Chapter 4

FOOD ENVIRONMENTS AND BEHAVIORAL DRIVERS OF FOOD CHOICE IN SOUTH ASIA

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KEY MESSAGES

- To improve diets, policy interventions are needed across the four key dimensions of the food environment: accessibility, affordability, availability, and desirability.
- The distinction between rural and urban food sectors is diminishing, with increased availability of packaged foods from multinational companies playing a significant role in this shift.
- Establishing an effective regulatory framework for food packaging, labeling, and marketing is essential to creating healthier food environments and shaping consumer perceptions of food products and their desirability.
- There is increasing support for taxing food products that are high in unhealthy fats, salt, and sugar, such as sugar-sweetened beverages, chips, biscuits, and so on.
- Low consumption of fruits and vegetables, driven by both supply- and demand-side constraints, poses a significant challenge to achieving healthy diets in South Asia.
- Exposure to advertising and digital food environment reach are high among high-income groups, yet knowledge about the promotion and reach of healthy diet information is limited.
- The proliferation of digital food environments also poses regulatory challenges, as marketing targeted at wealthier households creates a ripple effect across lower income groups who emulate these behaviors.

Food environments encompass all physical and digital spaces where individuals interact with and access food. These environments play a critical role in shaping dietary patterns, including where and how people purchase, consume, and engage with food (Turner et al. 2018; Downs et al. 2020). Examples of food environments include grocery stores, farmers' markets, large retail outlets, restaurants, school canteens, and tea and coffee shops, as well as digital platforms that facilitate the sale and delivery of food directly to consumers (Singh et al. 2024). Decisions within food environments are influenced by both consumer demand and producer supply-side factors, including purchasing power, market access, food availability, and tastes (Turner et al. 2018). Policies and interventions can be implemented to reshape food environments with the aim of promoting healthier diets (Blake et al. 2021).

Using primary and secondary data sources, this chapter examines the characteristics of food environments across South Asian countries and explores key aspects of the policy landscape that influences them. The first section illustrates key drivers of food choices and their relationship with food consumption. The second section describes food environments in rural South Asia and digital food environments in India. The last section proposes possible policy solutions to emerging challenges related to food environments in the region.

HOW DO CONSUMER PERCEPTIONS OF THEIR FOOD ENVIRONMENTS INFLUENCE THEIR FOOD CHOICES?

The *2024 Global Food Policy Report* underscores accessibility, affordability, availability, and desirability as the important food environment domains driving food choices (IFPRI 2024). Accessibility refers to the ease of acquiring food (distance to markets or the proximity of roads, for example) while availability refers to the presence of a food source or the product itself (market supply) (Charreire et al. 2010; Lake 2018). Affordability is a function of individual or household purchasing power and market prices (Gaupholm et al. 2023; Bassi et al. 2021), whereas desirability is a function of personal preferences and tastes (Moitra and Madan 2022). These food environment domains can be measured at multiple levels (Turner et al. 2018). The district agrifood systems assessment survey conducted by the CGIAR Research Initiative on Transforming Agrifood Systems in South Asia (TAFSSA) included these food environment measures at individual, household, and market levels (see Box 4.1 on the importance of studying food environments in the region). This section focuses on results from a novel tool, developed by TAFSSA, to understand individual perceptions of these food choice drivers.

Individual perceptions of food accessibility, availability, affordability, and desirability

The TAFSSA survey was conducted in five locations: Rajshahi and Rangpur districts in Bangladesh, Nalanda district in India, and Banke and Surkhet districts in Nepal. TAFSSA considered foods high in fats, sugar, and salt unhealthy, whereas unprocessed fresh foods dense in nutrients were considered healthy. Respondents were requested to "agree", "disagree", or "neither agree nor disagree" (Likert scale) with statements related to individual-level drivers for six common foods: dal, eggs, green leafy vegetables, and bananas (healthy foods); and biscuits and fried food (unhealthy foods). The responses were assigned a score (agree=1, disagree=0, neither agree nor disagree=0.5). The scores for the food items were summed and standardized (as proportions) to range between 0 (lowest) and 1 (highest).

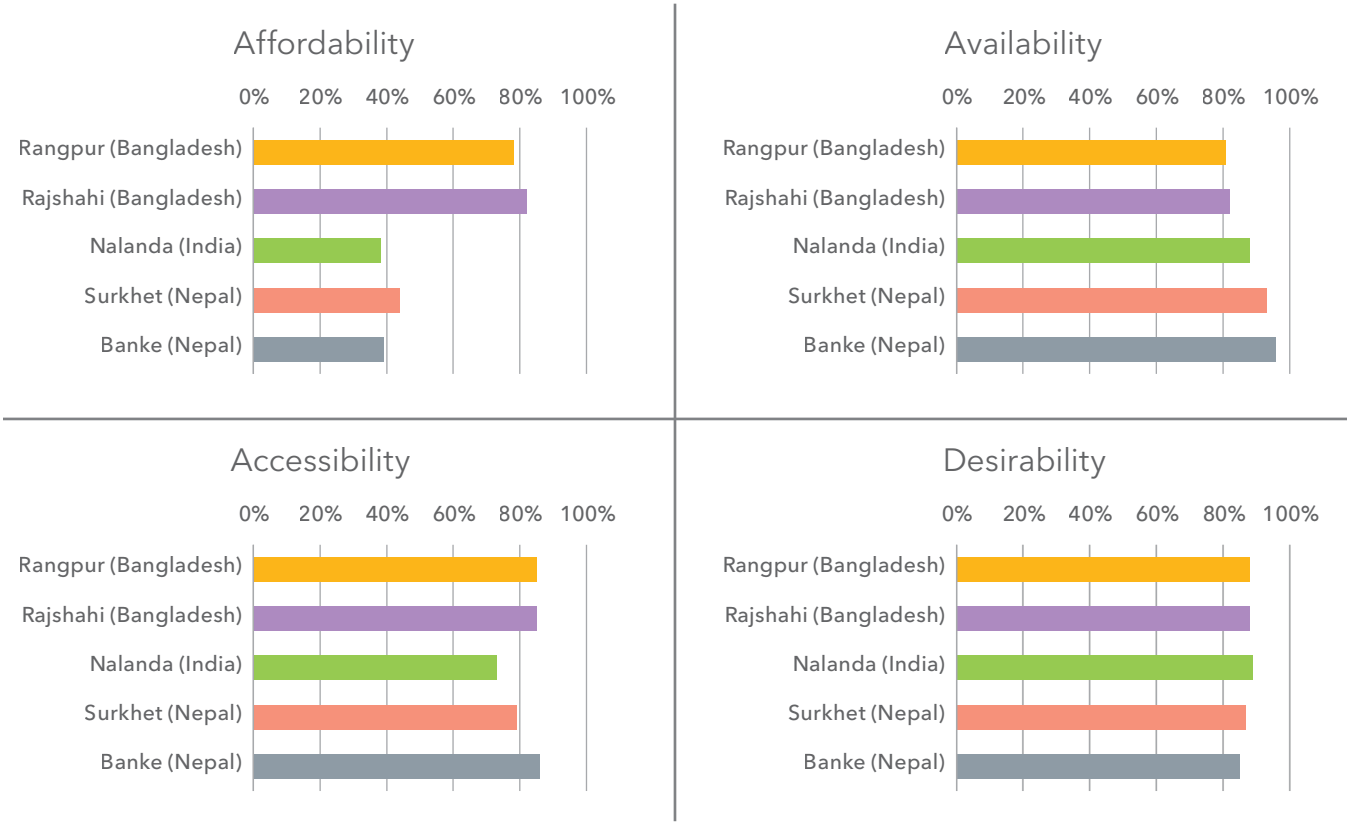
Figure 4.1 shows the percentage of respondents who agreed with statements about perceptions of individual-level food choice drivers for all six foods in all five districts combined. High agreement rates for healthy and unhealthy sentinel foods for accessibility (65–92 percent) and availability (81–96 percent), resulting in higher averages across

BOX 4.1 Why study food environments in South Asia?

While food environments are evolving rapidly across low- and middle-income countries, South Asia presents a unique setting for several reasons.

- Household incomes across the region have been steadily increasing for decades, enabling consumers to purchase a wider variety of foods (Pingali and Abraham 2022).
- South Asian countries are experiencing rapid urbanization, with significant migration from rural to urban areas (Shivakoti 2022; Naz and Khan 2021; Bren d'Amour et al. 2020).
- South Asia's food environments are characterized by a large share of informal markets and vendors, which are often challenging to regulate (Henson et al. 2023).
- The widespread adoption of smartphones and internet access in South Asia is driving a swift transition to and growth in the digital food environment (Pingali and Abraham 2022; Ma et al. 2022).
- The region faces a high burden of diet-related noncommunicable diseases, highlighting an urgent need to assess and intervene in food environments to steer dietary patterns toward healthier outcomes (Gopalan et al. 2018).

FIGURE 4.1 Percentage of respondents who agreed with statements about perceptions on individual-level food choice drivers



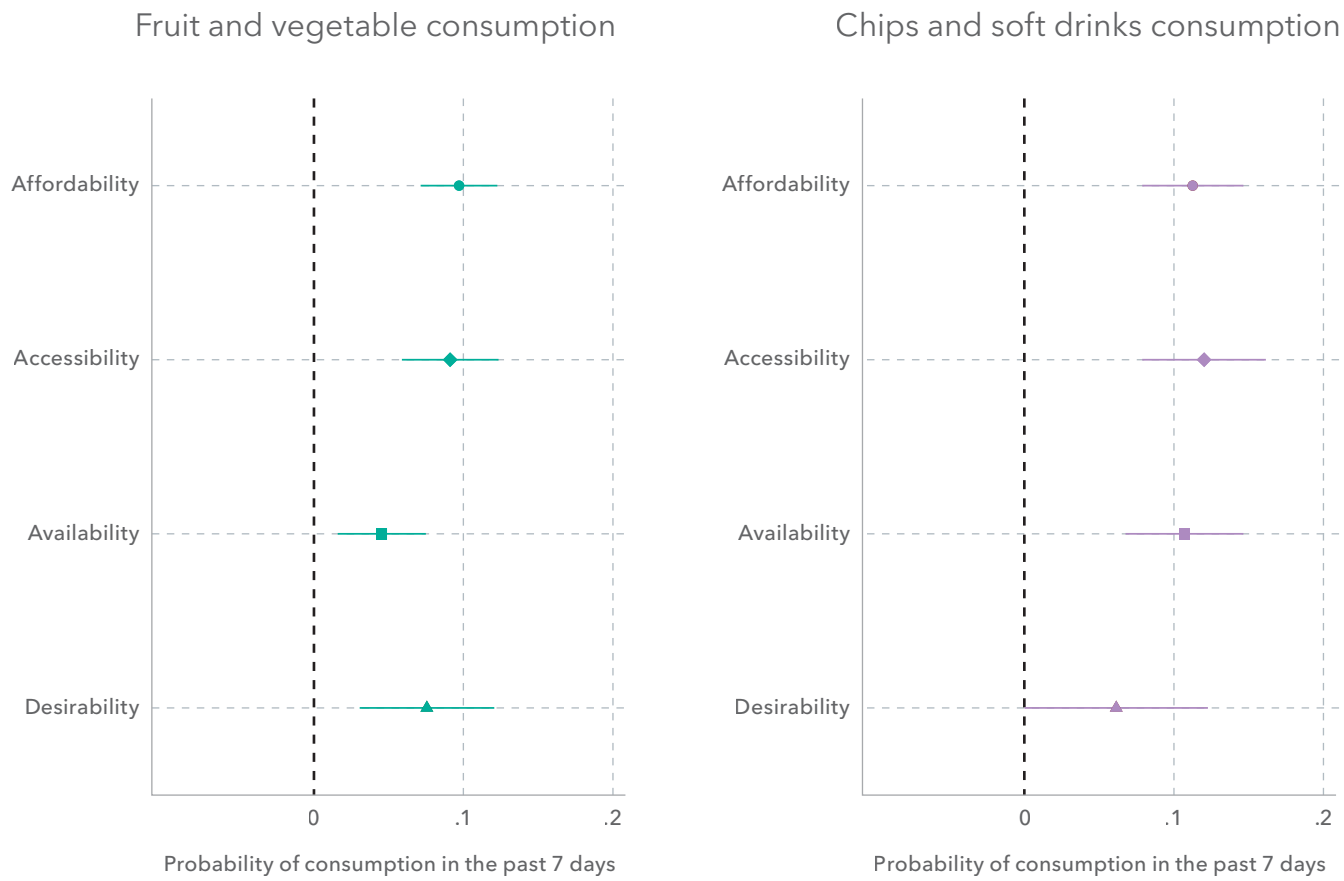
Source: Data from the TAFSSA district agrifood systems assement. Note: The following statements were posed to respondents: Affordability (Given my income, _____ are not too expensive); Accessibility (It is easy to acquire _____ close to where I spend most of my time); Availability (I know of at least one vendors/shop who sells _____); and Desirability (I like the taste of _____)

districts, indicates that even rural markets in South Asia appear to be evolving into "food swamps," where there is a co-occurrence of unhealthy foods along with traditional healthy foods (Bridle-Fitzpatrick 2015; Bevel et al. 2023). The most commonly perceived constraint among the four domains was low affordability, especially in India and Nepal.

Food accessibility, availability, affordability, and desirability and their association with food choice

This section examines how individual-level food choice drivers correlate with the consumption of healthy foods (fruits and vegetables) and unhealthy foods (chips and soft drinks). Consumption was measured using a Food Frequency Questionnaire, and outcomes were measured as respondents reporting consumption of the food group at least once in the past seven days. We used an ordinary least squares model to test the association between food intake for this period with the four individual-level food choice drivers: average perceived accessibility, availability, affordability, and desirability for all six foods. The models controlled for age, sex, and district fixed effects. With binary outcomes, the regression coefficients are interpreted as

FIGURE 4.2 OLS estimates for consumption in the last seven days against perceptions of affordability, accessibility, availability, and desirability



Source: Data from the TAFSSA district agrifood systems assement.

Note: OLS = ordinary least squares analysis.

higher or lower probabilities of consuming the food group at the maximum level of the respective food choice drivers.

Higher levels of agreement across all four individual-level food choice drivers are associated with higher levels of fruit/vegetable and chips/soft drinks consumed (Figure 4.2). In the figure, the dots represent regression point estimates and bands represent 95 percent confidence intervals. Wherever the bands intersect with the vertical line at zero, the estimate is not statistically significant. Affordability, accessibility, and desirability were independently important for the consumption of fruits and vegetables. For instance, individuals who reported that all six foods were affordable had a 10 percent greater probability of consuming fruits and vegetables the previous week. Perceptions of availability had different associations with the consumption of healthy foods and of unhealthy foods. High perceived availability of all six foods increased the probability of consuming chips and soft drinks (by 11 percent) more than the probability of consuming fruits and vegetables (by 5 percent). A caveat to these results is that food choice drivers with high averages also have low variation, thus reducing the likelihood of being predictive.

As income levels rise, the affordability constraint on food choices may gradually relax, potentially alleviating a key barrier to accessing healthier diets. However, with other domain perceptions — such as availability, accessibility, and desirability — already at high levels, increased income could also lead to greater consumption of unhealthy foods. This dual possibility underscores the importance of understanding how income growth interacts with food environments to influence dietary behaviors (Gaupholm et al. 2023; Moitra and Madan 2022). The findings on desirability highlight a critical focus area for interventions aimed at promoting healthier diets. The positive association between perceived food availability and unhealthy consumption underscores the need to investigate market-level factors that influence household and individual dietary patterns. While it is crucial to understand consumer perceptions of individual-level drivers of food choice, designing interventions that effectively promote healthy eating habits also requires an analysis of external food environment factors. We discuss these in the last section.

HOW DO ATTRIBUTES OF LOCAL FOOD ENVIRONMENTS INFLUENCE FOOD CHOICES?

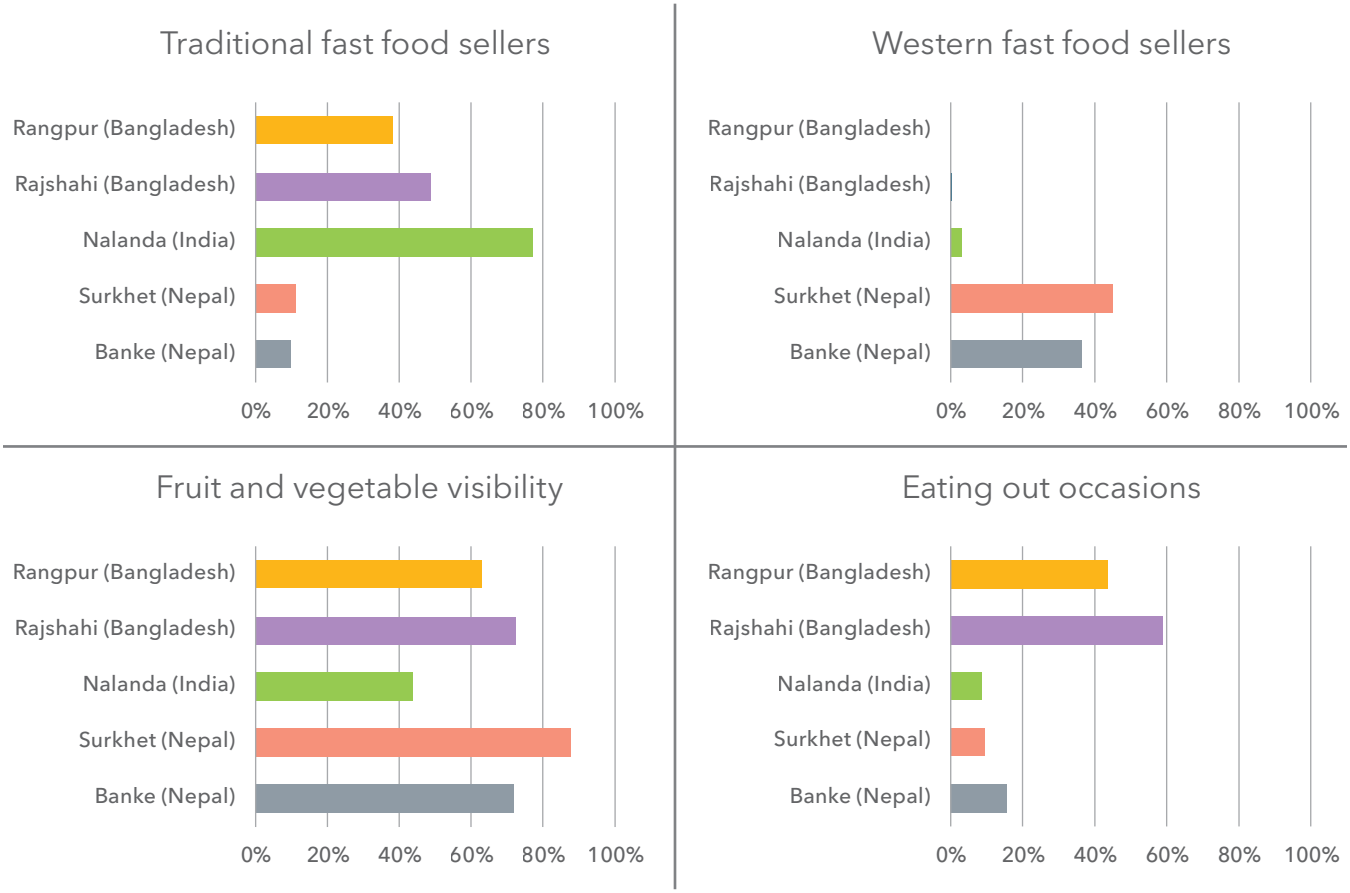
Market penetration of fast food and prevalence of eating out

As countries urbanize and develop economically, fast-food chains increase their market penetration, leading to changes in dietary habits and a rise in the frequency of eating out among urban populations (Regmi 2001; Tefft et al. 2017). In South Asia, rapid urbanization has led to the proliferation of vendors offering both traditional foods and Western fast foods that are high in calories and low in nutrient density, reflecting changing dietary patterns and the influence of globalization on local food cultures (Popkin et al. 2012). In general, the healthfulness of both traditional and Western fast foods depends on the ingredients used and whether they are ultra-processed and/or high in fats, salts, and sugar. On the one hand, traditional fast foods, such as *dahi chaat,* contain a combination of healthy and unhealthy ingredients and have been consumed for long periods without a concurrent increase in noncommunicable diseases (NCDs). On the other hand, a growing body of research has demonstrated that increased access to Western fast-food outlets is associated with rising obesity rates (Wu et al. 2021). The presence of Western fast food can be seen as part of wider shifts in lifestyle and diets that accompany the epidemiological transition.

Product placement at retail outlets

Ultra-processed foods (UPFs), such as chips and biscuits, are widely available even in rural areas of South Asia (Samin et al. 2023). A key concern is the visibility and prominence of UPFs in stores relative to healthier food options. Retailers often prefer

FIGURE 4.3 External food environment indicators



Source: Data from the TAFSSA district agrifood systems assement.

Note: Panels refer to (1) percent of sampled villages that had traditional fast-food vendors; (2) percent of sampled villages that had Western fast-food vendors; (3) percent of households that reported eating out; and (4) percent of sampled vendors that placed fruits and vegetables at visible locations in their stores.

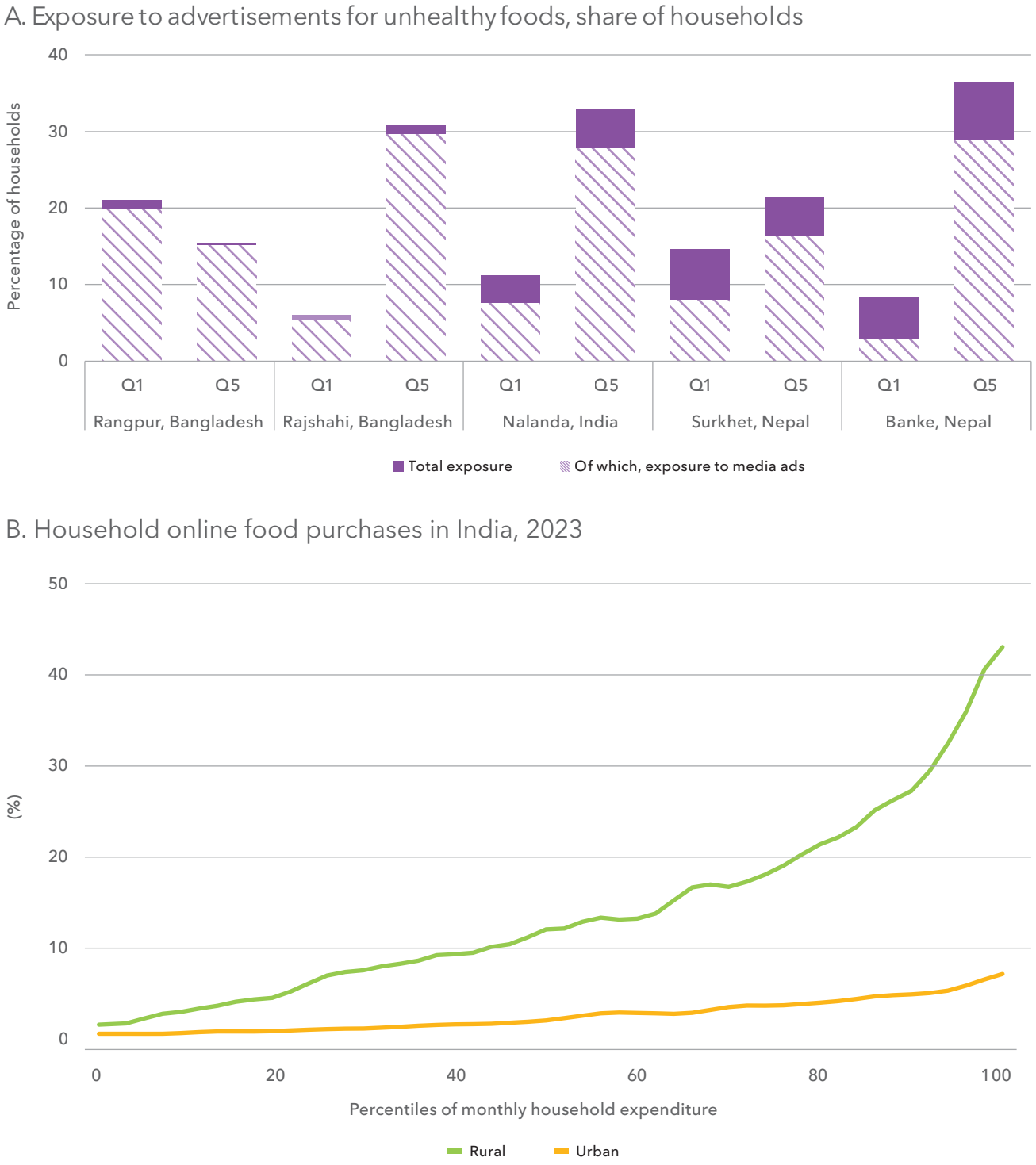
to display UPFs at eye level or in high-traffic areas, such as checkout counters, due to their longer shelf life and ready-to-eat convenience (Shaw 2020). The TAFSSA survey defined high visibility as products being displayed outside, near the counter, or in the front of shops. Across South Asian districts (Figure 4.3), the visibility of fruits and vegetables is moderate. These patterns may result from product placement and marketing strategies, as UPFs are typically packaged in bright, colorful, and attractive ways and often leverage promotions, branding, and endorsements to draw consumer attention (Shaw et al. 2020).

HOW DO ATTRIBUTES OF DIGITAL FOOD ENVIRONMENTS INFLUENCE FOOD CHOICES?

Access to mobile phones and internet and exposure to advertising

Another key marketing strategy employed by the food industry is the use of food advertisements, which play a crucial role in shaping consumer preferences and dietary choices (Giammattei et al. 2003). Rapid growth of media platforms such as television and mobile phones across South Asian countries is reflected in high access and ownership (GSMA 2023). For example, in India in 2021,

FIGURE 4.4 Exposure to advertisements and online food purchases



Source: Panel A – Data are from TAFSSA district agrifood systems survey, open-access agrifood system data from 4,000 households across Bangladesh, India, and Nepal. CGIAR. Panel B – Data are from the National Statistical Office (2024), Consumer Expenditure Survey 2022–2023. Ministry of Statistics and Programme Implementation, Government of India. The y-axis indicates the percentage of households reporting any online food purchases in the previous week.

BOX 4.2 Food environments in Sri Lanka from a FRESH perspective

The CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets (FRESH) conducted scoping reviews of published literature on food environments in Sri Lanka (Clarke et al. 2024), deep dives into fruit and vegetable (F&V) consumption (Silva et al. 2023), and a study on urban food environments in Colombo's low-income areas (Gooneratne 2024). These are the key findings from each study:

- The majority of published studies focus on formal markets, measuring vendor and product properties, prices, availability, and desirability. Barriers to healthy eating identified included the high cost of animal-source foods and vegetables, marketing of unhealthy snacks and fast food to adolescents, food labels' limited influence, and use of credit as a coping mechanism for food insecure households (Clarke et al. 2024).
- Studies on F&V consumption recommended promotion of education and awareness around the benefits of eating F&V through mass media campaigns; improving access through farmers' markets and community gardens and mobile produce stands; implementing programs that promote F&V consumption in workplaces; mandating F&V inclusion in school meals; and encouraging the development of value-added products and processing techniques for excess or perishable F&V (Silva et al. 2023).
- The urban food environment investigation revealed that price is not the sole determinant of consumers' choice: produce quality plays an important role; infrastructure determines what is bought, the method of preparation, and the utensils used to prepare the food; mid-day meal coverage is low; some households are aware of good nutritional practices, with many taking care to alter meals to reduce noncommunicable diseases; and mothers are likely to buy and cook items that their children like to eat (Gooneratne 2024).

54 percent of women and 78 percent of men owned mobile phones (IIPS and ICF 2021). Similarly, in Bangladesh, 47 percent of women and 74 percent of men reported mobile phone ownership (NIPORT and ICF 2020), and in Nepal, mobile phone access is even higher, with 77 percent of women and 90 percent of men owning mobile phones (Nepal Ministry of Health et al. 2017). These devices have become critical channels for accessing information, including advertisements, and play a prominent role in influencing food choices through digital food platforms. Moreover, internet use in these countries has seen significant growth (World Bank), increasing by 45 percentage points between 2000 and 2023. For instance, as of 2023, India reported 970 million internet subscribers (more than 60 percent of the population) (TRAI 2024). This widespread internet access further expands the reach and impact of digital food marketing.

Food marketing across various settings and media platforms predominantly promotes UPFs and sugary beverages, with children and adolescents being particularly vulnerable to such marketing (Harris and Graff 2015). Using TAFSSA survey data, Figure 4.4, panel A, shows that nonpoor households (represented by the highest asset quintile, Q5) report substantially higher exposure to advertisements, particularly through media channels, compared to the poorest households (Q1) across most districts surveyed. For instance, in India, the exposure of wealthy households to advertisements is 22 percentage points higher than for those in the lowest wealth quintile, underscoring the importance of socioeconomic status (SES) to advertising reach.

Digital platforms for online food purchases

South Asia has a large working-age population, which contributes significantly to its labor force. According to the World Bank, the working-age population (ages 15–64) in South Asia was approximately 65 percent of the total population in 2022 (World Bank). This demographic structure provides a substantial regional workforce, often at competitive labor costs compared to global averages,

particularly in India, Bangladesh, and Pakistan (ILO 2025). A significant portion of the workforce is employed in the informal sector, including emerging areas such as food delivery services, which have seen rapid growth with the expansion of the gig economy (Chen and Carré 2020). Data from India's latest national household consumer expenditure survey (2023) indicate that online food purchases increase with household wealth, particularly in urban areas (Figure 4.4, panel B). This pattern is notably pronounced among higher SES groups, with online food purchases sharply increasing among the highest-spending urban households and reaching nearly 50 percent in the top expenditure percentile.

These SES gradients in advertising exposure and online food purchases may contribute to a shift away from traditional, healthier diets toward more processed, calorie-dense foods high in sugar, salt, and unhealthy fats among wealthier households (Pingali 2007). Trends in obesity across South Asia closely mirror these SES gradients (Wu et al. 2021). Greater exposure to food marketing, such as advertisements for junk food, among wealthier households may differentially influence diet quality and health outcomes, increasing unhealthy consumption in that stratum. Concerningly, the dietary behaviors of the high-SES population could become aspirational for lower-SES populations, potentially promoting unhealthy eating habits more broadly.

POLICY RECOMMENDATIONS AND RESEARCH PRIORITIES

Policymaking for food environments is a multifaceted process involving diverse stakeholders, including government bodies (national and provincial), producers (farmers, food processors, producer associations, and retailers), and consumers (households, workers, children, and adolescents). Our analysis of the TAFSSA survey data emphasizes that policy interventions are needed across the four key dimensions of the food environment: accessibility, affordability, availability, and desirability. The distinction between rural and urban food sectors is diminishing, with increased availability of packaged foods produced by multinational companies playing a significant role in this shift (Pingali 2007). Lack of regulations on product packaging, size, and labeling allows unhealthy UPFs (such as chips and candy) to easily enter household consumption patterns through small affordable packets and aggressive targeting of susceptible groups, including children. Over time, consumption of these products alters children's tastes and preferences, displacing healthier alternatives (Cornwell and McAlister 2011). With affordable pricing, convenient access, and sensory appeal, UPFs present a significant challenge for nutrition policy, requiring both regulation of unhealthy foods and promotion of healthier options.

Establishing an effective regulatory framework for food packaging, labeling, and marketing is essential to creating healthier food environments and shaping consumer perceptions of food products and their desirability. Due to the wide heterogeneity in consumer understanding, conveying clear information on nutrient composition is crucial. Front-of-package nutrition labeling (FOPNL) offers a simple, visual representation of a product's nutritional quality, helping consumers make healthier choices. Various countries have adopted FOPNL systems — such as Nutri-Score, Health Star Rating, and traffic light and warning labels — designed to discourage the consumption of unhealthy foods and beverages (Pettigrew et al. 2023). Promoting healthy food consumption also requires broader nutrition education and awareness initiatives. For instance, campaigns that help consumers understand and interpret warning labels are essential in populations with low literacy levels. While schools and workplaces serve as traditional platforms for disseminating such information, South Asia has unique community-based channels that can be leveraged, including village health centers, consumer associations, producer cooperatives, and women's collectives (Kumar et al. 2024). These platforms offer promising avenues to engage diverse populations in adopting healthier diets (An et al. 2017).

From a fiscal policy perspective, there is increasing support for taxing food products high in unhealthy fats, salt, and sugar (HFSS), such as sugar-sweetened beverages (Krishnamoorthy et al. 2020). These taxes are typically assessed based on value added or the quantity of HFSS components in the product. Many tax systems already impose different tax rates based on food categories. For example, in India, aerated beverages are subject to higher taxes than other unhealthy food products However, food taxation policies face criticism for their potentially regressive and distortionary effects that disproportionately impact lower-income consumers. Additionally, systematic reviews of global literature suggest that quantity-based taxation — such as levies on sugar or salt content per unit — can incentivize reformulation of HFSS products toward healthier compositions, potentially reducing overall intake of these ingredients (Pineda et al. 2024).

UPFs are widely available and often strategically packaged in small amounts to be affordable for low-income consumers. Companies effectively raise prices by reducing quantities but holding prices and package sizes constant. Research increasingly shows that the aggressive marketing of highly processed foods and sugary drinks negatively influences dietary habits, particularly in young children, contributing to NCDs (Dixon et al. 2007). In response to growing concerns, the World Health Organization (WHO) and UNICEF have escalated calls to regulate the targeted marketing of unhealthy foods and beverages to children in South Asia (WHO 2023; UNICEF 2023). WHO has developed global recommendations aimed at curbing the influence of food advertising and reducing children's exposure to such promotions (Paglia 2023). While the advertising of HFSS foods remains dominant, limited promotion of healthier options is emerging. Evidence suggests that advertising boosts product sales, so fiscal measures such as tax concessions or subsidized advertising rates for healthy food options could incentivize their consumption over HFSS products. The TAFSSA and National Sample Survey datasets reveal a high prevalence of advertising and digital food environment reach among high SES groups, yet knowledge about the promotion and reach of healthy diets remains limited.

Low consumption of fruits and vegetables poses a significant challenge to achieving healthy diets in South Asia, driven by constraints to both supply and demand. Box 4.2 describes learnings from a CGIAR study on constraints to fruit and vegetable consumption. On the demand side, affordability is a primary barrier preventing poor and food insecure populations from eating diets rich in fruits and vegetables. On the supply side, agricultural policies in the region have largely overlooked the promotion of fruit and vegetable production and supply chains, with existing initiatives yet to demonstrate broad-scale impact (Faqeerzada et al. 2018). The fragmented nature of these efforts suggests that a piecemeal approach to food policy will offer limited benefits. To address this, South Asian countries should aim to leverage existing national platforms, such as school meal programs, nutrition supplementation initiatives, and nutrition education to promote fruit and vegetable consumption (Buse et al. 2020). Further research is essential to understand the barriers to implementation and to evaluate the effectiveness of these interventions for health outcomes, providing the necessary evidence for more effective, context-specific policy reforms.

The pattern of increased online food purchases and exposure to digital food marketing among higher SES groups in South Asia underscores challenges for food systems and public health in the coming decade. From a food systems perspective, the shift toward processed, calorie-dense foods driven by digital platforms and aspirational behaviors may exacerbate the nutrition transition already underway in the region (Pingali 2007). This transition risks displacing traditional diets, further entrenching reliance on UPFs. The proliferation of digital food environments also poses regulatory challenges, as marketing targeted at wealthier households creates a ripple effect across lower SES groups who emulate their behaviors (Ali-Alsaadi et al. 2023). From a health perspective, these dietary shifts are likely

to accelerate the dual burden of malnutrition, with rising obesity rates among higher-income groups coexisting with persistent undernutrition across the population (Kelly 2016). Addressing these dynamics will require integrated interventions, including promoting healthier digital food environments by strengthening regulatory frameworks for food marketing on digital applications.

CONCLUSION

This chapter explores how food environments shape dietary patterns in South Asia, a region where urbanization, growing incomes, and digital platforms are rapidly transforming food systems. Traditional diets persist, but the appeal and availability of UPFs are growing. Affordability continues to hinder access to healthier diets, while aggressive marketing and the growth of digital food environments are driving greater consumption of unhealthy foods, particularly among wealthier groups. Addressing these challenges requires a multifaceted policy approach that leverages programs and policies operating at scale. Potential strategies include subsidizing nutrient-rich foods, integrating healthy options into public safety nets, introducing front-of-package labeling, and regulating the marketing of unhealthy foods promoted on physical and digital platforms. At the same time, leveraging digital spaces to advocate for healthier choices and fostering grassroots, community-led initiatives are critical. Scaling for impact toward healthier diets requires targeting the entire population base through unique interventions designed for children, adolescents, and adults, while simultaneously, large-scale supply-side initiatives are needed to promote availability and accessibility of healthy foods.

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