



Within-day and between-day variations in urban food environments in Dar es Salaam, Tanzania: Results from the DECIDE study

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Background

- Urban built environments and food systems are rapidly evolving with a high informal vendor prevalence in response to urbanization and consumer preference.^{1,2}
- The food environment (FE) is critical for accessing healthy diets in HIC/LMIC.²
- Highly variable FE can affect FE-Diet associations.

Research Aims

- Evaluate within-day variation of the FE in peri-urban environment.
- Evaluate between-day (weekday vs. weekend) variation of the FE in peri-urban environment.

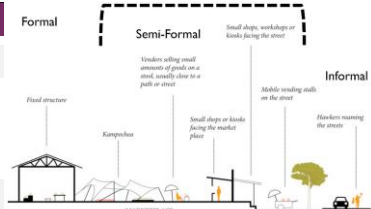
Methods

THE FOOD VENDOR TOOL COLLECTED:

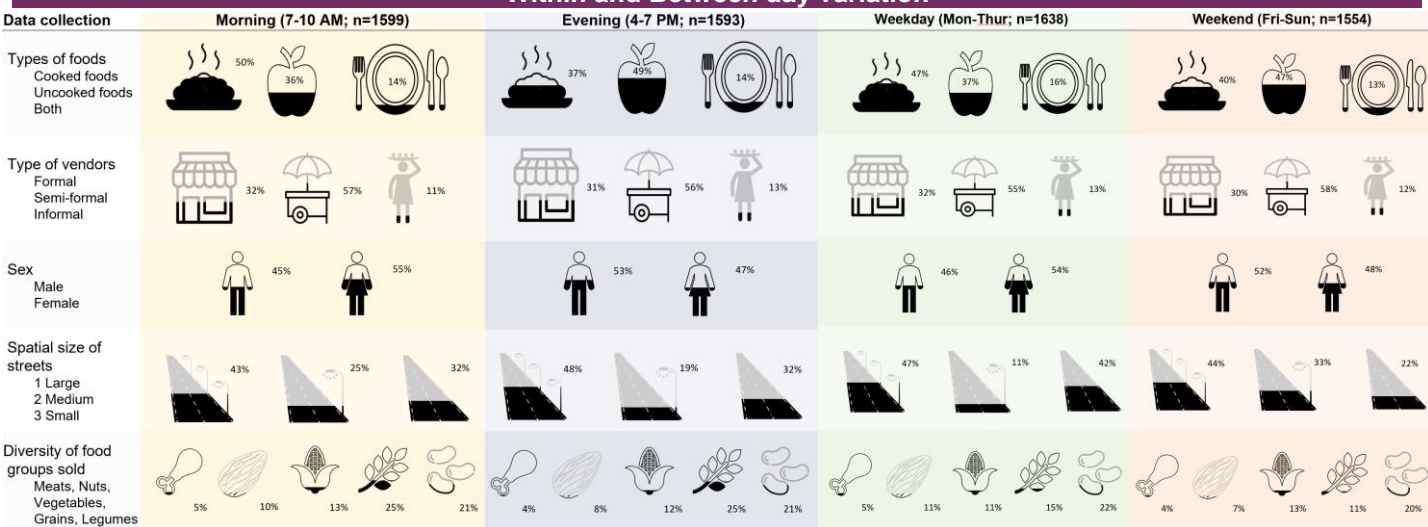
- Location (GPS)
- Sex of vendor
- 53 food types offered
- Time
- Type of Vendor

DATA COLLECTION:

- We selected three types of streets: one large street with high foot and vehicular traffic, three medium streets, and three small streets. Each street transect was surveyed for three non-consecutive days in the morning (7-10AM) and separately in the evening (4-7PM) on the same day, including two weekdays and one weekend day.
- Overall, data from 3,192* vendors were collected from February 27-March 7, 2020, in a peri-urban neighborhood.
- Metrics included density of informal/ formal/semi-formal food vendors; dietary diversity of food groups; and % male:female**



Within and Between day variation



Summarized Results by Type of Food

Food Group	Vendor Type	Spatial	Temporal
Legumes	Mainly formal	More common on medium and smaller streets	No differences between day Shops selling dry goods less likely to be open in the evening
Vegetables	Mainly semi/informal vendors	Large and small streets, but not medium streets	No differences between day Less in the evening
Snacks & sugary beverages	Mainly formal stores and smaller kiosks	More common on medium and smaller streets	No differences within day More on the weekdays
"Cooked" food	Mainly semi/informal	More common on medium and smaller streets	More available in morning & weekdays

Methodological Implications

- A cross-sectional view of the FE may be limited. However, **repeated sampling and longitudinal data collection could reveal new insights food environment insights.**
- Boundary question: How far from main road should one go to sample FE?
- Data collection usually does not sample informal vendors, smaller streets, and during evening and weekends, all of which were shown as important aspects of the FE.
- Measurement protocols need to be standardized depending upon the aspect of food environment question of interest.

Key Messages and Future Work

- Food environments are **dynamic**; methods must:
 - Capture **informal food vendor** contribution to FE
 - Measure FE on **smaller streets** outside main markets
 - Capture **between-day and within-day** variation
- High availability of snacks and SSBs** in smaller streets, **allow easier access to less healthy foods**, while availability of cooked foods is convenient as people work/study outside the home.



Limitations/Future Work:

- Future: Capture variation across seasons and years
- Future: Collect lunch hour (employment in town), not only morning/evening
- Limitations: Data collection dependent on weather and affected by seasonality; Gender of owner/employer data was not differentiated.

¹ Reardon T, Tschirley D, Liverpool-Tasie LSO, et al. The processed food revolution in African food systems and the double burden of malnutrition. *Glob Food Secur.* 2021;28:100466. doi:10.1016/j.gfs.2020.100466

² Turner C, Aggarwal A, Walls H, et al. Concepts and critical perspectives for food environment research: A global framework with implications for action in low- and middle-income countries. *Glob Food Secur.* 2018;18:93-101. doi:10.1016/j.gfs.2018.08.003

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In this peri-urban environment, we see **variations in food availability within-day** where legumes ($p < 0.031$) and vegetables ($p < 0.001$) have reduced evening availability. **Variations in food availability between days** make snacks and sugary beverages more convenient over the weekend. Cooked food availability varies both within- ($p < 0.001$) and between-day ($p < 0.001$), typically target individuals working/studying outside the home.