gain
Global Alliance for
Improved Nutrition

# TRADITIONAL FOOD MARKETS – HOW ARE THEY ASSOCIATED WITH DIETS?

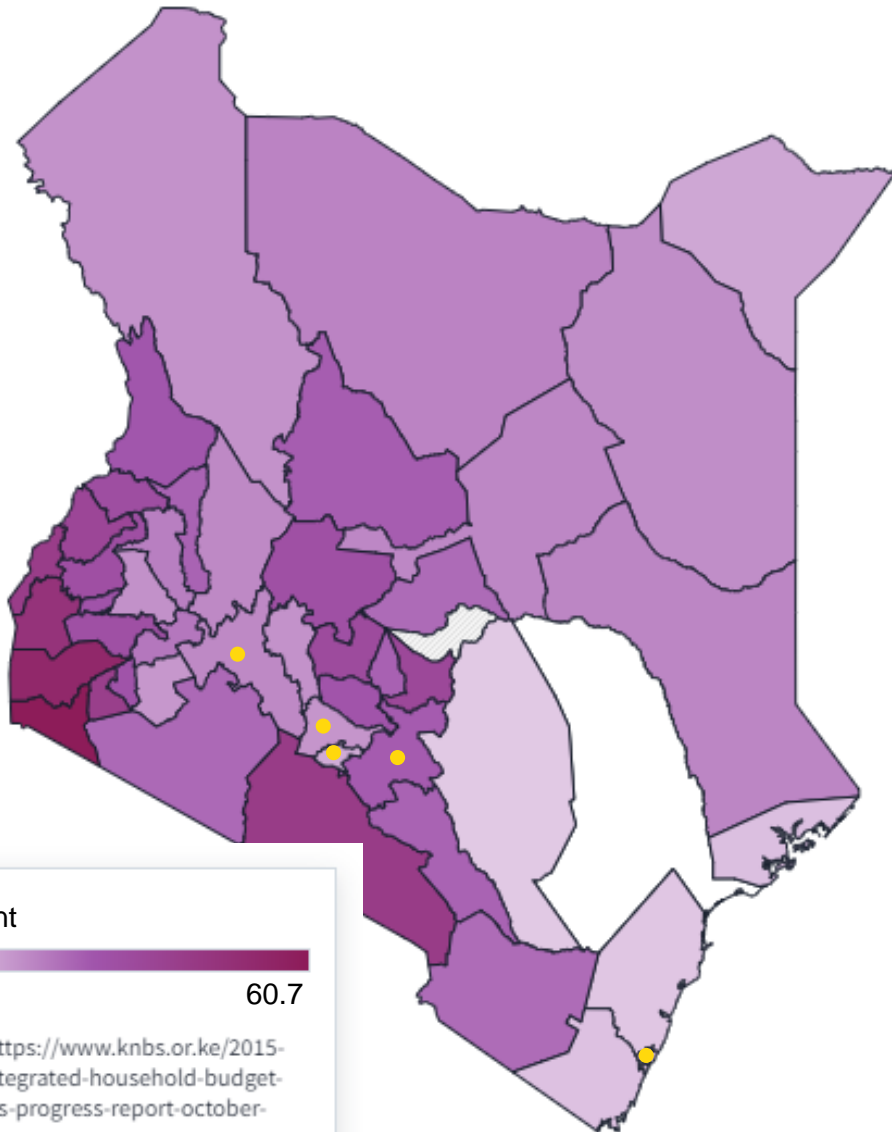**Dr. Kathrin Demmler**

ICAE, 6th August 2024

# TRADITIONAL FOOD MARKETS ARE PART OF THE TERRITORIAL ECONOMY

- important places for business

- operate under certain levels of informality

- diverse food options

- especially relevant for low-income consumers

- not only local foods; also imported foods, including grains, fruits and vegetables are sold



HLPE, 2024; de Kanter 2024
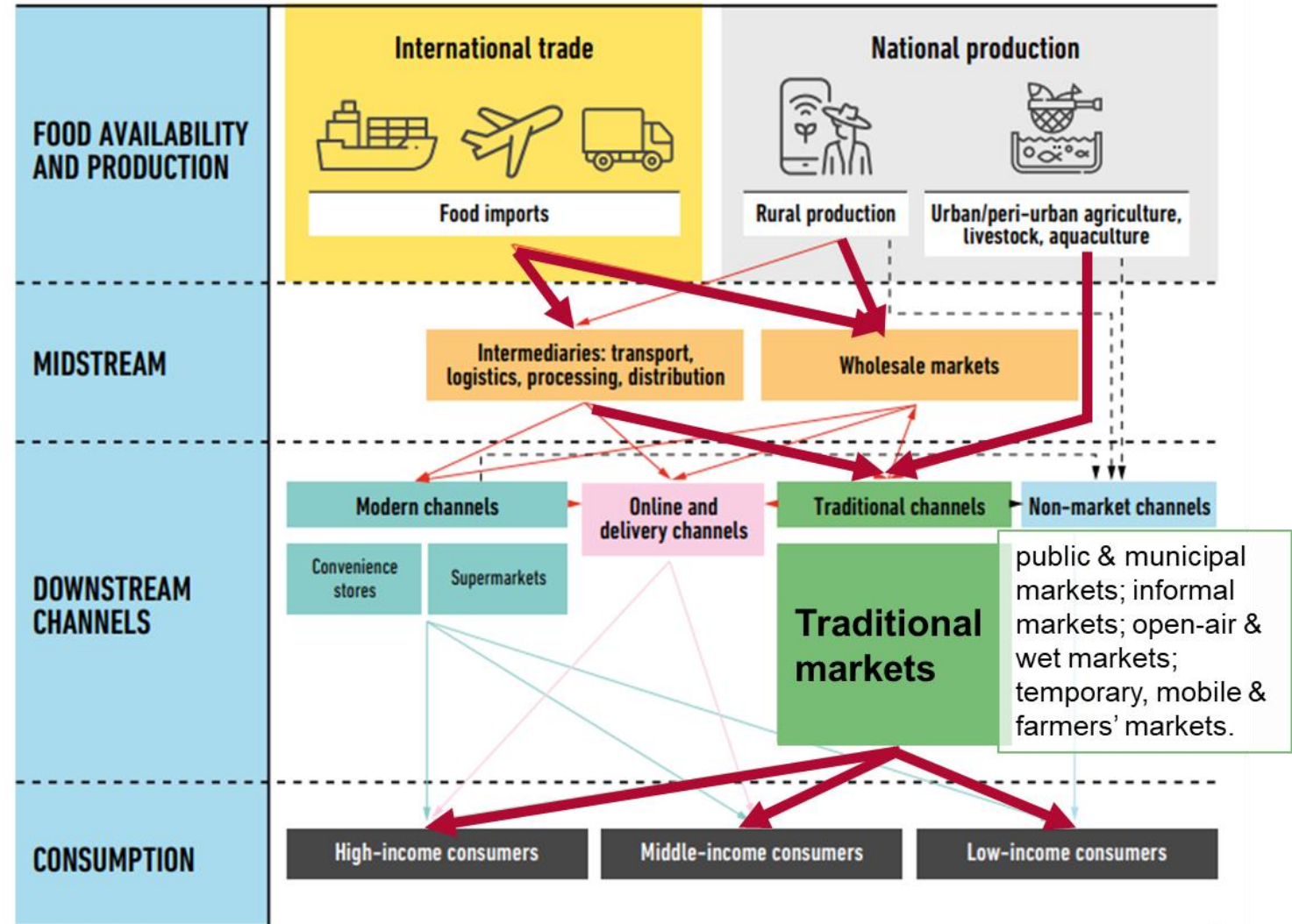
# IN KENYA: TRADITIONAL MARKETS ARE A MAJOR SOURCE FOR FOOD
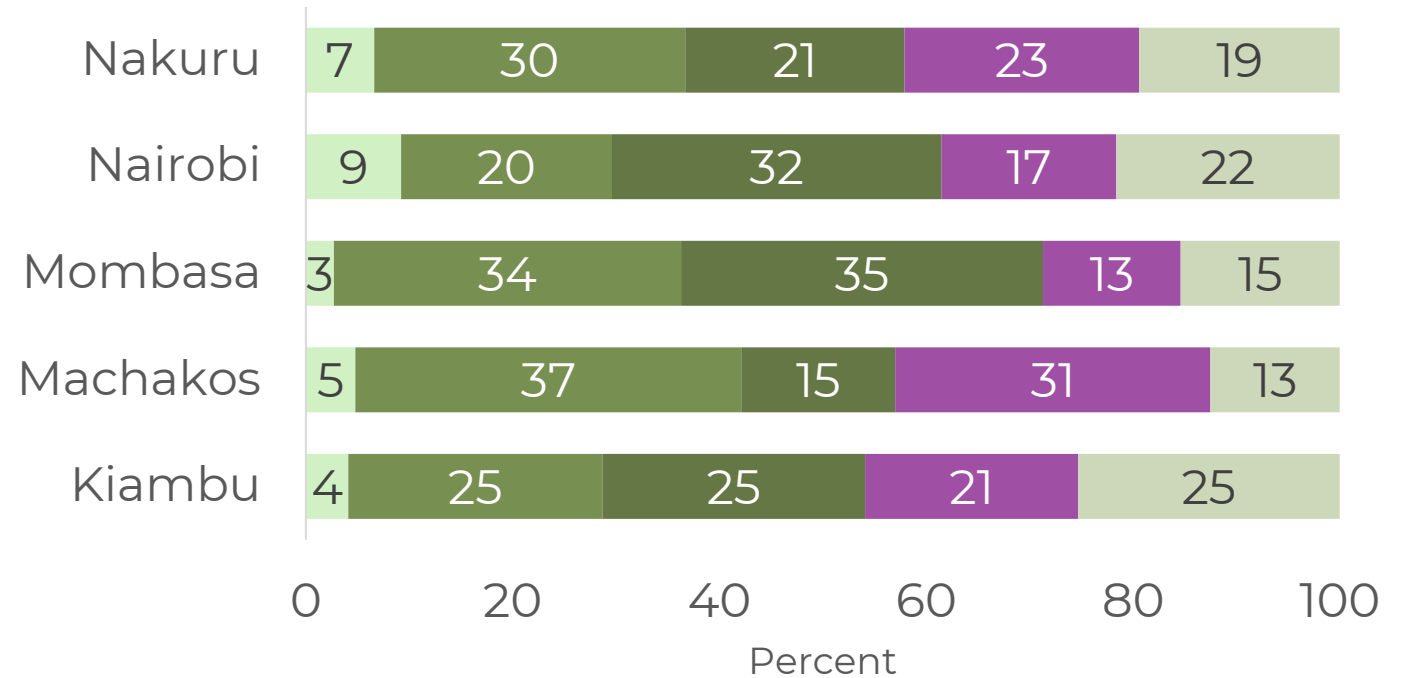
**Percent of food purchased from open markets, 2015-16**



In percent
2.5 — 60.7

Data from https://www.knbs.or.ke/2015-16-kenya-integrated-household-budget-survey-kihbs-progress-report-october-2015/

| Region | Supermarkets | General shops | Kiosks | Open markets | Other |
|--------|--------------|---------------|--------|--------------|-------|
| Nakuru | 7 | 30 | 21 | 23 | 19 |
| Nairobi | 9 | 20 | 32 | 17 | 22 |
| Mombasa | 3 | 34 | 35 | 13 | 15 |
| Machakos | 5 | 37 | 15 | 31 | 13 |
| Kiambu | 4 | 25 | 25 | 21 | 25 |

Percent

■ Supermarkets ■ General shops ■ Kiosks ■ Open markets ■ Other

The Food Systems Dashboard, 2023

# 2022/23: 5 markets, 5 Counties in Kenya, different local context



**Representative sampling in markets**
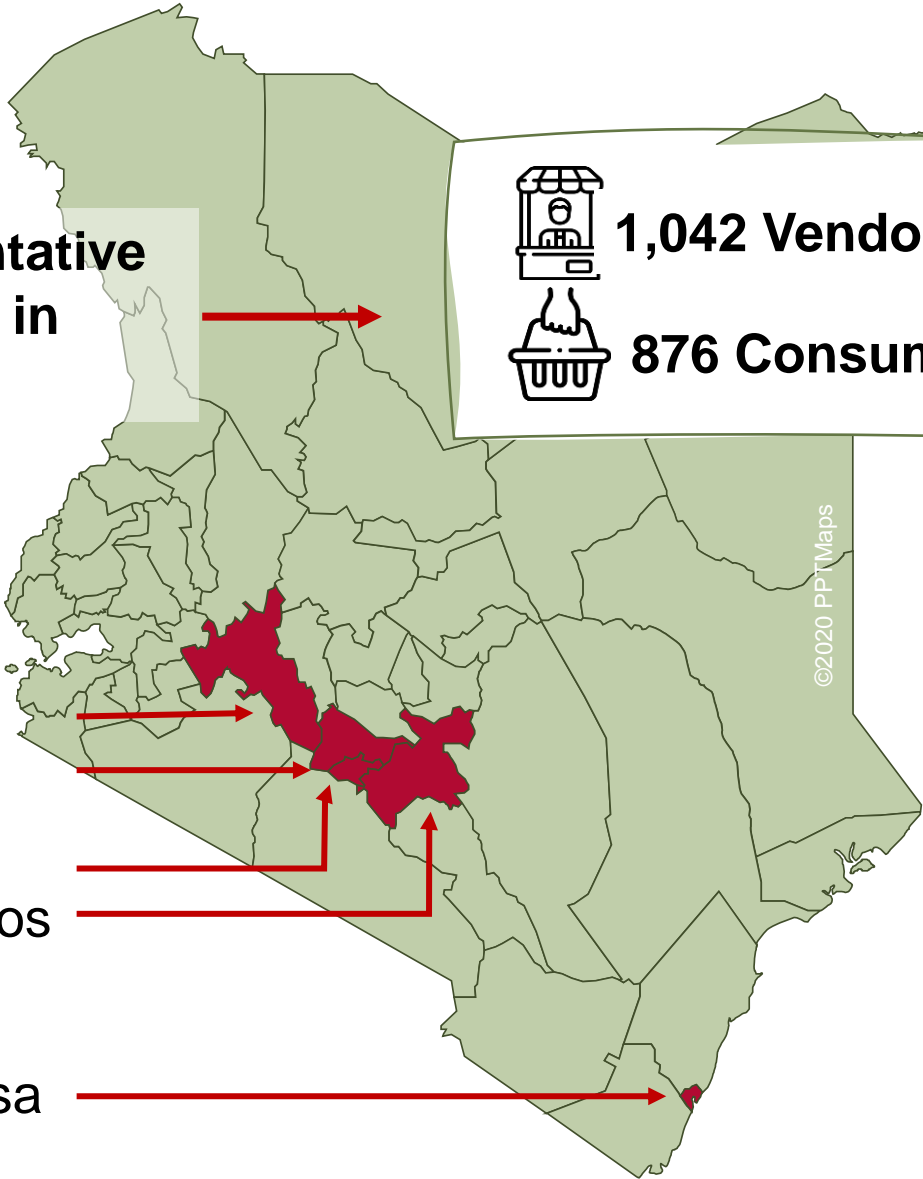
**1,042 Vendors**

**876 Consumers**

**Counties:**
Nakuru
Kiambu
Nairobi
Machakos

Mombasa

ResMar_Consumer_KEN_26_04_2023_Rev1

ResMar_Vendor_KEN_26_04_2023_Rev1

DIET QUALITY QUESTIONNAIRE (DQQ)

KENYA

**Read:** Now I'd like to ask you some yes-or-no questions about foods and drinks that you consumed yesterday during the day or night, whether you had it at home or somewhere else.

**Areas of interest**
- Respondent characteristics
- Shopping & business characteristics
- Waste & storage
- Business attraction
- Governance & market environment
- Food safety
- Training
- Dietary quality (DQQ)

# USING THE DIET QUALITY QUESTIONNAIRE TO ASSESS INDIVIDUAL DIETARY INTAKE IN 5-8 MINUTES



DIET QUALITY QUESTIONNAIRE (DQQ)

**KENYA**

**Read:** Now I'd like to ask you some yes-or-no questions about foods and drinks that you consumed yesterday during the day or night, whether you had it at home or somewhere else.

First, I would like you to think about yesterday, from the time you woke up through the night. Think to yourself about the first thing you ate or drank after you woke up in the morning ... Think about where you were when you had any food or drink in the middle of the day ... Think about where you were when you had any evening meal ... and any food or drink you may have had in the evening or late-night... and any other snacks or drinks you may have had between meals throughout the day or night.

I am interested in whether you had the food items I will mention even if they were combined with other foods.

Please listen to the list of foods and drinks, and if you ate or drank ANY ONE OF THEM, say yes.

| | Yesterday, did you eat any of the following foods: | (circle answer) |
|---|---|---|
| 1 | Maize ugali, maize porridge, rice, bread, chapati, injera, pasta, or noodles? | YES or NO |
| 2 | Ugali made from millet or sorghum, porridge made from millet or sorghum, green maize, githeri, oats, or popcorn? | YES or NO |
| 3 | Irish potato, white sweet potato, green banana, nduma, yam, or cassava? | YES or NO |
| 4 | Beans, githeri, green gram, kamande, pigeon peas, or green peas? | YES or NO |
| | **Yesterday, did you eat any of the following vegetables:** | |
| 5 | Carrots, pumpkin, butternut, or sweet potato that is orange or yellow inside? | YES or NO |
| 6.1 | Sukuma wiki, Ethiopian kale, spinach, nightshade, amaranth, saget, or cowpea leaves? | YES or NO |
| 6.2 | Broccoli, pumpkin leaves, mrenda, nderema, mitoo, or mchunga? | YES or NO |
| 7.1 | Tomatoes, cabbage, green capsicum, mushrooms, or cauliflower? | YES or NO |
| 7.2 | Cucumber, French beans, lettuce, eggplant, or courgette? | YES or NO |
| | Yesterday, did you eat any of the following fruits: | |
| | | YES or NO |
| 9 | Orange or tangerine? | YES or NO |
| | | YES or NO |
| | Apple, grapes, pear, or guava? | YES or NO |
| | Yesterday, did you eat any of the following sweets: | |
| 11 | Cakes, queencakes, biscuits, or kaimati? | YES or NO |
| 12 | Sweets, chocolates, ice cream, or ice lollies? | YES or NO |
| | Yesterday, did you eat any of the following foods of animal origin: | |

- Set of **29 food groups** that share similar nutritional properties or biological or culinary characteristics.

- Food groups are not asked about directly, rather represented by **sentinel foods**.

- All "yes or no" questions

| Diet quality indicators used | |
|---|---|
| Dietary Diversity Score (DDS) (0-10) | Positive, semi-continuous score of food group diversity, expressed as the average score out of 10. |
| Global Dietary Recommendations (GDR) score (0-18) | Positive, semi-continuous score that indicates adherence to global dietary recommendations, GDR score = (NCD-Protect) – (NCD-Risk + 9). |
| Non-communicable disease-Protect score (0-9) | Positive, semi-continuous score of dietary factors protective against NCDs, sub-component of GDR score. |
| Non-communicable disease-Risk score (0-9) | Negative, semi-continuous score (0-9) of dietary factors for NCDs, proxy for ultra-processed food intake, sub-component of GDR score |

NCD: non-communicable diseases

Diet Quality Project, 2024

# DATA ANALYSIS: USING OLS REGRESSION FOR VENDORS AND CONSUMERS

| Vendor | Consumer |
|---|---|
| **Types of food typically sold in the market, last 30 days** | Types of food typically bought in the market, last 30 days |
| **Travel time to reach the market from home, ranges of minutes** | **Travel time to reach the market from home, ranges of minutes** |
| | Frequency visiting the market, last 30 days |
| Believed food-related sickness (oneself or others), past 2 years | Believed food-related sickness (oneself or others), past 2 years |

| Control variables – Socio-economic/demographic factors |
|---|
| **Gender, age group**, education (finalised), household size, sales values and credit received (vendors), expenditure (consumer), |

# DIETARY CHARACTERISTICS OF VENDORS AND CONSUMERS

| | Vendor | Consumer |
|---|---|---|
| Dietary Diversity Score (0-10) | 7.05 ± 1.80 | 7.35 ± 1.66 |
| Global Dietary Recommendations score (0-18) | 12.10 ± 2.04 | 11.32 ± 2.31 |
| NCD-Protect score (0-9) | 5.05 ± 1.87 | 5.27 ± 1.75 |
| NCD-Risk score (0-9) | 1.95 ± 1.81 | 2.96 ± 2.27 |
| N | 1042 | 876 |

Values are means ± SD.



Demmler et al., 2024 (in preparation)
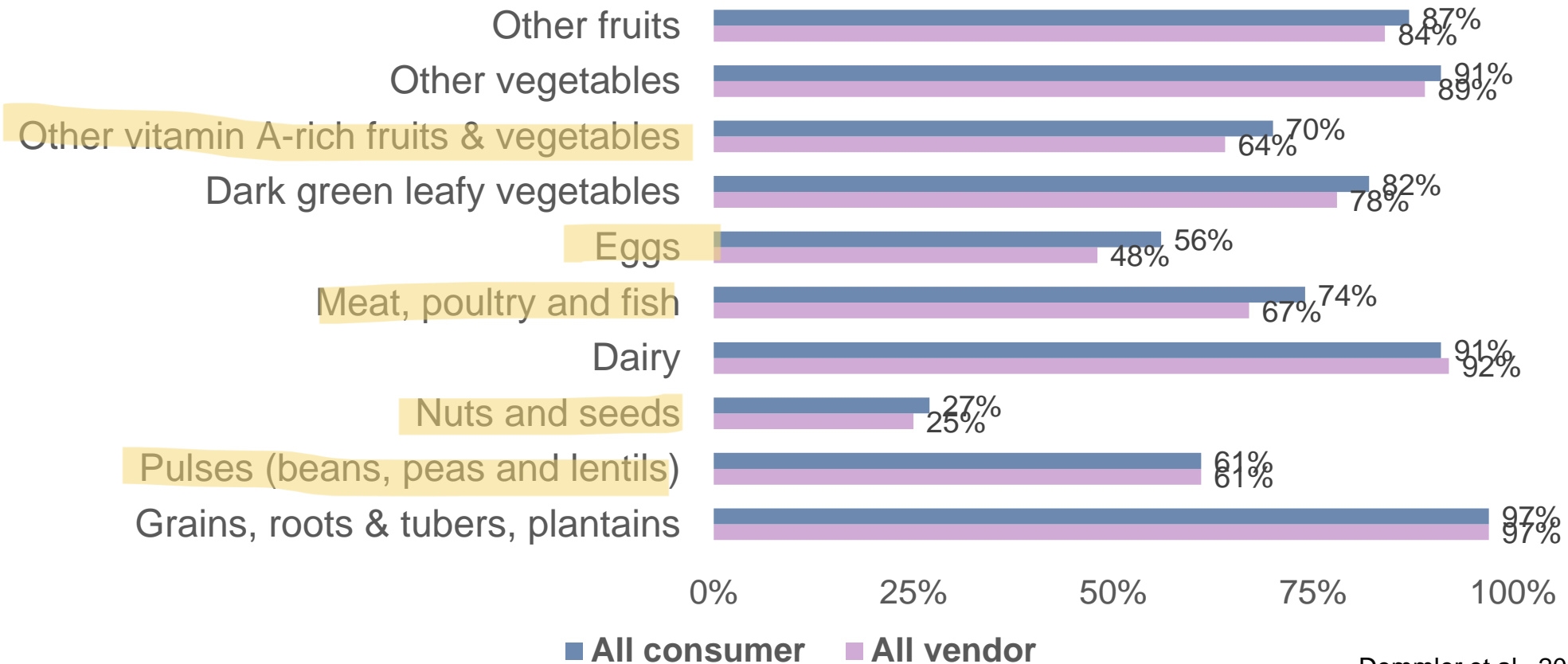
# VENDORS: ASSOCIATIONS BETWEEN FOOD GROUPS SOLD & DIET QUALITY

| Food groups sold | DDS | GDR | NCD-Protect | NCD-Risk *(negative)* |
|---|---|---|---|---|
| Cereals | ns | ns | ns | ns |
| Roots and tubers | ns | ns | ns | ns |
| Legumes, seeds & nuts | ns | ns | ns | ns |
| Vegetables | ns | ns | ns | ns |
| Fruits | ns | ns | ns | ns |
| Animal source food (ASF) | ns | ++ | ns | ns |
| Miscellaneous | ns | ns | ns | ns |
| Control variables | yes | yes | yes | yes |
| N | 902 | 902 | 902 | 902 |

Coefficient estimates of ordinary least square (OLS) models are shown with standard errors in parentheses. Standard errors are cluster-corrected at county level. Control variables: female, age group, education level, household size, sickness from food, travel time to market; average sales values, receiving credit/loan. DDS, Dietary Diversity Score; GDR, Global Dietary Recommendation; NCD, Non-communicable diseases; N, number of observations.
+/- Significant at 10% level ++/-- Significant at 5% level +++/--- Significant at 1% level



% of vendors that consumed food group previous day/night
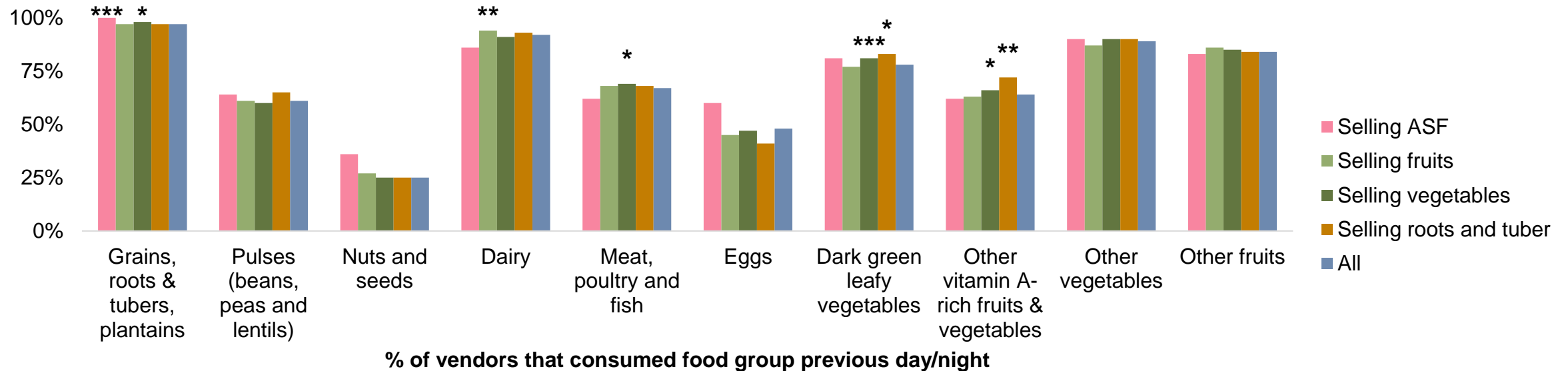
# ASSOCIATIONS BETWEEN TRAVEL TIME TO MARKET & DIET QUALITY

| Vendors | DDS | GDR | NCD-Protect | NCD-Risk *(negative)* |
|---|---|---|---|---|
| < 5 mins *(reference)* | | | | |
| 5 - <10 min | -- | ns | ns | ns |
| 10 - <20 min | -- | ns | ns | ns |
| 20 - <30 min | ns | ns | ns | ns |
| 30 - <60 mins | - | ns | ns | ns |
| > 60 min/1hr | - | ns | ns | ns |
| Control variables | yes | yes | yes | yes |
| N | 902 | 902 | 902 | 902 |

| Consumers | DDS | GDR | NCD-Protect | NCD-Risk *(negative)* |
|---|---|---|---|---|
| < 5 mins *(reference)* | | | | |
| 5 - <10 min | ns | ns | - | - |
| 10 - <20 min | ns | ns | ns | ns |
| 20 - <30 min | ns | ns | ns | -- |
| 30 - <60 mins | ns | ns | - | -- |
| > 60 min/1hr | -- | ns | -- | -- |
| Control variables | yes | yes | yes | yes |
| N | 835 | 835 | 835 | 835 |

Coefficient estimates of ordinary least square (OLS) models are shown with standard errors in parentheses. Standard errors are cluster-corrected at county level. Control variables (vendors & consumers): female, age group, education level, household size, sickness from food; (vendors only): foods sold, average sales values, receiving credit/loan, (consumer only): foods purchased, frequency of visits to the market, money spend at market. DDS, Dietary Diversity Score; GDR, Global Dietary Recommendation; NCD, Non-communicable diseases; N, number of observations. +/- Significant at 10% level ++/-- Significant at 5% level +++/--- Significant at 1% level

Demmler et al., 2024 (in preparation)

# ASSOCIATIONS BETWEEN GENDER, AGE & DIET QUALITY

**SOCIO-DEMOGRAPHIC FACTORS**

| | DDS | | GDR | | NCD-Protect | | NCD-Risk (negative) | |
|---|---|---|---|---|---|---|---|---|
| | Vendor | Consumer | Vendor | Consumer | Vendor | Consumer | Vendor | Consumer |
| **Gender (Female)** | ns | ns | ns | -- | ns | ns | ++ | ns |
| **N** | 902 | 835 | 902 | 835 | 902 | 835 | 902 | 835 |

| | DDS | | GDR | | NCD-Protect | | NCD-Risk (negative) | |
|---|---|---|---|---|---|---|---|---|
| | Vendor | Consumer | Vendor | Consumer | Vendor | Consumer | Vendor | Consumer |
| **Age group** | | | | | | | | |
| 18-24 (reference) | | | | | | | | |
| 25-30 | ns | + | ns | ns | ns | ns | ns | ns |
| 31-40 | ns | + | ns | ++ | ns | ns | ns | -- |
| 41-50 | ns | ns | ns | +++ | ns | ns | ns | --- |
| 51-65 | --- | ns | + | +++ | ns | ns | - | --- |
| 66-75 | - | +++ | + | +++ | ns | + | --- | --- |
| **N** | 902 | 835 | 902 | 835 | 902 | 835 | 902 | 835 |

Coefficient estimates of ordinary least square (OLS) models are shown with standard errors in parentheses. Standard errors are cluster-corrected at county level. DDS, Dietary Diversity Score; GDR, Global Dietary Recommendation; NCD, Non-communicable diseases; N, number of observations +/- Significant at 10% level ++/-- Significant at 5% level +++/--- Significant at 1% level

Demmler et al., 2024 (in preparation)

# WE FOUND ASSOCIATIONS BETWEEN MARKET CHARACTERISTICS, VENDORS AND CONSUMERS SOCIO-DEMOGRAPHIC FACTORS AND DIET QUALITY

1. Food groups sold by vendors are not necessarily reflected in vendors' diets; exception are vendors selling vegetables

2. Travel time to markets are notable barriers to achieving higher dietary diversity in vendors and consumers; however, increase time also lowered consumption of foods related to NCDs.

3. There is a disparity in dietary habits between gender and age groups, with men and older age groups generally adhering more to dietary guidelines.

Limitations:

• Non-causal analysis

• Market selection bias

# POLICIES AND INTERVENTIONS NEED TO CONSIDER…

- **Infrastructure** and **urban planning** aspects

- Socio-demographic factors like gender and age emphasizes the need for **interventions tailored to specific groups and needs,** particularly for women and young people

- Issues of **access to healthy ready-to-eat foods, financial constraints, dietary information campaigns** for both vendors and consumers.

- **Research** on **other informal food environments**, using **longitudinal data sets** and inclusion of more **diverse food environment elements** and indicators will be needed.

# THANKS TO MY CO-AUTHORS:

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