Methodological Insights: Evaluating the Rural Food Environment to Promote Sustainable and Nutritious Diets in India

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RATIONALE

The study aimed to explore rural food environments by examining a blend of external and personal domains through a scoring method. It sought to understand their impact on food choices, attitudes, and consumption habits in rural populations within low- and middle-income countries (LMICs).

FRAMEWORK

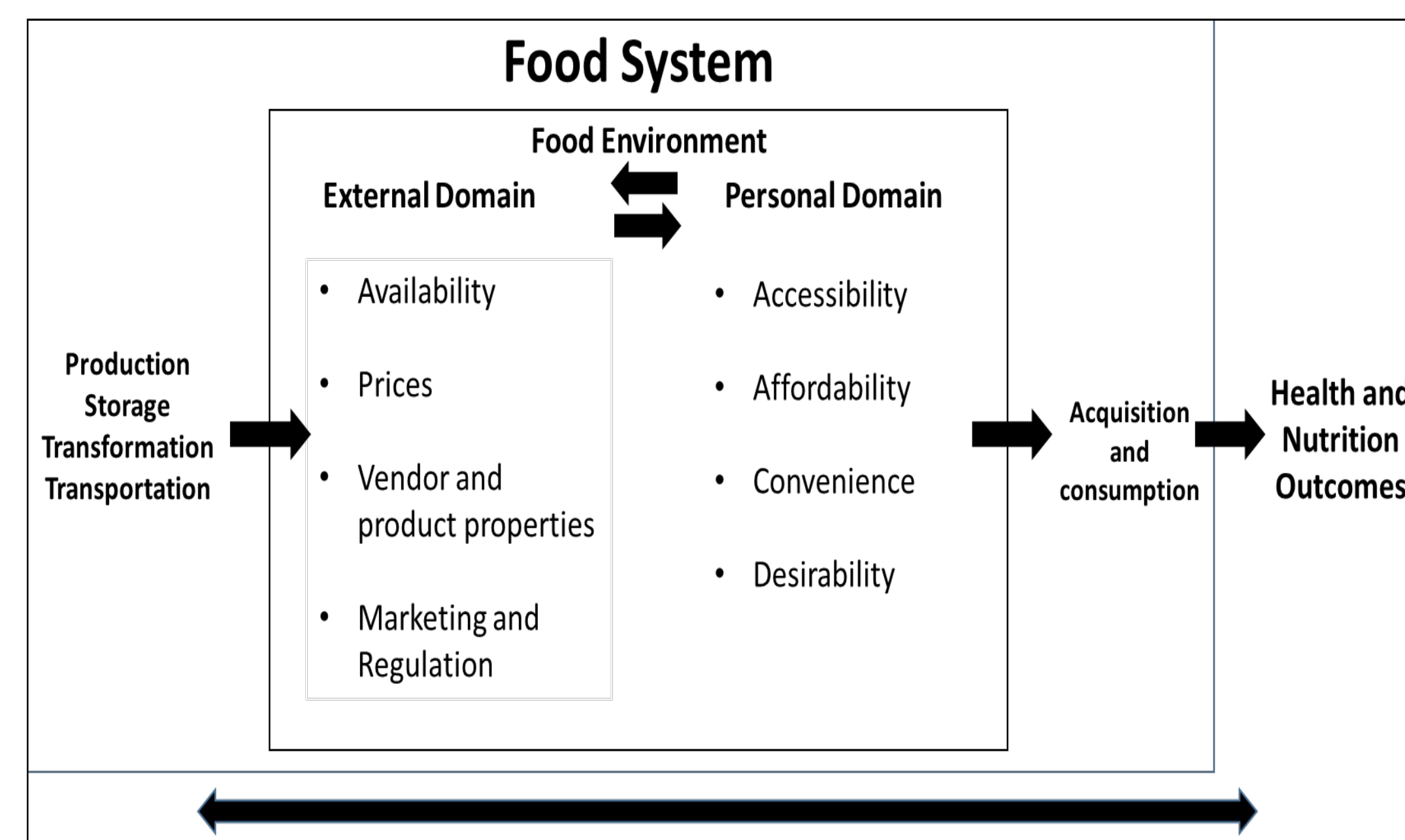We have adapted the framework (Fig 1) from Turner et al., 2018

Fig 1. Food environment framework

METHODS

Community-level data were gathered with qualitative methods included eight focus group discussions (FGDs) with 38 men and 40 women, and key informant interviews involving 80 vendors In addition, unique quantitative longitudinal panel data spanning 2009 to 2014 from the study villages were utilized to analyze long-term food consumption behaviors.

The scoring method (Table 1) was adopted, utilizing data from FGDs and individual respondents to evaluate various attributes of both the external and personal domains, thereby gaining insights into the rural food environment.

Table 1. Calculation of score for eliciting external and personal domain characteristics of the selected rural food environment

Attributes	External Domain	Attributes	Personal Domain
Availability	Variety availability score = Number of products selling in the particular food group by a vendor/ Total number of products in that particular food group	Accessibility- physical distance	Average distance per food item per person = Average (Number of persons * distance of seller) Average distance food group wise per person = Average distance per food item (those food items in that group) per person If average distance per food item per person <= average distance food group wise per person, then 1; otherwise, 0 Score of food group = Total score of food items in that group/ Total Number of food items in that group
Price	Product price score = Number of products selling at less than or equal to average price/ Total number of products being sold by the vendor	Affordability - relative price	Cheap, somewhat cheap, and Neutral (based on perceptions of the consumer) =1 Somewhat expensive and Very expensive =0 Score of food group = Total score of food items in that group/ Total Number of food items in that group
Vendor and product properties	Timing score = closing time- opening time-interim time/24-hour period	Convenience - easy to store	If the food item is easy to store in the consumer's perception, then 1 If the food item is not easy to store, then 0 Average group score for particular food item = Total score of particular food item / Number of groups that responded Average food category score = Total score of particular food category / Number of food items in the food category responded *We are not considering those who have not responded during the Focus Group Discussion
	Food category quality score = Average (proportion of best quality + proportion of medium quality) *We considered the share of the best quality and medium quality products in the total products being sold based on the perceptions of the vendors	Desirability -preferences, and knowledge	If the respondents liked to consume more of a food item, then 1, otherwise 0 Average group score for particular food item = Total score of particular food item / Number of groups Average food category score = Total score of particular food category / Number of food items in a food category
Marketing	Promotion score = Average (proportion of total display area of the shop covered by a particular product)		If the consumers perceived the food as a healthy diet, then 1, otherwise 0 Average group score for particular food item = Total score of particular food item / Number of groups Average food category score = Total score of particular food category / Number of food items in the food category

RESULTS

- Food environment significantly shapes the availability, accessibility, and consumption of food groups in rural communities (Fig 2).
- Rural households prioritized carbohydrate-rich foods, often from own farms and subsidized Public Distribution System (PDS) supplies.
- Households' low priority to protein and micronutrient-rich foods, due to cost and taste preferences.
- Infrastructural constraints and transactions cost also limit access to healthy food.
- Small packaged high-carb and sugary foods have been increasingly integrated into daily diets due to low prices, globalization and aggressive marketing.
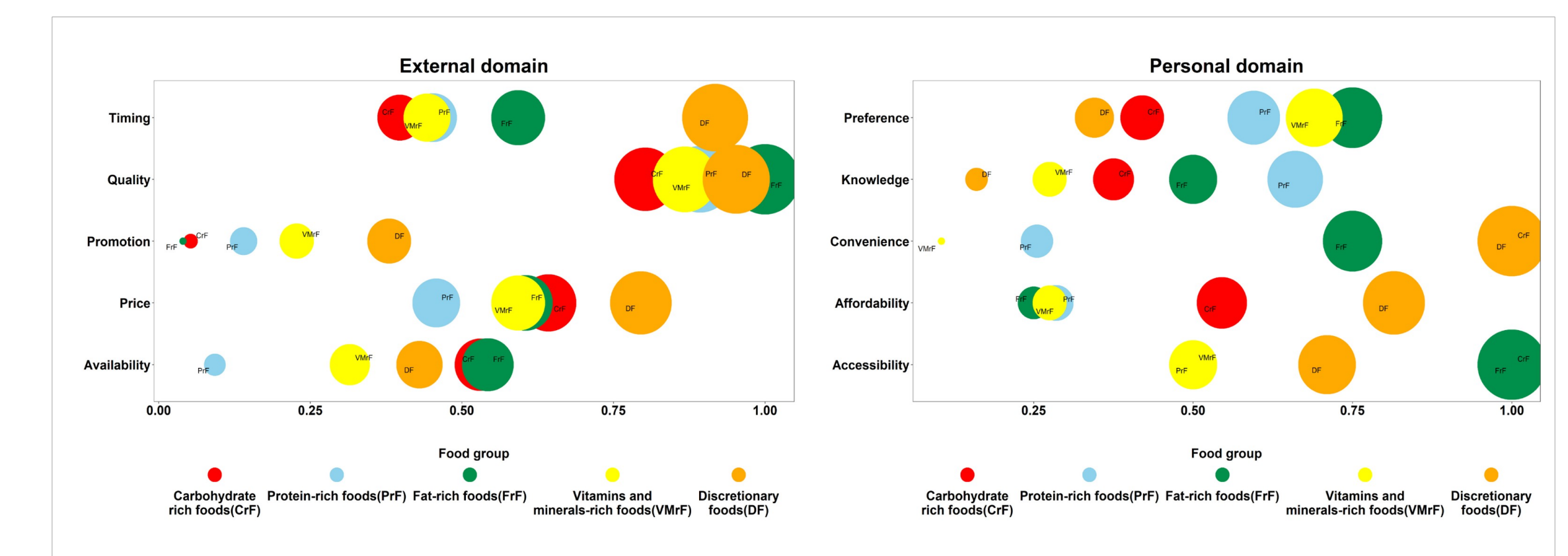

Fig 2. External and personal domains of the rural food environment

IMPLICATIONS

Our LMIC-focused study is consistent with global frameworks, emphasizes tailored nutrition education, and supporting digital business models and increased access to nutritious food, display norms for unhealthy foods and local production as key policy recommendations. It underscores the need for further research on evolving food environments and socio-cultural influences on diets, alongside innovative interventions and policy dynamics.

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October 2023