

Characterizing food environments in Rural South Asia

Evidence from Bangladesh, India, Nepal

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Introduction: Changing Food Environments in Rural Areas

The changing landscape

- Increasing household wealth and food industry penetration are transforming rural food environments (FE)
- Rural areas offer unique opportunities to study emerging FE dynamics

Need for evidence on...

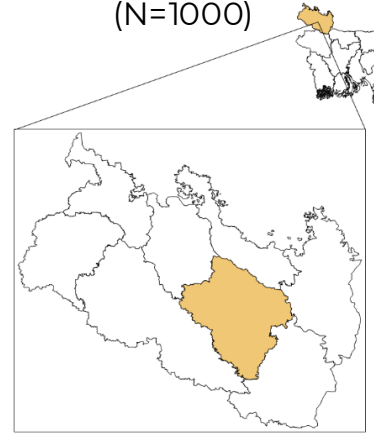
- Describing FE in South Asia
- Linking FE factors (affordability, accessibility, availability, and desirability) with diet outcomes

TAFSSA district agrifood system assessment

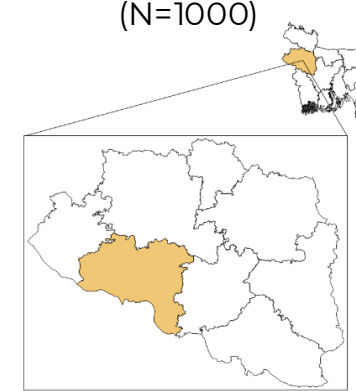
Household survey

- **5 districts** selected*
- Villages/wards were selected from national census data using PPS sampling → district representative
- N=4000 households
- Interviewed 3 individuals per household (adult male, adult female, adolescent male or female)
- Data collection: Feb-April 2023

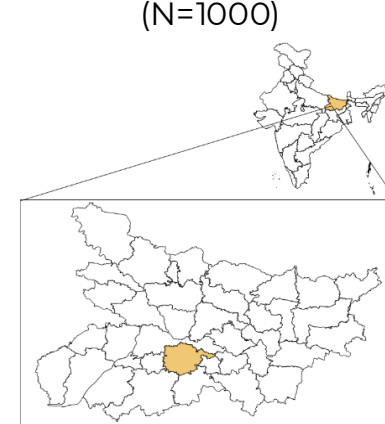
Rangpur, Bangladesh
(N=1000)



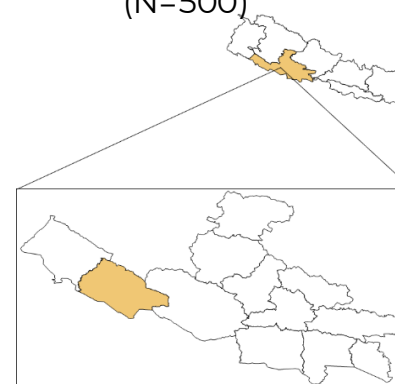
Rajshahi, Bangladesh
(N=1000)



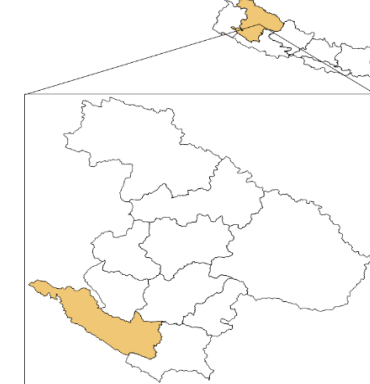
Nalanda, India
(N=1000)



Banke, Nepal
(N=500)



Surkhet, Nepal
(N=500)



*hotspots for issues related to poverty, climate, gender, social inclusion, and malnutrition; and with existing CGIAR staff presence

TAFSSA district agrifood system assessment

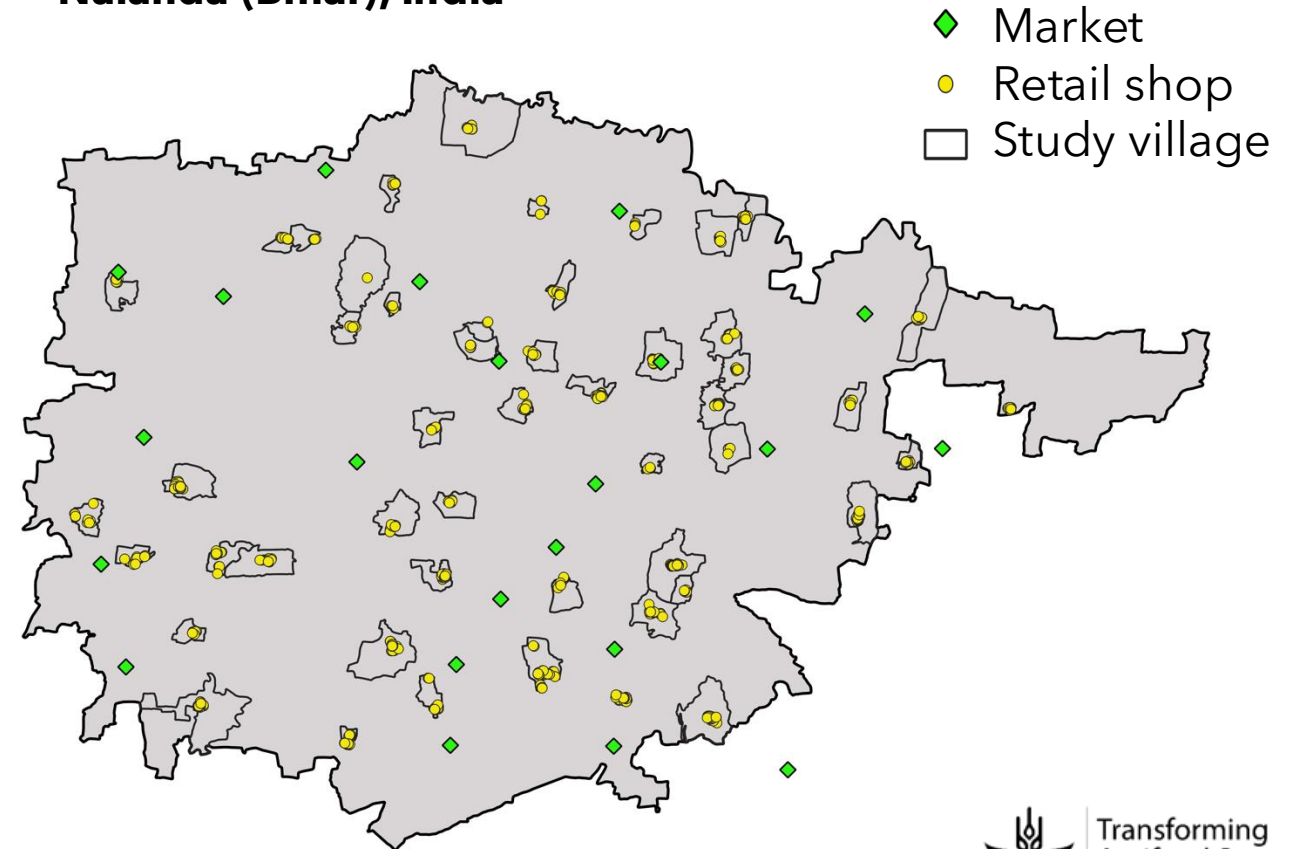
Market survey

- Market serving the village/ward (sampled for household survey)
- Stratified random sampling classifying shops/vendors into different categories as per product they are selling and gender

Respondents

- Market vendors (N=2173)
- Retail shops (N=1600)
- Market managers (210)

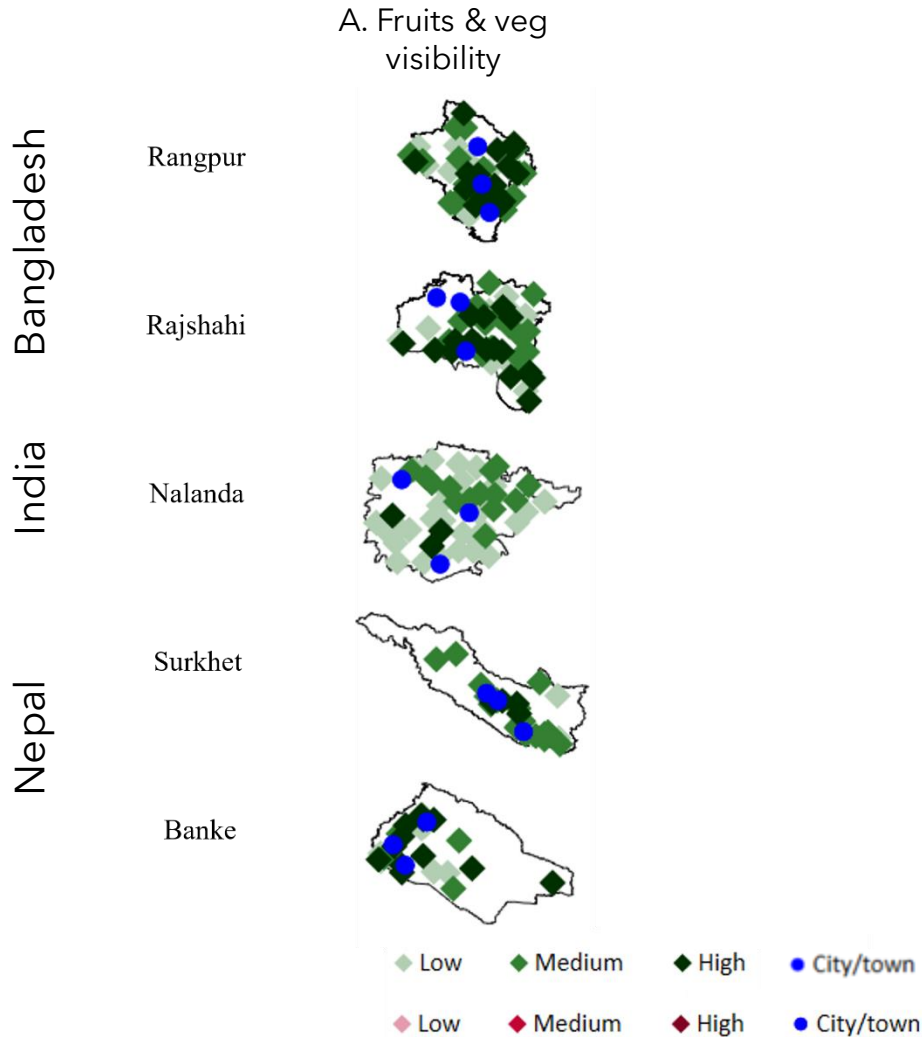
Example of market survey locations from Nalanda (Bihar), India



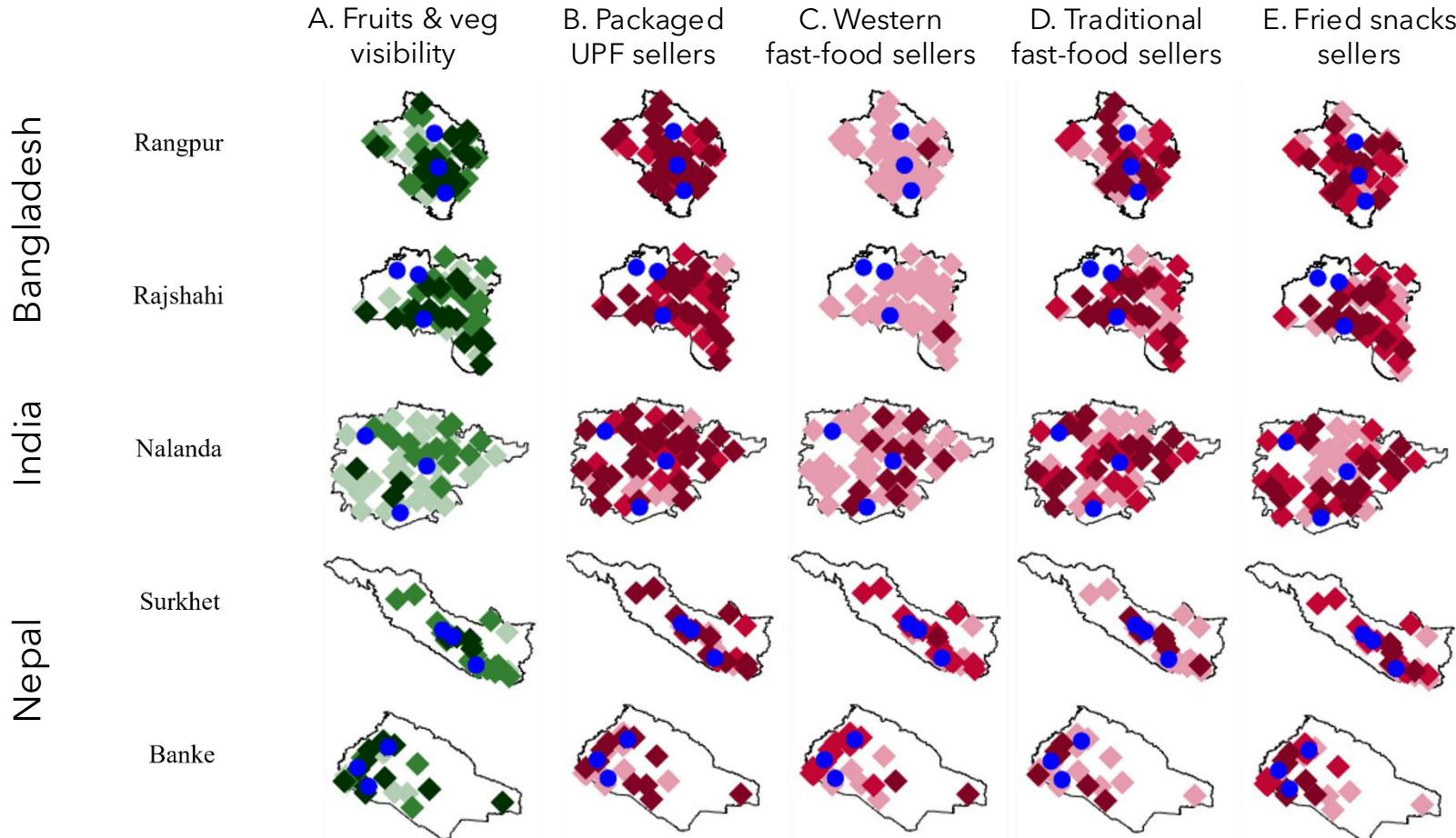
Research questions

1. What are the characteristics of food environments in rural South Asia?
 - Are healthy foods visible? What types of unhealthy foods are sold? Do vendors report barrier to market access?
 - What percent of household respondents see ads on unhealthy foods and where do they see them?
2. How do affordability, accessibility, availability and desirability of healthy and unhealthy foods relate to consumption of these foods?

Fruits and vegetables visibility within shops is high in Bangladesh and Nepal, concentrated around cities and towns

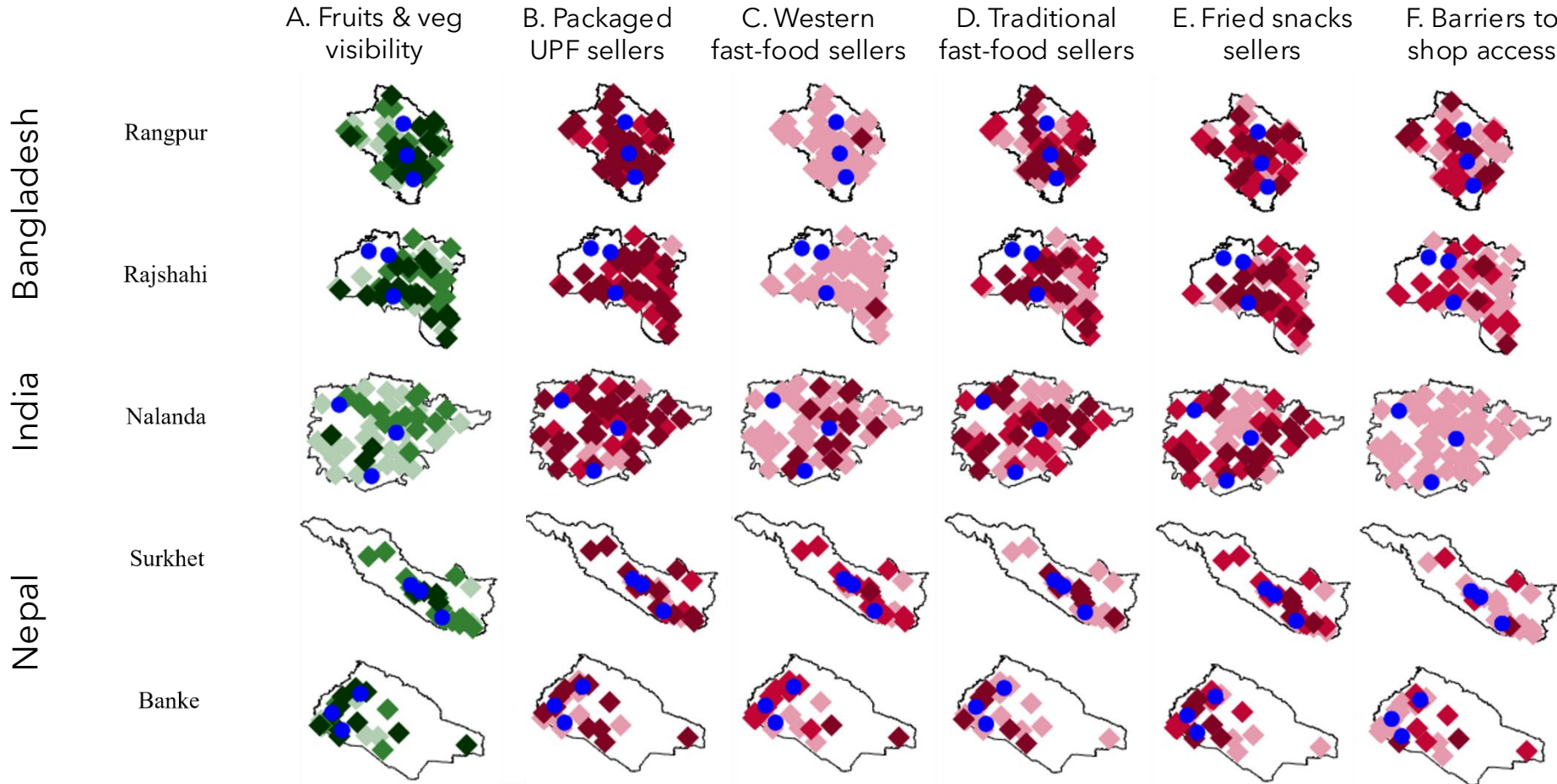


Vendors selling unhealthy foods are widely present across all districts



◆ Low ◆ Medium ◆ High ● City/town
◆ Low ◆ Medium ◆ High ● City/town

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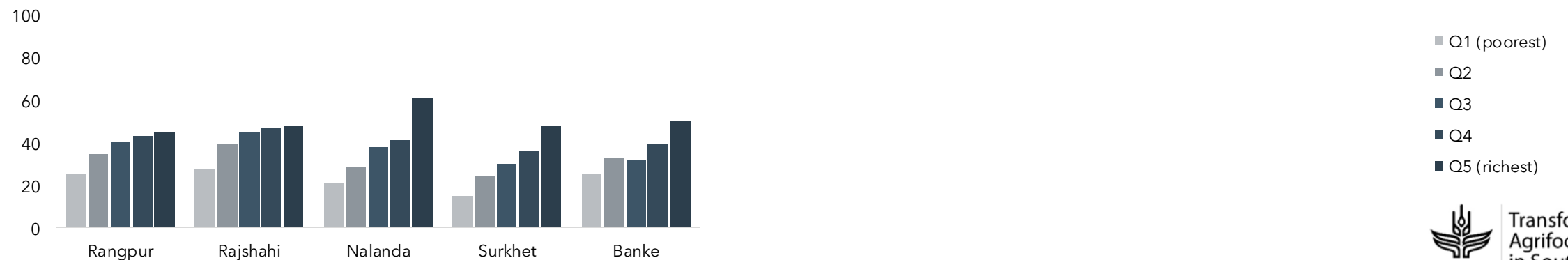
Unhealthy food advertisements exist and exposure increases by wealth

Exposure to ads

A. Seen/heard promotional ads about unhealthy foods, %



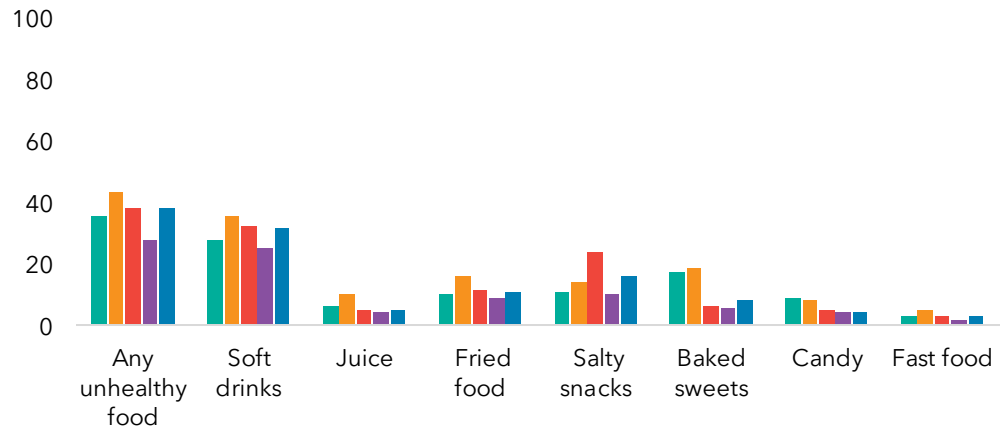
B. Seen/heard promotional ads about unhealthy foods by wealth, %



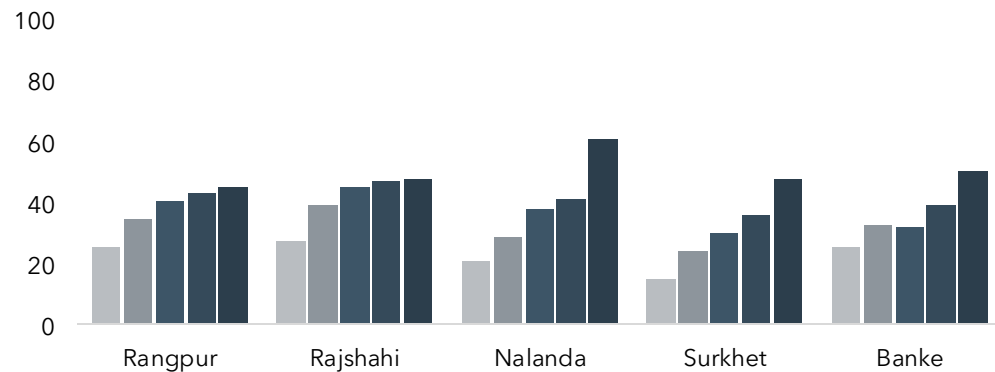
Media is the primary source of unhealthy food advertisements

Exposure to ads

A. Seen/heard promotional ads about unhealthy foods, %

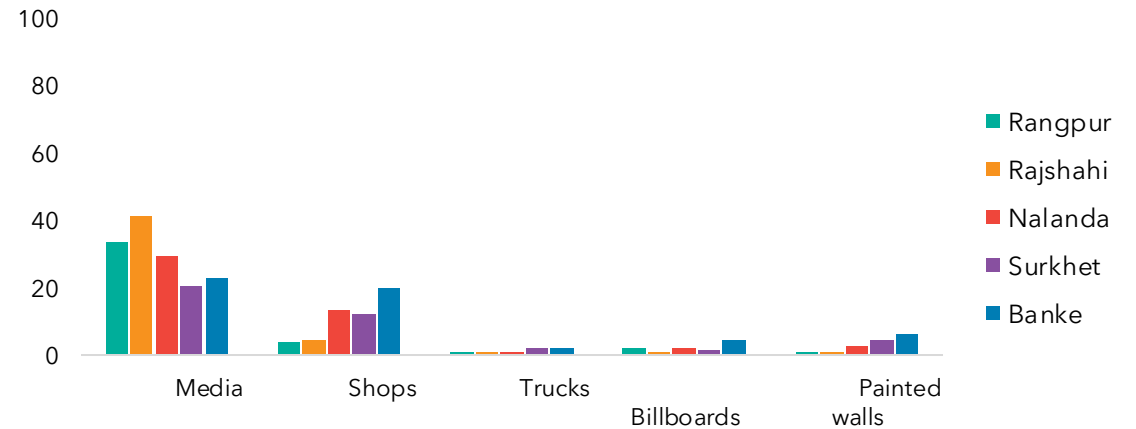


B. Seen/heard promotional ads about unhealthy foods by wealth, %

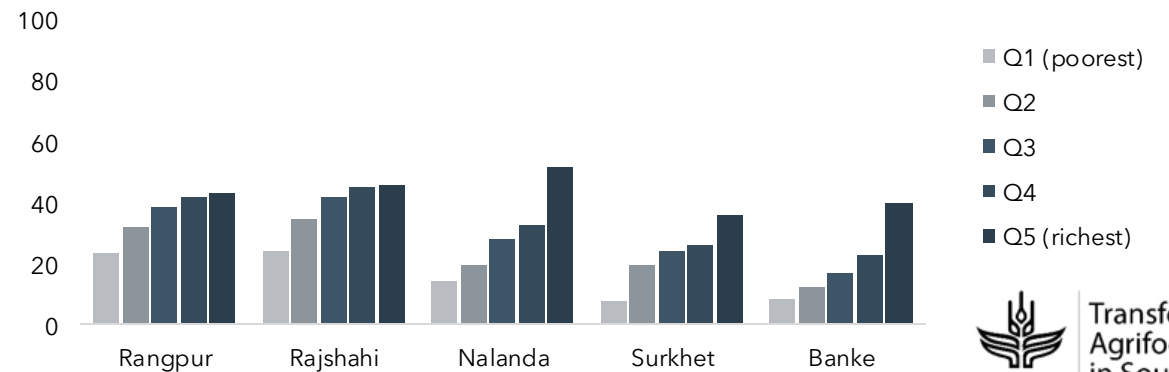


Source of ads

C. Source of promotional ads about unhealthy foods, %



D. Saw ads on unhealthy foods from media, by wealth, %



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Key challenges to sustainable healthy diets - GFPR*

1 Desirability

Food choices are driven by a complex interplay of a person's cognition, environment and behavior. Thus, even when diverse, healthy foods are available, accessible and affordable, people often do not choose healthy diets.

2 Affordability

Low income + high costs of safe, diverse and healthy foods (especially fruits, vegetables, ASF) make healthy diets unaffordable for at least 2 billion people worldwide.

3 Accessibility

Consumers are often lack regular and convenient access to safe, diverse, healthy and affordable foods.

4 Availability

Insufficient year-round availability of diverse fruits and vegetables and other healthy foods leads to high costs and hard-to-find sources.

Key challenges to sustainable healthy diets - GFPR*

Indicators we used

messaging on

healthy/unhealthy foods

reported by respondents

1 Desirability

Food choices are driven by a complex interplay of a person's cognition, environment and behavior. Thus, even when diverse, healthy foods are available, accessible and affordable, people often do not choose healthy diets.

wealthy (non-poor)

reported by respondents based on assets

2 Affordability

Low income + high costs of safe, diverse and healthy foods (especially fruits, vegetables, ASF) make healthy diets unaffordable for at least 2 billion people worldwide.

local market prices

measured in market survey

3 Accessibility

Consumers are often lack regular and convenient access to safe, diverse, healthy and affordable foods.

proximity to markets

measured using GPS coordinates

4 Availability

Insufficient year-round availability of diverse fruits and vegetables and other healthy foods leads to high costs and hard-to-find sources.

availability of seven sentinel foods

reported by respondents

*International Food Policy Research Institute. (2024). *Global Food Policy Report: Food Systems for Healthy Diets and Nutrition*. <https://hdl.handle.net/10568/141760>

Food environment and weekly food intake

Estimating equation

$$Food^f_{i,h,c,d} = \beta_0 + \beta_1 Price^f_{c,d} + \beta_2 Distance_{h,c,d} + \beta_3 Availability_{i,h,c,d} + \beta_4 Info^f_{i,h,c,d} + \beta_5 Nonpoor_{h,c,d} + \sum_{j=6}^J \beta_j X_{j,i,h,c,d} + \epsilon^f_{i,h,c,d}$$

$X_{j,i,h,c,d}$ includes:

- Age
- Sex
- District fixed effects

Association between food environment indicators and food consumption

Accessibility
Distance to
market,
per 10 km

Rice	0.98***
Wheat	-1.20***
Maize	-0.46***
Millets	-0.03
Potato	0.65*
Moong dal	-0.01
Masoor dal	0.62*
Chana dal	-0.16
Chickpeas	0.69***
Poultry	0.22*
Fish	-0.78***
Other meat	0.06
Eggs	0.24*
Milk	-0.48*
Orange veg	0.05
Leafy veg	0.52**
Onion	1.45***
Tomato	1.68***
Fruits	0.44**
Noodles	-0.23**
Chips	0.04
Baked	0.03
Deep fried	0.08
Sugary beverage	0.23***
Tea/coffee with sugar	0.25

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Accessibility: Remote communities consume less rice and fresh foods, but more fish

Association between food environment indicators and food consumption

	Accessibility Distance to market, per 10 km	Availability High food availability, lowest versus highest
Rice	0.98***	0.85***
Wheat	-1.20***	0.07
Maize	-0.46***	0.08
Millets	-0.03	0.05
Potato	0.65*	0.43
Moong dal	-0.01	0.14
Masoor dal	0.62*	-0.59*
Chana dal	-0.16	0.01
Chickpeas	0.69***	0.57***
Poultry	0.22*	0.15
Fish	-0.78***	-0.70*
Other meat	0.06	0.11
Eggs	0.24*	0.37**
Milk	-0.48*	-0.04
Orange veg	0.05	0.07
Leafy veg	0.52**	-0.17
Onion	1.45***	0.75**
Tomato	1.68***	0.01
Fruits	0.44**	0.52**
Noodles	-0.23**	0.1
Chips	0.04	0.22***
Baked	0.03	0.81***
Deep fried	0.08	0.64***
Sugary beverage	0.23***	0.23***
Tea/coffee with sugar	0.25	2.19***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Accessibility: Remote communities consume less rice and fresh foods, but more fish

Availability: High reported availability of foods in general relate to higher consumption of unhealthy foods

Association between food environment indicators and food consumption

	Accessibility Distance to market, per 10 km	Availability High food availability, lowest versus highest	Affordability Retail prices standardized by lowest rice price, rupees/taka/kg
Rice	0.98***	0.85***	-0.31***
Wheat	-1.20***	0.07	-0.37**
Maize	-0.46***	0.08	0.2
Millets	-0.03	0.05	0
Potato	0.65*	0.43	0.11
Moong dal	-0.01	0.14	-0.13
Masoor dal	0.62*	-0.59*	0.57***
Chana dal	-0.16	0.01	0.31**
Chickpeas	0.69***	0.57***	-0.04
Poultry	0.22*	0.15	-0.01**
Fish	-0.78***	-0.70*	0.01
Other meat	0.06	0.11	-0.08***
Eggs	0.24*	0.37**	-0.2
Milk	-0.48*	-0.04	-0.09
Orange veg	0.05	0.07	0
Leafy veg	0.52**	-0.17	0.19
Onion	1.45***	0.75**	1.04
Tomato	1.68***	0.01	-2.03***
Fruits	0.44**	0.52**	-0.09*
Noodles	-0.23**	0.1	0
Chips	0.04	0.22***	-0.01
Baked	0.03	0.81***	-0.01
Deep fried	0.08	0.64***	-0.13**
Sugary beverage	0.23***	0.23***	0.03**
Tea/coffee with sugar	0.25	2.19***	-1.20**

* p < 0.1, ** p < 0.05, *** p < 0.01

Accessibility: Remote communities consume less rice and fresh foods, but more fish

Availability: High reported availability of foods in general relate to higher consumption of unhealthy foods

Affordability: Cereals, tomatoes, and tea/coffee are price sensitive

Association between food environment indicators and food consumption

	Accessibility Distance to market, per 10 km	Availability High food availability, lowest versus highest	Affordability Retail prices standardized by lowest rice price, rupees/taka/kg	Desirability Non-poor, highest wealth tertile	Seen or heard messages about healthy/unhealthy foods
Rice	0.98***	0.85***	-0.31***	-0.90***	-0.22
Wheat	-1.20***	0.07	-0.37**	0.97***	0.31*
Maize	-0.46***	0.08	0.2	-0.11*	-0.07
Millets	-0.03	0.05	0	-0.03	0.07
Potato	0.65*	0.43	0.11	0.02	-0.26
Moong dal	-0.01	0.14	-0.13	0.26***	0.15**
Masoor dal	0.62*	-0.59*	0.57***	0.70***	0.08
Chana dal	-0.16	0.01	0.31**	0.42***	0.16**
Chickpeas	0.69***	0.57***	-0.04	0.35***	0.04
Poultry	0.22*	0.15	-0.01**	0.46***	0.08
Fish	-0.78***	-0.70*	0.01	0.72***	0.39***
Other meat	0.06	0.11	-0.08***	0.36***	0.06
Eggs	0.24*	0.37**	-0.2	0.66***	0.32***
Milk	-0.48*	-0.04	-0.09	1.08***	0.22*
Orange veg	0.05	0.07	0	0.60***	0.13**
Leafy veg	0.52**	-0.17	0.19	0.36***	0.31***
Onion	1.45***	0.75**	1.04	1.28***	0.74***
Tomato	1.68***	0.01	-2.03***	1.75***	0.78***
Fruits	0.44**	0.52**	-0.09*	1.01***	0.27**
Noodles	-0.23**	0.1	0	0.19***	0.10**
Chips	0.04	0.22***	-0.01	0.11**	0.19***
Baked	0.03	0.81***	-0.01	0.44***	0.32***
Deep fried	0.08	0.64***	-0.13**	0.32***	0.21***
Sugary beverage	0.23***	0.23***	0.03**	0.36***	0.14***
Tea/coffee with sugar	0.25	2.19***	-1.20**	0.77***	0.75***

* p < 0.1, ** p < 0.05, *** p < 0.01

Accessibility: Remote communities consume less rice and fresh foods, but more fish

Availability: High reported availability of foods in general relate to higher consumption of unhealthy foods

Affordability: Cereals, tomatoes, and tea/coffee are price sensitive

Desirability: Richer households consume more of all foods, except rice.

Take-aways

1. What are the characteristics of food environments in rural South Asia?
 - UPFs, traditional fast foods, and fried snacks are widely available
 - Households with more assets are exposed to unhealthy food ads through media
2. How do affordability, accessibility, availability and desirability of healthy and unhealthy foods relate to consumption of these foods?
 - Unhealthy food consumption is strongly linked to availability
 - In relatively poor households, cereals are price sensitive
 - As wealth increases, both healthy and unhealthy foods become desirable

Thank you
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