



Measuring Environmental Sustainability of Food Environments

RATIONALE

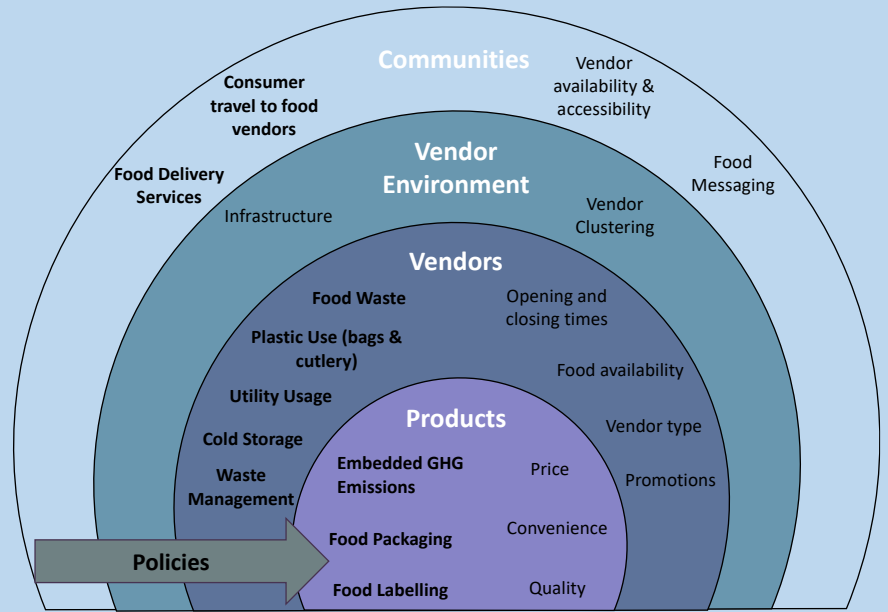
KEY MESSAGES

- The environmental impact of food environments goes beyond the environmental impact of food available.
- When assessing the sustainability of food environments, a food group approach should be considered to avoid rewarding food vendors with minimal food waste and limited cold storage but only selling highly processed packaged foods.
- When applying this new framework to pilot food systems data in four cities, we found variations in food environment sustainability indicators, particularly regarding consumer transportation to food vendors.

Food environments are rapidly changing due to increased urbanisation, economic development, and globalisation. By 2050, an estimated 68% of the world's population will live in urban areas (1). As places urbanise, a greater percentage of individuals rely on food purchased from markets rather than home production. Food supply chains in urban areas are longer than in rural areas and, therefore, more reliant on energy-intensive interventions, such as refrigeration, to mitigate food waste (2). In addition, increased access to markets and lifestyle changes associated with urban living increases the desirability of packaged and processed foods (3), a major contributor to the increased use of plastics.

The IMMANA Gap Map previously highlighted only four metrics for food environments, none of which measure environmental sustainability (4). Only one previous food environment framework proposes sustainability as a component of the food environment (5). In that framework, sustainability refers to the environmental and social impact associated with food items available within the food environment. However, a broader definition of environmental sustainability is needed to fully capture the environmental impacts of food environments.

Figure 1. Conceptual Framework of Environmental Sustainability in Food Environments.



Sub-domains highlighted in bold represent environmental components of the food environment that have not been included in previous food environment frameworks. GHG, greenhouse gas

RECOMMENDATIONS

- Food environments should be considered a point of intervention to improve the sustainability of food systems.
- Current food environment assessments should be expanded to collect data on indicators of food environment sustainability.
- Potential trade-offs exist within the sustainability domain. It is important to highlight and measure these trade-offs to allow policymakers to make informed decisions.
- To improve the sustainability of food environments, food systems decision makers should collaborate with actors in the urban planning field to facilitate sustainable consumer travel to food vendors.

METHODS AND FINDINGS

The primary objectives of this study were to 1) establish a new framework that describes environmental sustainability components of the food environment and 2) apply this framework to assess variability in indicators related to food environment sustainability using data previously collected in four South Asian cities: Ahmedabad (India), Pune (India), Kathmandu (Nepal), and Pokhara (Nepal).

Framework Development

We conducted a structured review to assess the inclusion of sustainability in existing food environment frameworks. Based on the findings of the systematic review, a preliminary draft of the framework was developed with the goal of expanding a standard framework of food environments to include specific sub-domains and indicators of environmental sustainability. We then conducted in-depth interviews with food and sustainability experts to collect their feedback on the framework. The framework was iteratively updated based on feedback after each interview. After finalising the framework, we identified potential indicators for each sub-domain of environmental sustainability in food environments.

We adopted a socioecological framework to describe sub-domains of environmental sustainability at varying levels within the food environment (Figure 1). Sub-domains highlighted in bold represent environmental components of the food environment that have not been included in previous food environment frameworks. Sub-domains related to environmental sustainability focused on GHG emissions and pollution as those were considered the most relevant to the food environment. Other sub-domains within the food environment framework were included based on data extracted from the literature review and feedback from qualitative interviews.

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Framework Application

We applied the framework to previously collected food environment data using the Urban Food Systems Assessments for Nutrition and Healthy Diets (UFSAN) Tool (6). Data was from a piloted survey in four South Asian cities: Ahmedabad, India; Pune, India; Kathmandu, Nepal; and Pokhara, Nepal. Surveys were collected through convenience sampling (therefore not representative of each city) between October and December 2020. A total of 1797 consumers were surveyed across the four cities: Ahmedabad (n=446), Pune (n=451), Kathmandu (n=450), and Pokhara (n=450). In Kathmandu and Pokhara, 55 food vendors were surveyed. In Ahmedabad and Pune, 54 and 66 food vendors were surveyed, respectively.

Across all cities, consumers reported a high reliance on wet markets and small local shops for weekly shopping. We found variations in food environment sustainability indicators, particularly regarding consumer transportation to food vendors. Residents in Ahmedabad and Pune lived further from food vendors and were significantly more likely to report using at least one non-walking or bicycle travel to purchase food. At the food vendor level, the majority of food vendors reported selling 75% or more of their products. Food vendors selling more perishable food items such as dairy, eggs, fruits, and vegetables did not report higher amounts of food waste compared to food vendors selling snacks and staples. Improved storage was highlighted as a key initiative across all cities for dairy, eggs, and meat. For fruits and vegetables, buying good quality food was another strategy that all vendors across the four cities reported.

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