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The effects of expanding urban food markets on food security and public health

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Abstract

Urban food markets support local economies, preserve urban areas, and promote a healthy diet. To support local farmers, more individuals are making purchases at these markets. Urban food market owners, sellers, municipal health officials, and customers work together to provide safer and healthier alternatives. Urban food markets should establish and promote efficient food safety procedures and raise public awareness to maintain their success as secure, effective hubs for producers and buyers. The study examined the impact of growing urban food markets on public health and food security. There have never been a bigger percentage of diners becoming ill. Meals derived from animals and fruits and vegetables are the healthiest options. In many big cities, consumption of all of these is rising. Food purchased from a street vendor may not be any safer than food purchased from a supermarket or other shop. For domestic market investments, food security in big cities must come first. Shopping customers, market management, vendors, government health inspectors, and vendors all have a stake in the safety of the food they purchase.

Keywords: urban food markets, food security, public health, Impact of Growth, Food Borne.

1. Introduction

More people will live in cities than in rural areas by 2050 when there will be 9 billion people on Earth. People in metropolitan regions are net consumers of food, whereas the majority of the population in rural areas is involved in agricultural production (Maye 2019). Cities will continue to rely on rural regions for their food supply as the proportion of the population that does not work in agriculture rises in tandem with urbanization (Serrajet *al* 2019). The generally accepted definition of food security states: "Food security exists when all people, at all times, have physical and economic access

to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life." At the 1996 World Food Summit (WFS), it was advocated that this be done to bring the problem of hunger to the forefront of the international community's mind (Zhou *et al*/2019). There are now 793 million people at risk of starvation, despite a ten-year decline in around 167 million. Millions of city inhabitants also routinely consume fewer calories than the minimum of 2100 per day suggested for a healthy, physically active adult (Xu *et al*/2022). Both emerging and international organizations point to urban areas as the future's primary sites of food insecurity. Planners and politicians preoccupied with unemployment, overpopulation, and crumbling infrastructure, need to pay more attention to the problem of food insecurity in urban areas (Baldassarre *et al* 2023). Food shortages affect a large percentage of the world's poor. Several nations are improving their rural agro-food systems and urban agricultural sectors to serve their growing urban populations better. Despite urban agriculture's potential to increase food supply and security, much of it is cultivated in filthy, unmanaged settings that pose health hazards and need to be recognized by the government (Filippini *et al* 2019). More recently, the importance of peri-urban agriculture in supplying food to rapidly growing cities has been acknowledged, and strategies have been developed to boost peri-urban agricultural production in response to demographic shifts (Enns *et al.*, 2023). Extreme weather and natural disasters are common in the Global South, compounding the challenges urban populations face with food production and availability in impoverished countries. This problem is most acute in megacities, the densest human settlements on the planet (Kodmany 2020). A healthy diet is promoted through urban food markets, which also help local businesses and maintain the integrity of city centers. More and more shoppers are flocking to these venues to show their support for regional farmers.

(Saraiva *et al*/2020) reviewed the most important components of how consumers see natural meals and natural sweets. The effects on human health, food security, and the environment of its use and expansion are also discussed. Key finding implies that consumers put a premium on purchasing ready-to-eat foods that are natural, easy to understand, and that also preserve their excellent taste. The food industry has produced natural sweeteners that are both healthful and tasty in response to this trend. (Wang *et al*/2022) defines the word and discusses its usage. Foodscape research was searched in MEDLINE, Scopus, and Web of Science Core Collection. One hundred forty articles revealed four foodscape views: Urban foodscape variation and its effects on diet and health are shown through spatial statistical and geographical analysis. According to qualitative case studies and quantitative food procurement analyses, foodscapes are socially formed and structurally diversified. An indoor micro-scale behavior study shows how foodscape views affect consumers' knowledge and behavior. Systemic actions fight global corporate food regimes and support local ethical and ecological food systems. (Moseley *et al*/2020) assessed Dhaka city residents' household food security using online and telephone questionnaires. About 25% of respondents lost their jobs between March and June 2020, and 80% reported a loss in income. Despite the pandemic, Bangladeshis eat fish. (Amare *et al*/2021) analyzes the effects of the COVID-19 pandemic on family food security and labor market participation in Nigeria using face-to-face surveys conducted before the pandemic and telephone polls conducted in April and May of 2020. We adopt difference-in-difference analysis to analyze temporal and spatial variation in COVID-19 exposure and lockdown metrics. (Cummins *et al*/2021) looked at four potential shifts in the food retailing industry in the UK and how they might affect the diet of the population: relocalization of the food retail system, increased use of digital groceries, reorganization of the fast-food industry, and effects on food banks and emergency food assistance programs. We conclude with thoughts on the challenge this presents for research and policy. (Nguyen *et al* 2019) examined how customers' backgrounds and lifestyles influence their opinions and preferences about organic beef. Many eco-friendly farmers and consumers agree that this is a valuable item. Vietnam was chosen as the study's location because of its developing market economy. Six hundred and nine customers from four Hanoi restaurants who had recently purchased

organic beef were surveyed using a validated survey instrument. May, 2019 proposed we conceptually link smart city planning to study urban food systems, highlighting policymaking and technical progress issues. A "smart city" refers to an urban research initiative incorporating data-gathering and technological advances into city infrastructures. Guida and Carpentieri, 2021 measured urban accessibility to healthcare facilities as an index of the elderly quality of life in Milan, a city afflicted by the COVID-19 pandemic, during regular working circumstances, and the pandemic. Older people, particularly in major metropolitan suburbs, have extremely inadequate access to primary health care, and the lack of services and activities impacts their condition.

2. The effects of expanding urban food markets on public health

More grocery outlets are needed in urban areas. Both traditional and cutting-edge food stores coexist in the contemporary city. There need to be more food options in city supermarkets and convenience shops. Meat, fruit, and dry goods are what you'll find in a typical market. While many do not fulfill regulatory standards when identified, many are compliant despite needing to be registered and needing food safety management systems. Cereals, sugar, oil, and ultra-processed foods are more common in conventional grocery stores, whereas fresh produce, meat, and fish are more common at informal markets. Even though they have a more complicated infrastructure and less reliable cold chain, informal marketplaces may deliver safer food. Aflatoxin M1 has been found in certain **Indian** milk. Consumption of meat and fresh produce rises as cities grow and the middle class expands. Providing fresh, inexpensive food from animal sources to cities with expanding populations is challenging. The rapid urbanization and population expansion of LMICs only make matters worse. Due to the difficulty of transporting perishable goods from rural areas, urban and peri-urban farming is more common. It was projected in 2014 that urban croplands made up 5.9% of the world's total cultivated area, with a higher concentration in low and medium-income. Producing high-value crops like vegetables and meat is essential for urban farms due to the high cost of urban land. Having these very perishable items close to the places where they will be used. Since most of the milk consumed in New Delhi made in densely populated regions, farmers sell it directly to customers at the farm gate. Customers know the milk they buy at the farm gate is fresh and of high quality, and the price is appropriate, too. But as urban markets grow, more suppliers and intermediaries enter the picture, making it harder to identify products and increasing the risk of adulteration or contamination in **Table 1** and **Figure 1**.

Table1:Growth of Urban Foods

	Values
<i>KFC</i>	1400
<i>Subway</i>	1100
<i>McDonald's</i>	750
<i>star bucks</i>	430
<i>Pizza hut</i>	410
<i>Baskin-Robbins</i>	390
<i>Domino's Pizza</i>	220

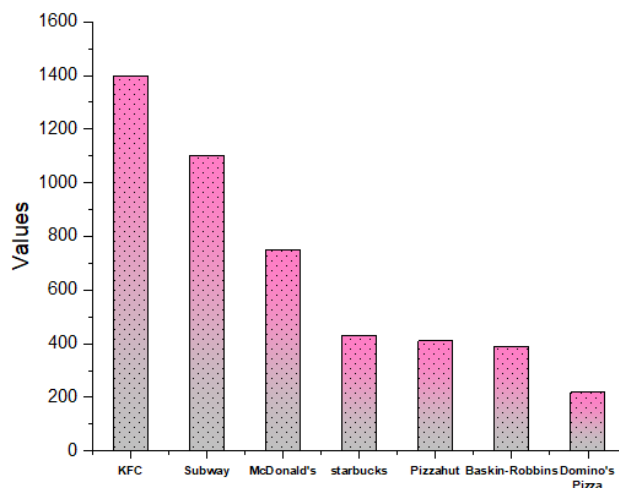


Figure 1: Expansion of Culinary Options in Cities

3. Risk Assessment of Food Safety: Scale and Scope of the Problem

Table2 and Figure 2 depict that the prevalence of Foodborne Diseases (FBD) has increased in recent years, even though FBD has not been decreasing, and increased public attention and economic expenses for businesses may emerge from improved detection capabilities that track FBD outbreaks back to their source. The well-known gastrointestinal symptoms only account for around half of the health burden associated with FBD. Rare but fatal complications of FBD include septicemia, paralysis, stillbirth, and meningitis.

Table 2: Growth of Urban Population

	Urban Population
2000	3.2
2005	3.4
2010	3.6
2015	3.8
2020	4
2025	4.2
2030	4.4
2035	4.6
2040	4.8
2045	5
2050	5.3

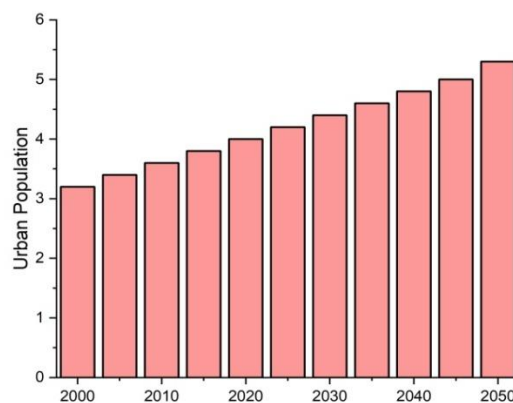


Figure 2: Growth of the city's resident population

The development of FBD, however, has yet to be prioritized by either LMICs or the international community. This is due to a combination of several factors FBD is difficult to measure in developing countries since many Infectious infections are notoriously difficult to diagnose accurately. Identifies the etiological organism, after establishing a diagnosis, it may be difficult to determine if a disease was transmitted by contaminated food, water, people, animals, or the environment. Although foodborne illnesses, including salmonella, cholera, and brucellosis, may be required to be reported, very few developing countries have such formal reporting requirements. It's been said that what gets measured is what gets controlled.

Consequently, the importance of FBD was drastically reevaluated once the first global burden estimate was released. **Table 3** shows the Foodborne Disease Epidemiology Reference Group (FERG) of the World Health Organization supervised this research. Young children (those under five) and low- and middle-income countries (LMICs) pay the lion's share of the price. The FERG study compiled a list of 31 potential dangers associated with food for which worldwide.

Table 3: Food borne Illness Medians

Diseases	DALY (95% UI)	Deaths (95% UI)	Illness (95% UI)
<i>Giardia spp</i>	0.9 (0.2-3)	0 (0-0)	810 (172-2,574)
<i>Cryptosporidium species</i>	15 (3-37)	0.4 (0.04-0.4)	206 (35-813)
<i>Diarrheal diseases</i>	688(369,107)	10(3-14)	9,831 (3,970-21,565)
<i>Hepatitis A virus</i>	26 (7-60)	0.6 (0.1-1)	233 (60-643)
<i>Norovirus</i>	83 (24-185)	2 (0.3-3)	1,74 (491-5,060)
<i>Mycobacterium bovis</i>	33 (19-42)	0.5 (0.3-0.7)	8 (4-9)
<i>Vibrio cholera</i>	114 (35-252)	3 (0.5-4)	44 (35-101)

There were an estimated 600 million incidents of food poisoning and 420,000 deaths in 2010 because of these 31 issues with food safety. Although they only make up 9% of the global population, children under five accounted for 40% of the total DALYs lost owing to premature death and disability. On a per-person basis, were second and third worst hit. Adjusted life years (DALYs) lost due to illness, death, and disability are listed below by area for each of the 31 foodborne hazards. The cost of FBD caused by four metals in 2015 was recently approximated using data from the same study. Over 9 million disability-adjusted life years (DALYs) and over 56,000 deaths were predicted. Although malaria and tuberculosis caused an estimated 40 million and 66 million DALYs lost globally, respectively, less

emphasis has been paid to ensuring food safety throughout the globe. Despite ongoing efforts, conclusive information on the foods that trigger FBD is lacking. The safest dietary choices are fruits and nuts, whereas vegetables and animal meals are the riskiest. Diseases caused by eating animals typically originate from parasites and bacteria. Fresh produce poses risks for FBD due to the same dietary parasites and bacterial infections. Meat and other animal-based foods are more popular in urban areas than in rural ones. As a result, businesses that serve them, such as roadside stands, small, informal, or formal restaurants, and similar establishments, have seen increased business. Several investigations have shown disturbing contamination levels in commonly used consumer items. The Bank projects a rise in FBD and its related economic burden in **Table 4** and **Figure 3** as nations continue their development and urbanization.

Table 4: Calories from Adults and 20-Year-Olds

Age (Years)	Percent		
	Overweight	Underweight/ Normal	Obese
Total	11.2	9.6	13.1
20–39	14.7	13.5	18
40–59	10.7	9	11.2
60 and over	5.8	3.8	7.7

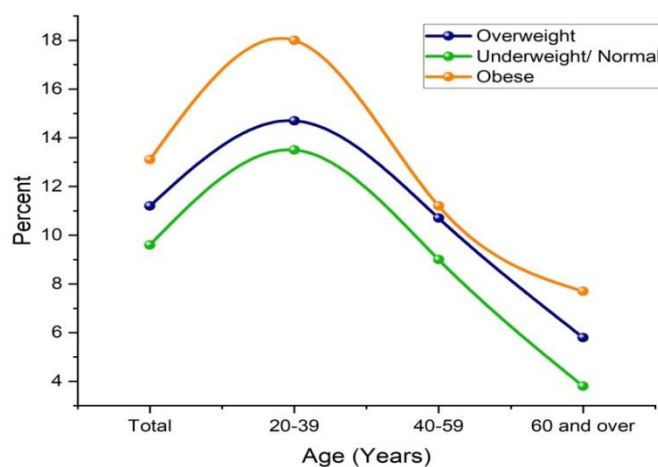
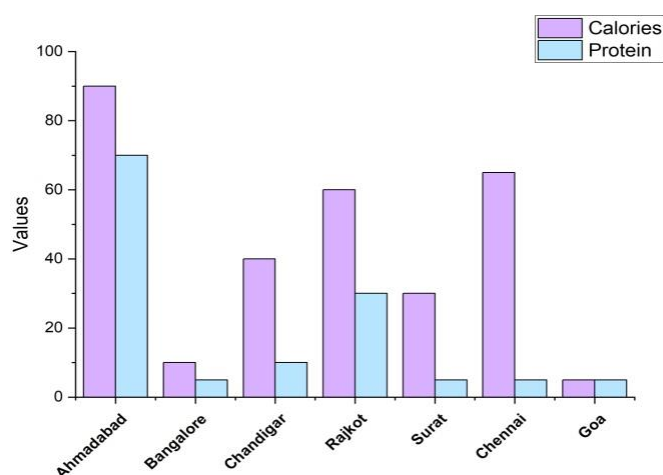


Figure 3: Percentage of calories among adults and 20-year-olds by race and ethnicity

Some examples of non-microbial dangers include mycotoxins, antibiotics, and pesticides. In metropolitan areas, pesticides and fungicides are standard practice. Normal horticulture insecticides can't be used on cotton or other crops. Chemicals, exposure, and danger all differ depending on location. There are pesticides in milk, cereal, and seafood. After anti-malaria spraying and public health campaigns have been ongoing for decades of crucial cash crops with dangerous and now-banned persistent organic pollutants (POPs). Several of the Research investigates organ chlorine and the introduction of harmful pesticides into the ecosystem and food chain. DDT and endosulfan have been found in fish, milk, and other dairy products, including breast milk. Bioaccumulation is a problem even if most pesticide levels are below international Maximum Residue Limits (MRL). Cities in LMICs will see an increase in FBD in **Table 5** and **Figure 4**.

Table 5: Diet Sufficient in Calories and Protein

	Values	
	Calories	Protein
<i>Ahmadabad</i>	90	70
<i>Bangalore</i>	10	5
<i>Chandigarh</i>	40	10
<i>Rajkot</i>	60	30
<i>Surat</i>	30	5
<i>Chennai</i>	65	5
<i>Goa</i>	5	5

**Figure 4:** Proportion of City Residents Eating Enough Protein and Calories

4. Risk Management for Food Safety

Dependable Organizations

Governments and the general public may benefit from an efficient food control system that guarantees the safety of the food they purchase, sell, or trade. These objectives are to be accomplished by lowering FDB dangers, protecting customers from dishonest business activities fostering economic progress by ensuring the quality and safety of sold items and preventing fraud and adulteration, otherwise transferred. A national food control system comprises a supportive legal framework, a management system for food control, food inspection, labs for risk monitoring and surveillance, information, education, communication, and training for consumers and value chain actors. This should be made explicit in a thorough food safety policy. The responsibility for food safety is dispersed across several organizations and groups due to unclear tasks that encourage passivity and duplication. The term "food law" refers to rules that provide governments the authority to monitor the safety of food supply networks. Knowing which departments and organizations are engaged in implementing food regulation is crucial. To encourage efficient resource use, good coordination, and the elimination of redundancies, it is essential that the law clearly defines the limits of the actors. The relevant standards could be clearer to many value chain stakeholders. Follow due to a lack of clarity, which might lead them to lose faith in the implementing agency. Several taxes are also applicable to the food business, many of which have no apparent advantages and may deter compliance in **Figure 5**.

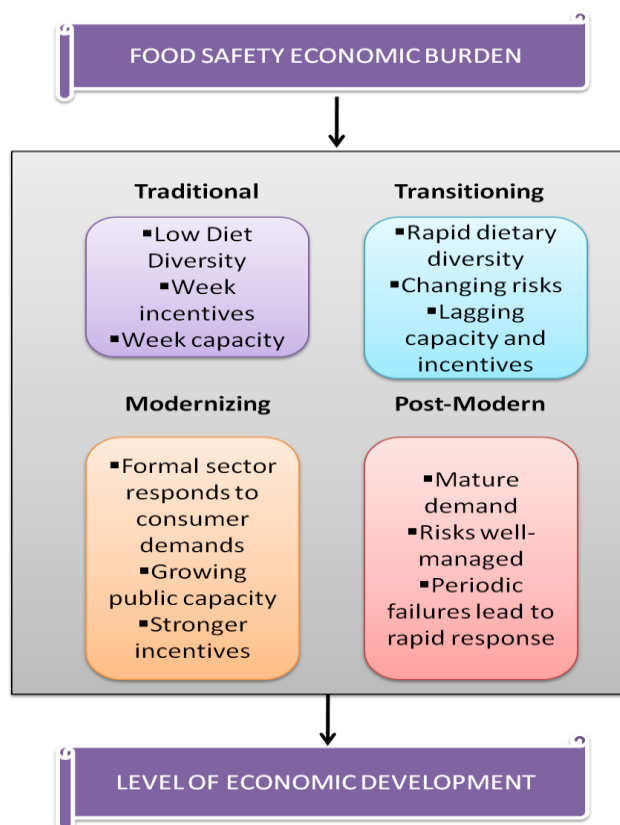


Figure 5: Development Level of Economic

These flaws reduce customer protection, and foodborne diseases still need to be solved. Governments must establish an integrated food management system to achieve health results linked to safe meals. Additionally, regional organizations have backed the LMIC food safety agenda development community (SADC) requested the creation of a cross-sectoral group charged with developing guidelines for managing food safety nationwide. Also, it gave instructions to ensure the safety of the food supply. Strategy and action plans are used by the community to direct its member nations toward the illusive safety of food and nourishment.

Regulations

While it may be difficult to guarantee complete safety, laws have been implemented to mitigate the problem. The formulation of standards aims to safeguard consumers and public health. Standards for food quality and safety are set by the Codex Alimentarius Commission (CAC) to ensure equitable global commerce. However, occasionally individual countries or regional groupings create even stricter standards. About half of CAC 188 member countries are located. National food standards are developed and enforced by designated government agencies. Recommendations from the Codex may inspire nations and regional organizations to create criteria appropriate for their contexts. They must work well with existing TBT (Technical Barriers to Trade) and sanitary/phytosanitary agreements. Unrealistic local circumstances, with their more intricate food systems and informal markets, make international norms irrelevant prevail. Although evidence-based standards are preferable, many developing countries need more financial means to conduct thorough risk assessments. To ensure that all of the food eaten and exchanged throughout the continent is safe for human consumption, regional economic communities (RECs) are working to harmonize their standards.

Monitoring Ability

It is crucial to keep an eye on food-safety systems. Examples include ensuring inspectors have the necessary resources to do their jobs and regularly reviewing and updating legislation to account for

new and reemerging health risks. Poor food sector management, insufficient logistical assistance, and a lack of respect for food safety authorities contribute to inefficient monitoring. As long as the need to give incentives to promote compliance is not recognized, the regulatory challenge posed by the prevalence of unregulated informal markets will persist. Reliable laboratory results are crucial to the food sector. It is not uncommon for public labs to be under-equipped. And just a minuscule fraction of them have been verified as genuine. With monitoring information, resource allocation and burden assessment are possible. Surveillance helps identify potential FBD outbreaks, source foods, and remove the offending item from the distribution chain via traceability and recall. If integrated, divisions may exchange data. Several nearby countries need more regional supervision.

Institutionalized Responses

The private sector ensures food safety while the government sets the legislative framework. LMICs remain under governmental control. However, the private sector is increasingly ensuring food security. Today's cities' growing middle and upper classes are spurring advanced food distribution networks. Formal value chains adopt industrialized nations' HACCP (Hazard analysis and critical control points) food safety standards despite procedural and accountability difficulties. Regulations do not ensure compliance. Pesticide residues and counterfeit formulations pose food safety risks, particularly in fresh produce supply chains. Most prohibited pesticides are persistent organophosphates. They harass animals, particularly bees. Since no global list of banned drugs exists, illicit chemicals remain on the market. The research indicated discovered most glycerophosphate pesticides have 10% less active ingredients than the allowed amount, suggesting that continuing usage would accelerate pesticide resistance. Pesticide industry fraud prevention involves numerous government entities. These steps should reduce Côte d'Ivoire's counterfeit pesticide sales from 40% to 20%.

Private standards are used by formal economy companies, notably major multinationals trying to meet consumer safety norms in export markets. Private companies use the Codex Alimentarius to improve international food supply chain management. A dependable Food Safety Management Control System uses HACCP and offers three levels of certification to produce risk-free goods. Small enterprises cannot afford certification, and ISO 22000 is not a standard for food safety in many poor nations. Countries should follow Codex standards to suit private norms. Several international and regional initiatives aid the commercial sector in delivering safe food. Products on shop shelves meet minimum standards set by regulatory and certifying authorities. The public needs to put more stock in these certifications as quality indicators. The private sector may now assure the food safety of expanding urban markets, thanks to the widespread adoption of voluntary certification schemes like GLOBAL GAP. There has been a rise in the number of people working on volunteer initiatives in the official economy. Widespread adoption of laboratory-based certification systems requires local laboratory and testing infrastructure. While these credentials are essential for assuring the safe production of food, their importance is frequently lost on small and medium-sized firms in LMICs and their consumers. Private companies will invest in certification only if there is a clear market.

5. Conclusion

In conclusion, urban food market development may have beneficial and bad consequences on people's health and access to nutritious food. These markets may boost food availability and eliminate "food deserts," improving city inhabitants' food security. Urban food markets may help small farmers and food producers create a more resilient and sustainable food system by boosting local economies and creating jobs. Food market growth has hurdles. Urbanites are consuming more processed food, which may lead to obesity, diabetes, and cardiovascular disease. Lax food safety and hygiene at urban food markets increases the risk of food borne disease. Urban food markets have the potential to enhance food security and public health in the future, but only if enough research is conducted to establish appropriate laws and practices.

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