Mettu town is located approximately 482 km southwest of Addis Ababa along the primary highway running through Jimma. Geographically, the town sits at an average altitude of approximately 1,745 meters above sea level and experiences a humid subtropical highland climate characterized by a rich evergreen forest canopy, an annual rainfall range of 1,500 to 2,000 mm, and a moderate mean temperature environment. At the time of the study, the population of the town was distributed across its designated administrative municipal units (*Kebeles*). The field data collection was executed over an eight-day period from March 4 to March 13, 2025, following preliminary census mapping and instrument pre-testing phases.

Study Design

An institution-based cross-sectional survey was carried out to concurrently evaluate the baseline structural and sanitary conditions of public food and drinking establishments, alongside assessing the food safety awareness, hygienic practices, and clinical health profiles of their food handlers.

Source and Study Population

The source population encompassed all public mass catering and drinking establishments operating within the geographical borders of Mettu town, irrespective of their formal business registration or licensing status. The study population consisted of two distinct units: all catering establishments that satisfied the specific structural eligibility criteria, and one randomly selected food handler directly involved in food preparation services from each corresponding venue.

Eligibility Criteria

Inclusion Criteria: All public food and drinking establishments that actively prepare, process, and supply edible food and beverages for immediate consumer purchase or public consumption were included in the study.

Exclusion Criteria: Establishments providing only transient or temporary services, mobile street food vendors, vendors exclusively offering pre-packaged or canned items, and local traditional breweries ("*Tela Bets*") were excluded from the investigation.

Sample Size and Sampling Method

An initial exhaustive census mapping was performed across the town over the course of one day to compile a complete frame of all functioning catering entities. A total of 178 public

catering establishments were identified. Because this total count was lower than the standard calculated sample size required for statistical sampling, a total enumeration approach was adopted, and all 178 available establishments were enrolled in the survey to ensure an exhaustive descriptive analysis.

For the selection of food handlers, a two-stage process was applied:

Behavioral and Knowledge Survey: In establishments employing more than one eligible worker, a single food handler who maintained close, direct contact with food preparation, ingredients, and food-contact surfaces was selected using a simple lottery method. This individual was designated for personal hygiene observations and interviewed to assess their knowledge, attitudes, and practices (KAP).

Clinical and Laboratory Assessment: From the enrolled establishments preparing edible items, one food handler was randomly selected to undergo physical medical evaluations and laboratory stool screenings. Out of the designated sample, 86.4% of the selected food handlers successfully completed the physical check-up and provided laboratory specimens.

Operational Definitions

Food and drinking establishment: Any commercial facility where foods or beverages are prepared and processed in large quantities for mass public consumption.

Food contact surface: The physical surface of utensils, tools, or heavy equipment with which food items regularly come into direct contact, including surfaces from which fluids can drain, drip, or splash back into raw or prepared ingredients.

Cooked food appropriately stored: Cooked food items placed inside a clean, dedicated storage container and secured with fitted lids or structural fixtures that prevent contact with ambient dust, fluid splashes, or insects.

Personal hygiene: Individual protective behaviors intended to maintain bodily cleanliness and restrict the spread of infectious pathogens, specifically requiring regular hand washing with clean water and soap, and maintaining clean clothing.

Wear of appropriate overcoat: The consistent use of a clean gown or protective overcoat and a dedicated hair cover specifically intended for food handling duties.

Cleanliness of the equipment kept: Equipment and serving utensils that are visibly free of dust accumulation, structural filth, surface grease, and prominent fingerprints.

Adequate lighting of the room: Ambient light levels that allow a person with normal vision to clearly identify small objects across the room without experiencing visual strain.

Good repair condition: The absence of structural cracks, visible holes, or loose joints capable of accumulating dirt and organic wastes within the floors, walls, and ceilings of preparation and dining areas.

Cleanliness of the room kept: An indoor space completely free of visible accumulated dirt, dust, residual soot, smoke particles, and spider webs.

Refuse/garbage properly handled: The onsite placement of durable, moisture-resistant, lightweight, and tightly covered

waste receptacles located at a safe distance away from active food preparation zones.

Data Collection Instruments

Data collection was facilitated via an integrated toolset combining an interviewer-administered questionnaire, an observational checklist, physical clinical examinations, and microscopic laboratory testing. Structured questionnaires captured background data, while the checklist was deployed for direct environmental observations of premise maintenance, kitchen hygiene, water and waste facility availability, storage safety, and personal apparel compliance. Physical check-ups were completed to screen food handlers for signs of active respiratory infections, skin lesions, and communicable eye diseases. Stool samples were collected directly from the handlers and analyzed by qualified technicians using standard direct microscopic methods to identify helminthic ova and intestinal parasites.

The field research team was highly structured, comprising two sanitarians and two public health nurses for environmental auditing and surveys, one health officer and one senior nurse for clinical check-ups, two laboratory technicians for parasitological diagnostics, and one senior sanitarian who acted as a field supervisor under the direction of the principal investigator.

Variables of the Study

Dependent Variables: The hygienic practices of food handlers during food processing, and the overall sanitary status and infrastructure provisions of the mass catering establishments.

Independent Variables: Educational background of the owners, managers, and food handlers; prior food safety training; formal licensing status of the venue; total years of operation; building ownership type (private vs. rented); history of official sanitary inspections within the past year; specific service type delivered; daily volume of customer visits; and the physical health profile of the food handlers.

Quality Assurance

To protect data integrity, the original English data collection tools were translated into *Afan Oromo*, back-translated into English by independent reviewers to ensure contextual consistency, and administered using the *Afan Oromo* version. Data collectors and supervisors underwent an intensive three-day training program on interview methods, objective observation, and the data collection manual.

The instruments were pre-tested at separate establishments outside the study area to identify and eliminate ambiguous language prior to deployment. During the field phase, the data collectors filled an average of five questionnaires per day. At the end of every data collection day, the supervisor and principal investigator held a briefing meeting with the field team to evaluate feedback, resolve challenges, and review all checklists for completeness.

Data Management and Analysis

Following data verification and coding, data entry and initial cleaning were performed using EPI Info version 6.04. The

dataset was then exported to the Statistical Package for the Social Sciences (SPSS) version 13.0 for final processing. To ensure data entry quality, a random subset comprising 10% of the completed questionnaires was independently re-entered and cross-checked for consistency against the primary database, and frequency distribution tables were reviewed to isolate missing values.

Continuous variables were categorized, and specific items were recorded to compute cumulative sanitary ratings for the premises. Statistical analysis involved descriptive frequencies, percentages, and bivariate calculations to generate odds ratios (OR) paired with 95% confidence intervals (C.I) to measure associations between independent operational factors and dependent sanitary parameters. The threshold for statistical significance was established at $p < 0.05$, and analyzed outputs were prepared using structured tables.

3. Results

Characteristics of Catering Establishments

Out of 178 identified catering establishments in Mettu town,

175 (98.3%) were successfully investigated, yielding a non-response rate of 1.7%. Food services were actively provided by 140 (80%) of these establishments. Private individuals owned the vast majority of the establishments (96.6%), whereas 2.3% were owned by organizations and 1.1% functioned as office recreational areas. Internal management was heavily structural; 86.3% of the venues were managed directly by their owners, 7.4% by relatives, and 6.3% by hired personnel. Routine training in food safety was highly deficient, with 80.6% of managers reporting no formal training.

The workforce comprised 987 food handlers, displaying a heavy female skew of 771 (78.1%) females compared to 216 (21.9%) males, averaging 5 to 6 workers per establishment. Collectively, these businesses served an estimated 11,916 customers daily. The establishments exhibited a median operational history of 4 years (ranging from one month to 50 years). Regulatory oversight varied widely: 68.6% had undergone inspection within the previous three months, while 27.4% had never been inspected. Although 61.1% were officially licensed, 10.3% of those licensed admitted to operating services outside the scope of their legal permits.

Table 1. Distribution of catering establishments by profile and operational status ($n = 175$).

Variable	Category	Frequency	%
Establishment Type	Restaurant	63	36.0
	Snack Bar	31	17.7
	Hotel / Grocery	42	24.0
	Others (Bar, Butcher, Tej Bet, etc.)	39	22.3
Service Type	Exclusively Food / Food & Drink	122	69.8
	Exclusively Drink	32	18.3
	Food, Drink, Bed & Hall	21	12.0
Licensing Status	Licensed	107	61.1
	Not Licensed	68	38.9
Building Ownership	Private	71	40.6
	Rented	104	59.4

Socio-Demographic Profile of Managers and Food Handlers

Socio-demographic evaluation revealed clear gender and educational patterns across leadership and staff roles. Among owner-managers, females constituted the majority (58.9%). The mean age of managers was 40.99 (+12.67) years, with a high proportion of literacy (82.9%) and marital stability, as 77.1% were married and cohabitating.

Among the sub-cohort of 140 food handlers selected for closer behavioral and knowledge tracking, females similarly dominated the landscape at 87.9%. The mean age for food handlers was notably younger at 28.01 (+11) years, with some workers entering the field as young as 13. Single individuals comprised 46.4% of the staff, while 41.4% were married. Literacy among food handlers stood at 67.9%, and their median career duration in food preparation was 2 years.

Table 2. Socio-demographic characteristics of managers vs. food handlers.

Demographic Variable	Category	Managers (n = 175) n (%)	Handlers (n = 140) n (%)
Sex	Male	72 (41.1%)	17 (12.1%)
	Female	103 (58.9%)	123 (87.9%)
Education Level	Illiterate	30 (17.1%)	45 (32.1%)
	Primary (Grade 1-6)	59 (33.7%)	59 (42.1%)
	Secondary / Higher (>Grade 7)	86 (49.1%)	36 (25.7%)
Marital Status	Married	135 (77.1%)	58 (41.4%)
	Non-Married / Other	40 (22.9%)	82 (58.6%)

Sanitary Facilities and Environmental Conditions

Environmental and infrastructural auditing demonstrated systemic vulnerabilities in utility access and waste management. While a majority (91.4%) utilized municipal piped water within their compounds, 86.9% lacked any storage tanks or reservoirs to buffer water shortages. Private latrine structures were absent in 21.7% of businesses, and among those available, 82.5% were dry pit latrines, 54.7% were unhygienic during inspection, and only 10.9% featured gender-segregated stalls. Hand-washing lavatories for customers were available in 74.4% of venues, but 56.1% of these lacked soap, and 69.2% possessed improperly drained, filthy liquid waste receptacles.

Kitchen infrastructure was equally compromised. Among businesses with kitchens (87.9%), 53.7% had floors made of plain earth, 52% exhibited poor structural floor repair, and 56.1% maintained unhygienic walls and ceilings. Standard ventilation (hoods/chimneys) was absent in 39.8% of kitchens, running water was unavailable in 55.3%, and vector or vermin infestations were verified in 7.3%.

Utensil processing was largely non-standard: 78.3% relied on basic bowls or buckets rather than commercial sinks, 45.6% kept unhygienic washing zones, and 43.4% lacked protected storage shelves, leaving clean utensils exposed to recontamination. Solid waste storage was similarly neglected, with 32.6% lacking any on-site refuse containers. Final solid waste disposal heavily contaminated local ecosystems, with 30.3% of businesses dumping refuse directly onto streets and 36% throwing it into rivers. For liquid waste, 73.7% utilized open-field dumping, while 7.4% discharged raw effluents straight into the Sore River.

Food Safety Knowledge, Hygiene Practices, and Health Status

Awareness of food safety principles was high among the 140 closely monitored food handlers; 92.1% had heard of food borne diseases, primarily via mass media (88.4%) and health professionals (62.8%). Furthermore, 92.9% recognized contaminated food as a vector for disease transmission, and 72.1%

understood that unwashed hands directly jeopardize food safety.

However, this theoretical knowledge failed to translate into hygienic practice. Only 28.6% wore appropriate outer garments or hair covers, and 47.9% displayed visibly unhygienic personal appearance or soiled overcoats. Physical evaluations revealed that 27.1% wore rings or finger ornaments during food prep, 30% maintained untrimmed or dirty nails, and 12.1% wore nail polish.

Biomedical screenings of 121 participating food handlers revealed significant underlying health risks. While localized infections like sinusitis (2.14%) were low, the overall prevalence of intestinal parasite infections reached a striking 34.7% (42 cases). The pathogenic landscape was heavily dominated by *Ascaris lumbricoides* (37.2%) and *Entamoeba histolytica* (32.6%).

Predictors of Sanitary Status

To determine the structural and regulatory drivers of hygiene levels, overall sanitary quality was evaluated using a composite local index. Out of 123 kitchens, only 23.6% achieved a "good" sanitary rating. Hotels demonstrated the highest compliance (61.9%), compared to a minimal 9.5% among standard restaurants.

Binary logistic regression demonstrated that institutional formalization and active regulatory oversight were powerful predictors of adequate sanitary infrastructure. Licensed establishments exhibited significantly better odds of maintaining clean floors (OR = 4.62; 95% CI: [2.15, 9.94]), functional running water infrastructure (OR = 7.49; 95% CI: [3.31, 16.96]), and a "good" overall sanitary status (OR = 12.22; 95% CI: [3.46, 43.24]) compared to unlicensed ones. Similarly, establishments subjected to routine sanitary inspections over the preceding year were strongly associated with superior structural maintenance, proper cooked food storage (OR = 5.75; 95% CI: [2.47, 13.45]), and excellent overall sanitation compliance (OR = 15.87; 95% CI: [2.07, 121.85]).

Table 3. Logistic regression of sanitary outcomes by regulatory status.

Environmental Predictor Variable	Compliant Status n (%)	Odds Ratio (OR)	95% Confidence Interval (CI)
Licensed Status (Overall Good Sanitation)	26 (89.7%)	12.22	3.46-43.24
Unlicensed Status	3 (10.3%)	1.00	1.00-1.00
Sanitary Inspection Done (Overall Good Sanitation)	28 (96.6%)	15.87	2.07-121.85
Sanitary Inspection Not Done	1 (3.4%)	1.00	1.00-1.00

4. Discussion

The comprehensive sanitary assessment revealed that only 23.6% of catering establishments with kitchens in Mettu town achieved a "good" sanitary compliance rating. Ensuring public food safety requires stringent control from the supply source to the ultimate consumer [14], with a particular focus on food processing and table service environments to suppress biological food borne illnesses.

A high proportion of informal, unlicensed catering establishments (38.9%) were found actively operating. This occupancy is higher than rates in Addis Ababa (29.1%), Mekelle (9%), and Awassa (9%), though lower than in Zeway (50.3%) [7-11]. These informal venues generally occupy buildings never originally designed for catering, fail to meet minimum public health licensing criteria, and serve low-income populations on razor-thin profit margins. Nevertheless, regulations dictate that no business should be carried out at insanitary premises [13] and must remain well-lit, ventilated, and structurally sound to eliminate vector breeding grounds [3].

Widespread infrastructure disrepair was documented across the surveyed premises, including 52% of kitchen floors, 46.3% of kitchen walls/ceilings, 39.4% of dining room floors, 28% of dining room walls, and 36% of dining room ceilings. These structural defects introduce crevices where organic debris and insects lodge, echoing structural degradation trends reported in Addis Ababa [7, 8] and Zeway [10]. Unlicensed venues displayed significantly worse maintenance and lower cleanliness scores than formal operations, indicating that formalized businesses better insulate food from unhygienic environments.

A powerful statistical association was established between recent regulatory sanitary inspections and superior physical upkeep. However, inspections in Ambo remain highly irregular and lack standardized guidelines. For long-term sanitary maintenance, routine external enforcement alone is inadequate and must be supplemented by education, motivation, persuasion, legal action, management supervision, and consistent internal managerial self-inspections [14].

Active internal managerial supervision yielded safer food preparation practices; however, an overwhelming 80.6% of

establishment managers lacked any formal training in food hygiene. The overall strategy requires placing a heavy emphasis on proper food safety education [16] so that trained managers can effectively educate and monitor staff regarding proper storage and thermal preparation workflows [13]. Critical shortages were also observed in essential sanitary utilities, including low coverage for municipal latrines, customer hand-washing lavatories, internal running water lines, and covered waste receptacles.

Waste management workflows were heavily compromised: only 19.4% of businesses utilized formal municipal solid waste services, with the remainder relying on backyard burning, street dumping, or direct disposal into nearby rivers. Furthermore, only 18.9% safely managed liquid waste, while the majority used open surface dumping or discharged raw effluents into the Uluka River. This severe mismanagement mirrors findings from Zeway and Awassa, contrasting sharply with the superior municipal container and septic systems utilized in Addis Ababa and Mekelle.

Compliance with core contamination-prevention principles has been shown to be effective using known microbiological and sanitary measures [14], yet local application was highly deficient. Cooked foods were improperly stored in 34.1% of kitchens, 35.8% maintained dirty processing equipment, 43.4% lacked protected utensil shelving, and 69.1% lacked drying racks. Only 39.3% possessed functional refrigerators, and just 32.7% of those kept safe holding temperatures ($< 10^{\circ}\text{C}$), a cold-chain deficiency similar to Addis Ababa but vastly inferior to Mekelle (66.3%) and Awassa (90.3%).

Finally, personal hygiene compliance was poor, even though clothing can play an important role in preventing contamination [3]. Protective outer garments were missing among 68.3% of kitchen staff, while 67.4% and 88.4% of dining room staff worked without overcoats and hair covers, respectively. This low protective gear usage is slightly similar to findings in Mauritius high schools [21], but noticeably worse than rates in Awassa, Mekelle, and Addis Ababa. While 92.2% of food handlers demonstrated good theoretical awareness of food borne diseases (primarily via mass media), this knowledge failed to translate into practice due to low attitudinal change and a deficient physical environment.

Strength and Limitation of the Study

Strengths of the Study

This investigation represents the first comprehensive, empirical environmental health audit conducted within the catering sector of this study area, providing an invaluable baseline dataset for planning future municipal health interventions.

The research methodology integrated diverse data collection modalities—including structured interviews, physical inspections, and environmental checklists—thereby ensuring data triangulation and high quality control.

Limitations of the Study

The study design was completely unsupportive of bacteriological or microbial testing of food contact surfaces, cooking utensils, or drinking water samples due to the total absence of a coordinated public health laboratory facility in the study area.

Due to the absence of standardized national grading frameworks for evaluating the sanitary quality of catering establishments, the study relied on a locally developed, modified evaluation index.

The study did not evaluate or map systemic workflows using the Hazard Analysis Critical Control Point (HACCP) methodology.

The precise sanitary methods used to serve drinking water to customers were omitted from the final data collection instrument due to an oversight during the initial conceptual design of the study.

5. Conclusions

Metu town features a highly concerning, unregulated proliferation of informal, unlicensed catering establishments actively serving the public.

The general sanitary status of the majority of catering businesses is profoundly unsatisfactory due to widespread structural disrepair, a severe lack of essential utilities, unhygienic preparation rooms, and highly unsafe liquid and solid waste management workflows.

The probability of widespread food contamination and localized outbreaks of food borne illness is exceptionally high across these venues due to compromised structural environments and unhygienic food handling methods.

Formal legal licensing, routine sanitary inspections by authorized public health bodies, active internal managerial self-auditing, and continuous professional guidance provided by managers to staff all exert a powerful, statistically significant positive impact on the sanitary compliance of food establishments.

The active coverage, frequency, and consistency of formal municipal sanitary inspections are critically low and structurally disorganized.

6. Recommendations

Inter-Sectoral Integration: The regional Health Sectors,

Municipal Administration, and the Ministry of Trade, Industry, and Tourism must establish an integrated task force to eliminate unhygienic commercial operations. This must be achieved by aggressively enforcing mandatory licensing for informal vendors, legally compelling all operators to construct private latrines and hand-washing stations, and conducting unannounced sanitary inspections backed by swift legal penalties for non-compliant venues.

Standardized Toolkits: Public health authorities must rapidly develop, publish, and distribute unified operational guidelines and objective checklists for sanitary inspectors to standardize municipal enforcement.

Managerial Capacity Building: To prevent the accidental contamination of food due to poor hygiene awareness, regional health departments should implement mandatory food safety certification training programs for establishment managers. Certified managers will, in turn, be legally responsible for training and monitoring their front-line staff.

Municipal Waste Infrastructure: The town administration must plan, finance, and execute an organized municipal solid and liquid waste collection system, expanding waste truck coverage and ending the illegal dumping of commercial effluents into local river basins.

Abbreviations

CFSAN	Center for Food Safety and Applied Nutrition
C.I	Confidence Interval (also Formatted as CI)
FDA	Food and Drug Administration
HACCP	Hazard Analysis Critical Control Point
ISBN	International Standard Book Number
LTD	Limited
No.	Number (also Formatted as No)
OR	Odds Ratio
oc	Degrees Celsius (intended as oC)
URL	Uniform Resource Locator
U.S / U.S.A	United States of America
WBJ	World Bank Journal
WHO	World Health Organization
WTO	World Trade Organization

Author Contributions

Dagim Dagne: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Software, Visualization, Writing – original draft, Writing – review & editing

Data Availability Statement

Data are available upon reasonable request from the corresponding author.

Conflicts of Interest

The authors declare no conflicts of interest.

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