Zambia Book of Dietary Data Graphics

Results from the National Food Consumption and Micronutrient Status Survey

REPUBLIC OF ZAMBIA

TDRC

intake
CENTER FOR DIETARY ASSESSMENT

Sweden
Sverige

THE WORLD BANK

unicef
for every child

Participants of the 'Dietary Data Use Workshop' hosted by *Intake* – Center for Dietary Assessment at the Southern Sun Ridgeway Hotel on July 9–11, 2024.

About the Zambia Book of Dietary Data Graphics

This book of graphics was created by the *Intake* – Center for Dietary Assessment as an input to the Intake-hosted 'Dietary Data Use Workshop', convened in Lusaka, Zambia, July 9–11, 2024. This book of graphics provides a visual representation of the results of the dietary component of the 2024 Zambia National Food Consumption and Micronutrient Status Survey.

This book of graphics is accompanied by interactive figures available at: https://www.intake.org/zambia-dietary-data-visualizations.

Graphic illustrations of the outputs from the workshop are available here.

Recommended Citation

Intake – Center for Dietary Assessment. 2024. Zambia Book of Dietary Data Graphics: Results from the 2024 Zambia National Food Consumption and Micronutrient Status Survey. Washington, DC: *Intake* – Center for Dietary Assessment at FHI 360.

About Intake

Intake is a Center for Dietary Assessment at FHI 360, established in 2016 with funding from the Gates Foundation. *Intake* aims to strengthen policies and programs to improve nutritional status in low- and middle-income countries (LMICs) by increasing the availability, quality, comparability, and use of dietary data. *Intake* provides flexible, on-demand technical assistance to governments for collecting, analyzing, and using dietary intake data for evidence-based decision-making in LMICs; develops tools and technologies to facilitate dietary data collection and analysis; and carries out research to advance dietary assessment methods and develop validated metrics of diet quality.

Learn more at intake.org

Follow Us

Contents

1 **Description of the Survey** 1

1.1 Survey Design and Objectives 1

2 **Energy and Nutrient Intakes for Children (24–59 mo), Adolescent Girls, and Women** 3

2.1 Energy Intake 3

2.2 Macronutrient Intakes and Prevalence of Inadequacy 4

2.3 Median Energy Contribution from Macronutrients 6

2.4 Micronutrient Intakes and Prevalence of Inadequacy 8

3 **Diet Quality Metrics for Women** 21

3.1 Minimum Dietary Diversity for Women (MDD-W) 21

3.2 Global Diet Quality Score (GDQS) 21

4 **Diets of Infants and Young Children (6–23 mo)** 22

4.1 Selected WHO/UNICEF Indicators 22

4.2 Nutrient Density of the Complementary Diet 23

5 **Biofortification Coverage** 24

6 **Fortification Coverage** 25

7 **Main Food Group Sources of Energy and Nutrients** 27

7.1 Mean Contribution to Energy and Nutrients by Food Group 27

7.2 Percentage of Women Consuming Foods by Food Group 31

8 **Contextual Information** 38

9 **References** 39

1 Description of the Survey

1.1 Survey Design and Objectives[1]

The National Food Consumption and Micronutrient Status Survey (FCMSS) was a population-based cross-sectional survey. The target groups sampled were children 6–59 months, adolescent girls 10–14 years, and women 15–49 years.

The main objective of the survey was to assess the population's micronutrient status by combining analysis of dietary intake and biochemical markers.

The specific objectives were to determine the following:

1. Prevalence of micronutrient deficiencies in children 6–59 months, adolescent girls 10–14 years, and women of reproductive age (WRA) 15–49 years (including pregnant and lactating women) at provincial, region (rural and urban) and national levels.
2. Daily intake of macronutrients (energy, protein, fat and carbohydrates) and critical vitamins and minerals (calcium, iron, zinc, vitamin A, vitamin C and B-vitamins) for children 6–59 months (excluding any nutrient intake from breastmilk), adolescent girls 10–14 years, and WRA 15–49 years (including pregnant and lactating women) at provincial, region (rural and urban) and national levels.
3. Household coverage of adequately fortified sugar and iodised salt at provincial, region (rural and urban) and national levels.
4. Individual coverage of the following nutrition interventions implemented at scale at provincial, region (rural and urban) and national levels:
   - Receipt of vitamin A supplementation for children 6–59 months of age based on a recall period of 6 months;
   - Receipt of postnatal vitamin A supplementation for women of WRA within eight weeks of delivery based on the recall during their most recent pregnancy in the last two years;
   - Receipt of deworming tablets for children 12–59 months of age in the previous six months;
   - Zinc supplementation for the treatment of diarrhea for children 6–59 months.
5. Prevalence of the following core Infant Young Child Feeding (IYCF) practices stratified at provincial, region (rural and urban) and national levels:
   - Minimum dietary diversity for children 6–23 months;
   - Minimum meal frequency for children 6–23 months; and
   - Minimum acceptable diet for children 6–23 months.
6. Dietary indicators for women at provincial, region (urban and rural) and national levels.
   - Minimum dietary diversity for WRA 15–49 years
   - Global diet quality score (GDQS)

Sampling within each province followed a two-stage random selection strategy. In the first stage, Enumeration Areas (EAs) were selected within rural and urban areas by Probability Proportional to Size (PPS) by province. Within each province, forty-four clusters were selected. In the second stage, 12 households per cluster were selected through linear systematic random sampling. In each selected household, all children 6–59 months of age and all adolescent girls ages 10–14 years were selected for inclusion. In households that included multiple women aged 15–49 years, a single woman 15–49 years was randomly selected for inclusion in the survey.

For the dietary component of the survey, data was collected using a diet questionnaire (topics included infant feeding and meals eaten at school) immediately followed by a multi-pass quantitative 24-hour dietary recall collected using pen and paper. A sub-sample of respondents completed a repeat quantitative 24-hour dietary recall interview two to three days later.

1 The text for this section was adapted from the survey report: National Food and Nutrition Commission (NFNC), Tropical Diseases Research Centre (TDRC), University of Zambia (UNZA), and National Institute of Industrial Research (NISIR), 2023, National Food Consumption and Micronutrient Status Survey, Lusaka, Zambia.

Information about household use of fortified and biofortified products were collected with a household social demographic questionnaire.

The quantitative 24-hour dietary recall interview data are presented separately for children (6–23 and 24–59 months), young adolescent girls (10–14 years), non-pregnant and non-lactating (NPNL) women 15–49 years of age, lactating women 15–49 years of age, and pregnant women 15–49 years of age.

Data for each demographic group are presented nationally and by residence (urban/rural) for all demographic groups except pregnant women. In addition, data for all women of reproductive age (WRA) 15–49 years are presented by province (n=10). The final sample size (with at least one completed 24-hour dietary recall) was 7,086.

Sample weights were applied to account for the survey design in the analyses.

Table 1. Sample size per target group

	National	Rural		Urban	
	n	n	%	n	%
Children (6–23 mo)	838	627	75%	211	25%
Children (24–59 mo)	1761	1340	76%	421	24%
Adolescent girls (10–14 y)	1433	1071	75%	362	25%
NPNL women (15–49 y)	2136	1430	67%	706	33%
Lactating women (15–49 y)	701	543	77%	158	23%
Pregnant women (15–49 y)	217				
Total	**7086**				

Table 2. Sample size for all women, including pregnant and lactating, per province

	n	%
Central	287	9%
Copperbelt	230	8%
Eastern	296	10%
Luapula	316	10%
Lusaka	308	10%
Muchinga	346	11%
Northern	322	11%
Northwestern	279	9%
Southern	355	12%
Western	315	10%
All women (15–49 y)	**3054**	

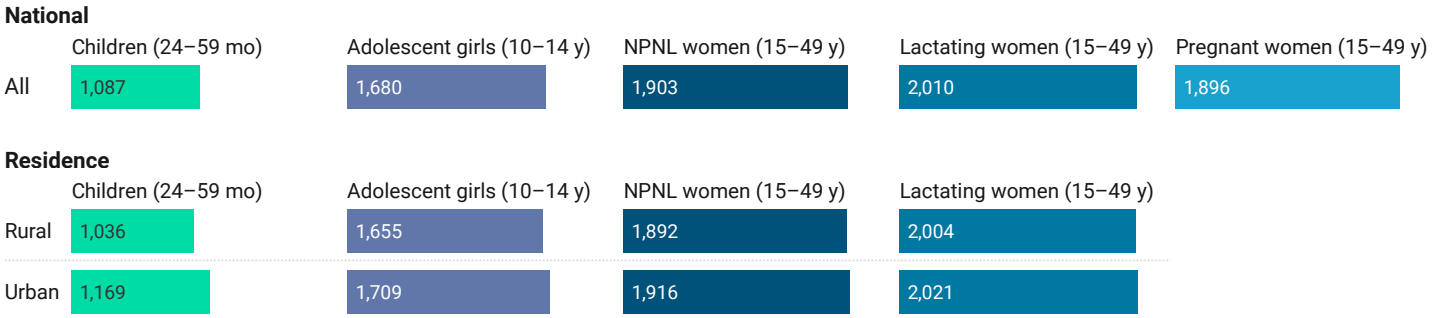
2 Energy and Nutrient Intakes for Children (24–59 mo), Adolescent Girls, and Women

Usual energy, macronutrient, and micronutrient intakes were derived from the quantitative 24-hour recall data collected for children aged 24–59 months, adolescent girls aged 10–14 years, and women 15–49 years (with results presented separately for NPNL women, lactating women, and pregnant women). Usual intakes for children aged 6–23 months are not presented because breastmilk intakes were not measured.

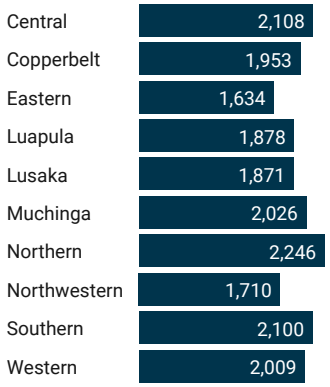
The National Cancer Institute (NCI) method was used to analyze usual nutrient or food intake. The NCI method implements statistical modeling using the information from those individuals with first and second recalls to estimate the within-person variation in food and nutrient intakes and estimates a distribution of intakes for the entire population or sub-population of interest that represents only the between-person variation. Nutrient intake adequacy was estimated with the NCI method in the same modeling procedures that produce the usual intake distributions. The Harmonized Average Requirements (H-AR) were used to assess the adequacy of micronutrient intakes (Allen, Carriquiry, and Murphy, 2020). Usual intakes are presented as medians, as the distributions of nutrient intakes tend to be skewed. The H-AR for nutrient intakes, representing the average daily requirements for a population, are shown for comparison as footnotes.

2.1 Energy Intake

Median daily energy intake (kcal/day)



Median daily energy intake for women (including pregnant and lactating), by province (kcal/day)



The WHO recommended ranges for energy requirements for women performing moderate activity are 2000–2300 kcal for NPNL women, 2285–2585 kcal for pregnant women, and 2550 to 2850 kcal for lactating women (FAO, 2001).

2.2 Macronutrient Intakes and Prevalence of Inadequacy

Median daily protein intake (g/day)

National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
All	32	48	55	57	55

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Urban	34	50	57	58
Rural	32	47	54	56

Median daily fat intake (g/day)

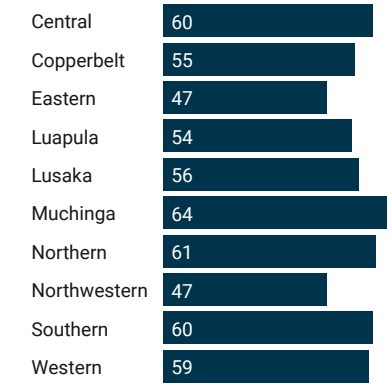
National

	Children 24–59 m	Adolescent girls 10–14 y	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
All	31	47	55	51	57

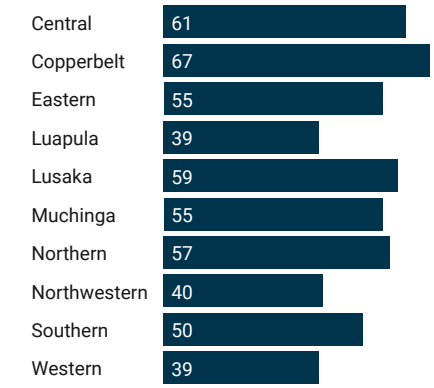
Residence

	Children 24–59 m	Adolescent girls 10–14 y	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	27	42	48	46
Urban	40	54	64	62

Median daily protein intake for women (including pregnant and lactating), by province (g/day)

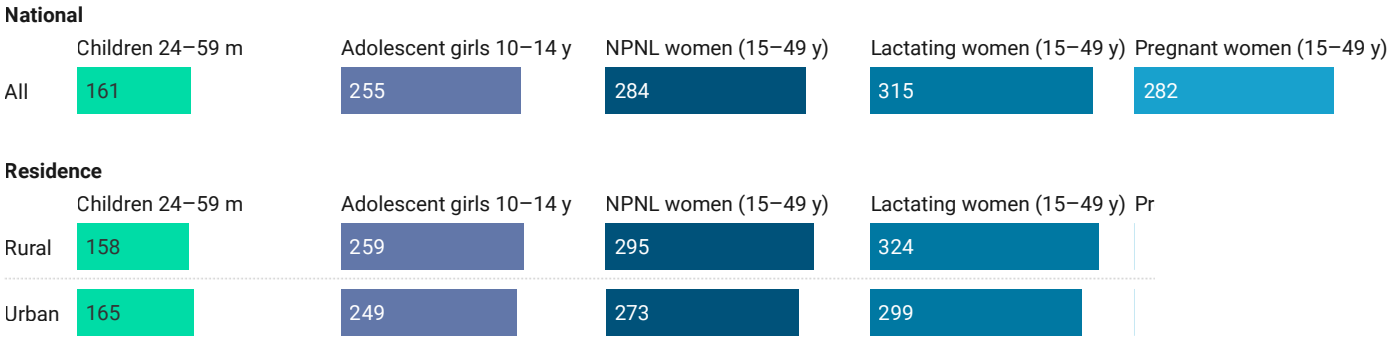


Median daily fat intake for women (including pregnant and lactating), by province (g/day)

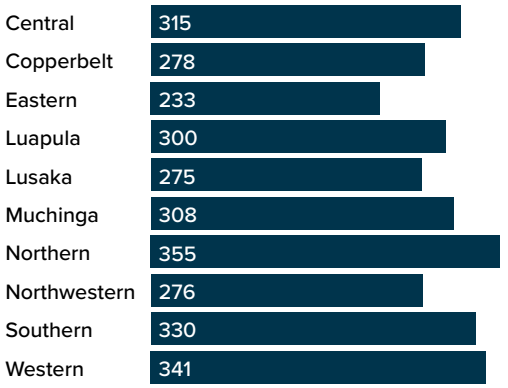


The EAR for protein is 9.6–11.7 g/day for children 24–59 months, 25.3–33.7 g/day for adolescent girls (10–14 y), 37.7–41.0 g/day for NPNL women, 50.2–53.5 g/day for lactating women, and 44.9–48.2 g/day for pregnant women.

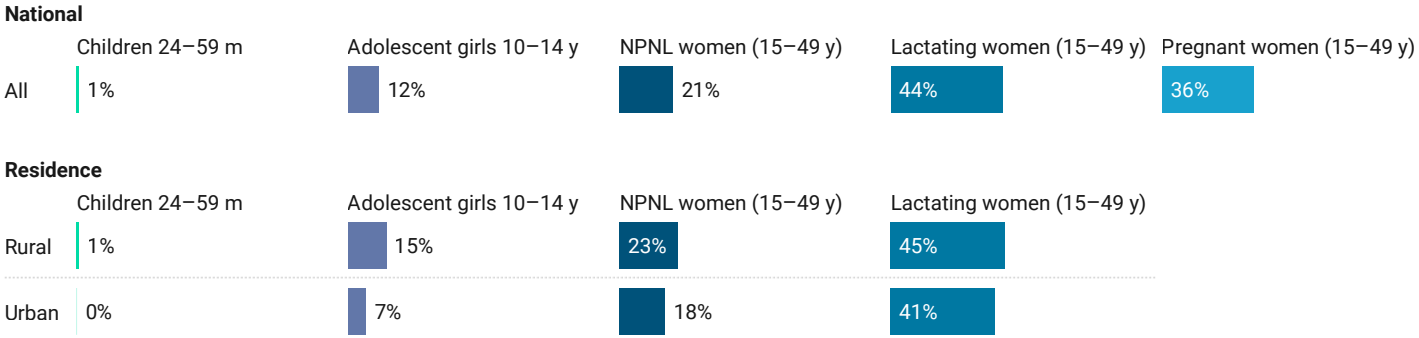
Median daily carbohydrates intake (g/day)



Median daily carbohydrates intake for women (including pregnant and lactating), by province (g/day)



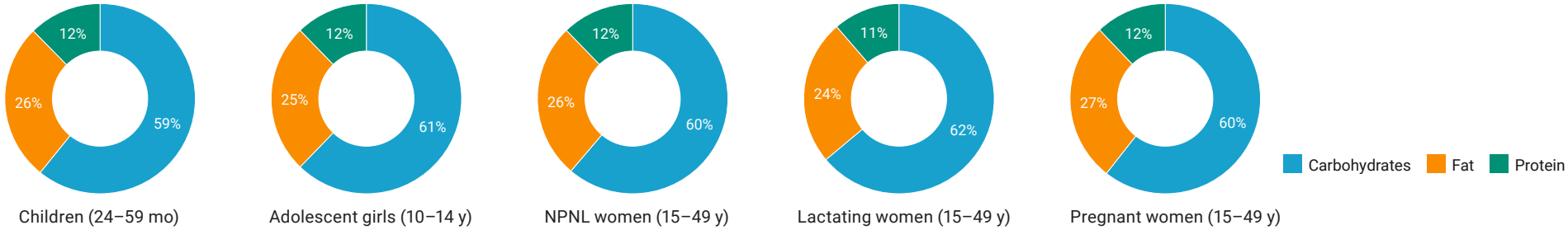
Prevalence of protein inadequacy (%<H-AR)



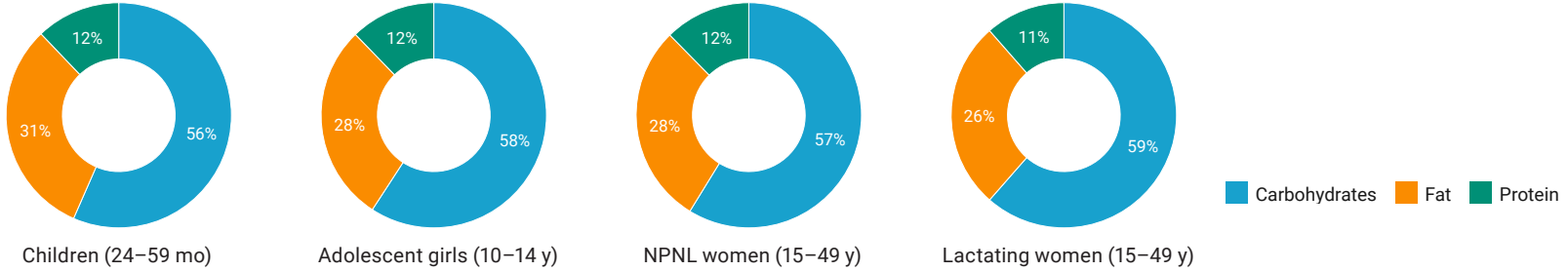
The EAR for protein is 9.6–11.7 g/day for children 24–59 months, 25.3–33.7 g/day for adolescent girls (10–14 y), 37.7–41.0 g/day for NPNL women, 50.2–53.5 g/day for lactating women, and 44.9–48.2 g/day for pregnant women.

2.3 Median Energy Contribution from Macronutrients

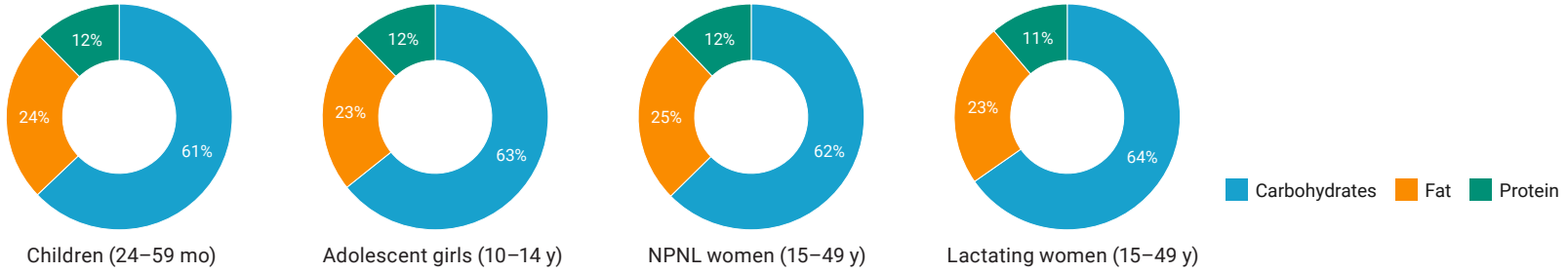
Median energy contribution from macronutrients (%)



Median energy contribution from macronutrients (%) – Urban

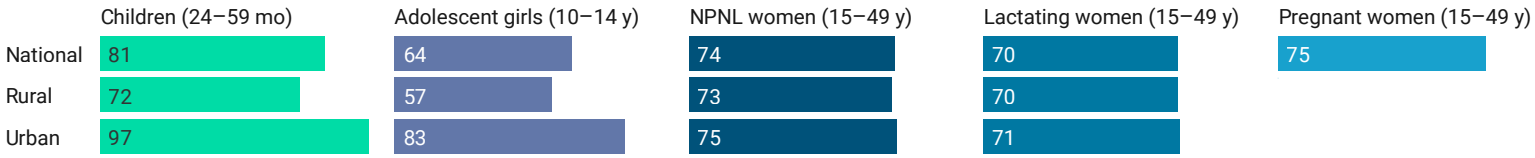


Median energy contribution from macronutrients (%) – Rural



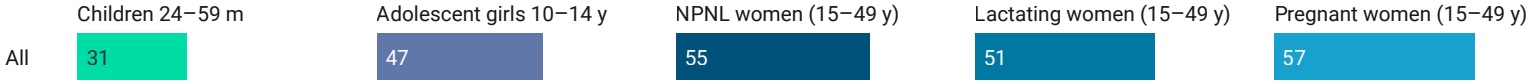
The reference range is 55–75% for carbohydrates, 15–30% for fat, and 10–15% for protein (WHO and FAO, 2003).

Percent of population with intakes within the reference range for protein (%)

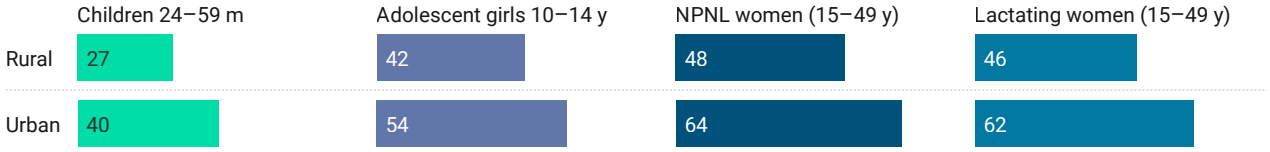


Percent of population with intakes within the reference range for fat (%)

National

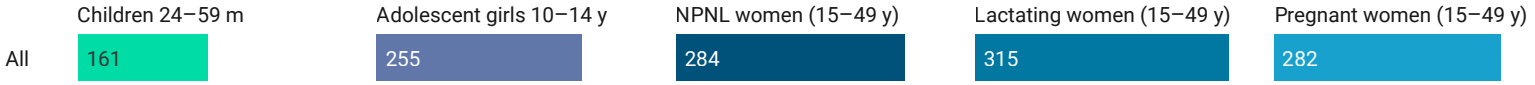


Residence

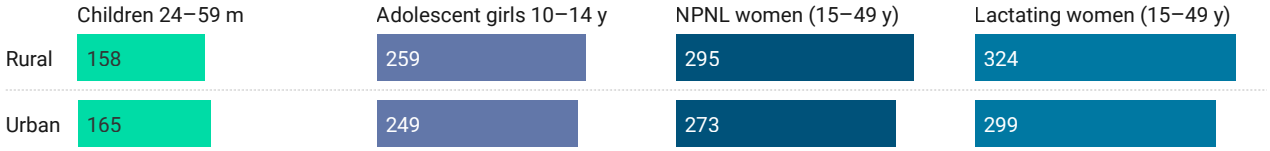


Percent of population with intakes within the reference range for carbohydrates (%)

National

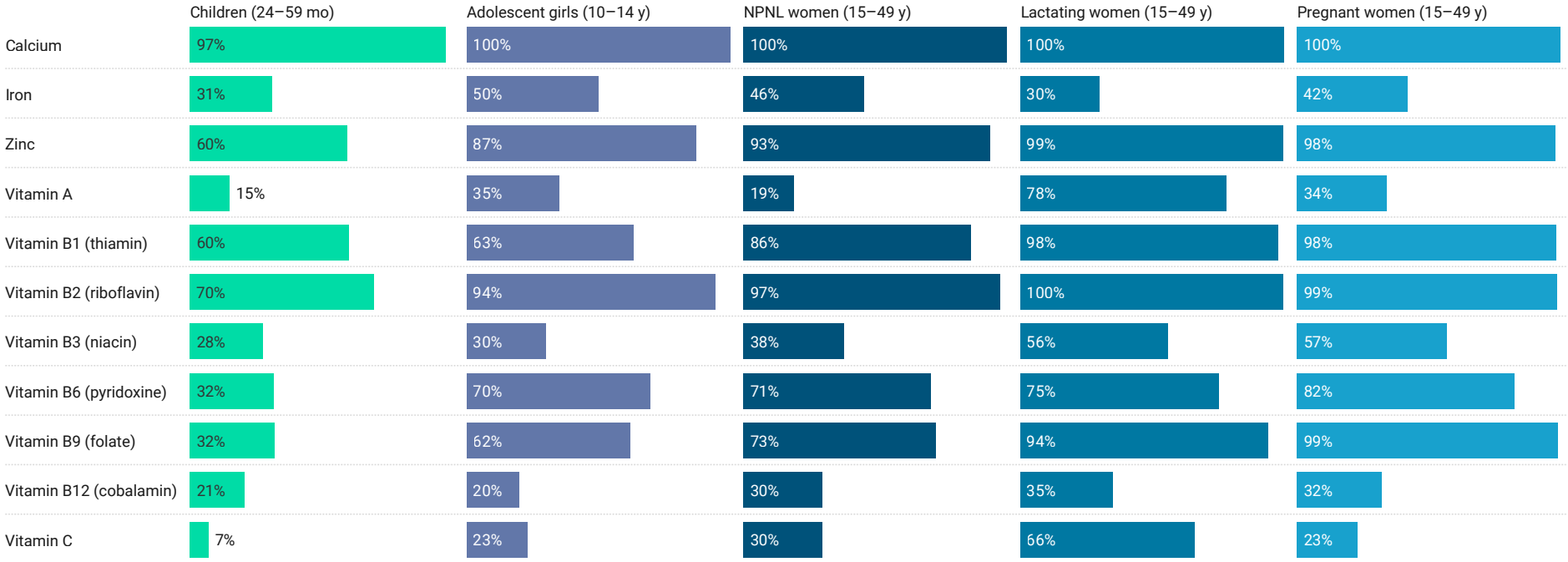


Residence

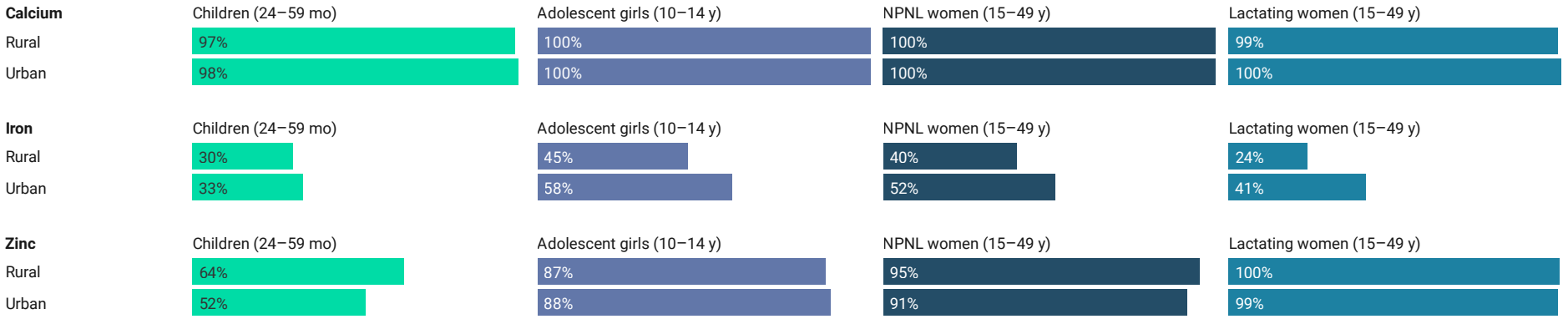


2.4 Micronutrient Intakes and Prevalence of Inadequacy

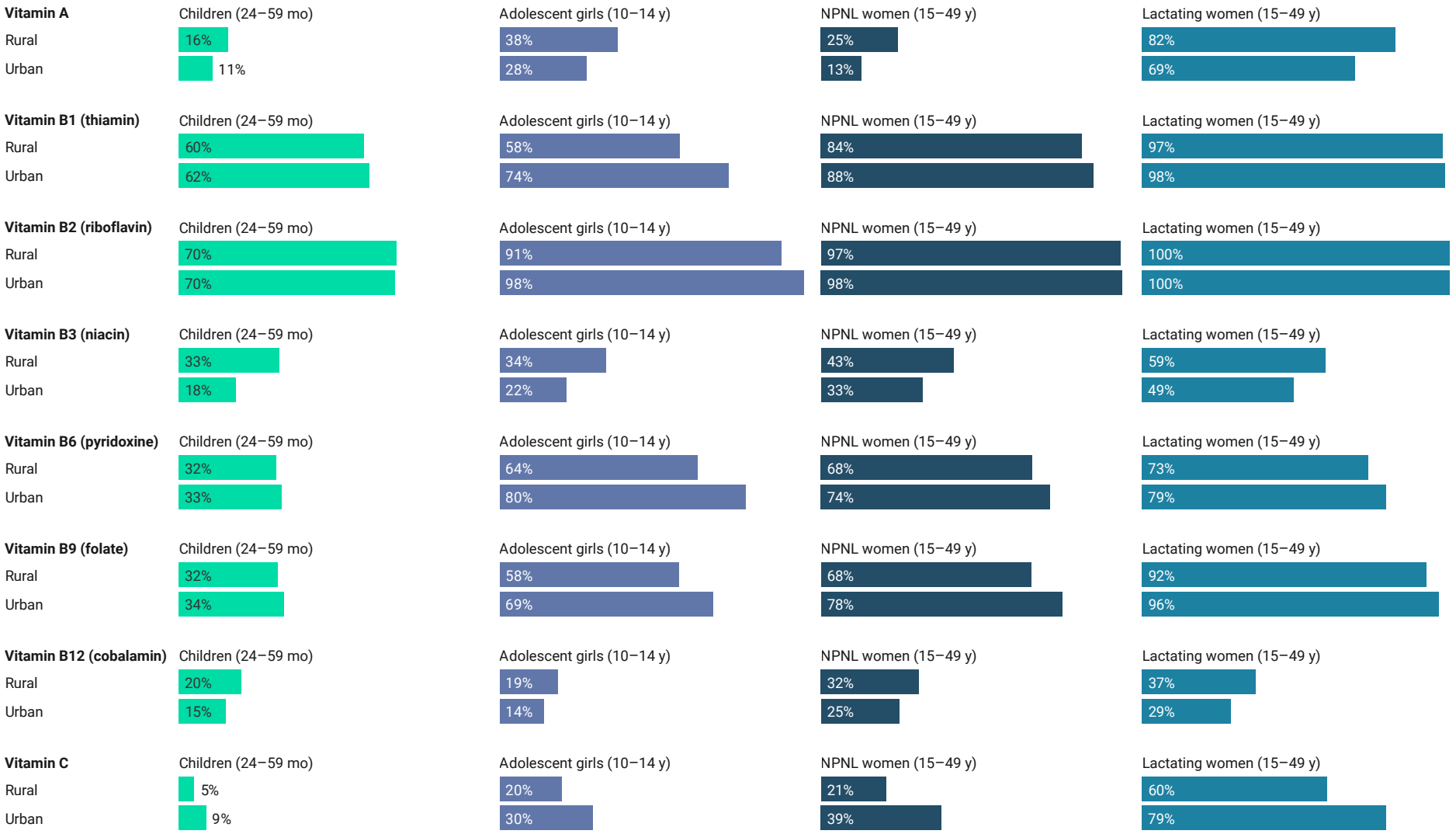
Prevalence of micronutrient inadequacy (%<H-AR)



Prevalence of micronutrient inadequacy (%<H-AR), by residence



CONTINUED — Prevalence of micronutrient inadequacy (%<H-AR), by residence



2.4.1 Calcium Intake and Prevalence of Inadequacy

Median daily calcium intake (mg/day)

National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	186	274	306	346	315

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	194	286	328	364
Urban	171	254	284	316

Prevalence of calcium inadequacy (%<H-AR)

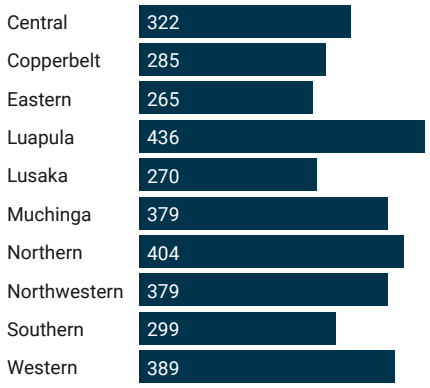
National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	97%	100%	100%	100%	100%

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	97%	100%	100%	99%
Urban	98%	100%	100%	100%

Median daily calcium intake for women (including pregnant and lactating), by province (mg/day)



The H-AR for calcium is 390–680 mg/day for children 24–59 months, 680–960 mg/day for adolescent girls (10–14 y), 750–960 mg/day for NPNL women, and 750–860 mg/day for lactating and pregnant women.

2.4.2 Iron Intake and Prevalence of Inadequacy

Median daily iron intake (mg/day)

National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	7.0	10.1	12.0	13.5	12.1

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	7.4	11.0	12.9	14.3
Urban	6.5	9.7	11.0	12.1

Prevalence of iron inadequacy (%<H-AR)

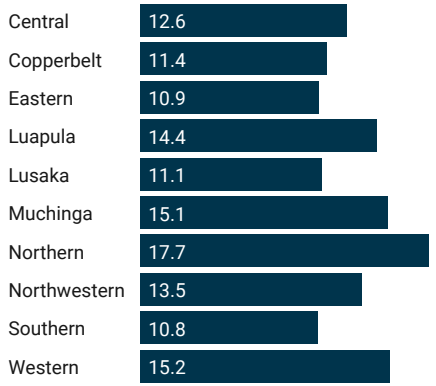
National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	31%	50%	46%	30%	42%

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	30%	45%	40%	24%
Urban	33%	58%	52%	41%

Median daily iron intake for women (including pregnant and lactating), by province (mg/day)



The H-AR for iron, assuming moderate absorption (10%), is 5.0 mg/day for children 24–59 months, 8–11.2 mg/day for adolescent girls (10–14 y), and 11.2 mg/day for women (including lactating and pregnant women).

2.4.3 Zinc Intake and Prevalence of Inadequacy

Median daily zinc intake (mg/day)

National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	3.6	5.4	6.2	6.2	6.0

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	3.4	5.2	5.9	6.0
Urban	3.9	5.7	6.5	6.6

Prevalence of zinc inadequacy (%<H-AR)

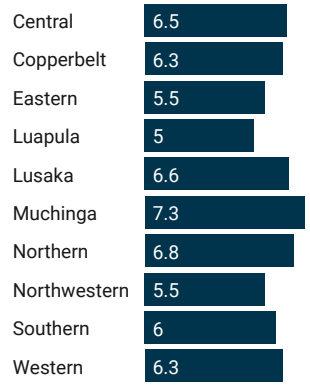
National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	60%	87%	93%	99%	98%

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	64%	87%	95%	100%
Urban	52%	88%	91%	99%

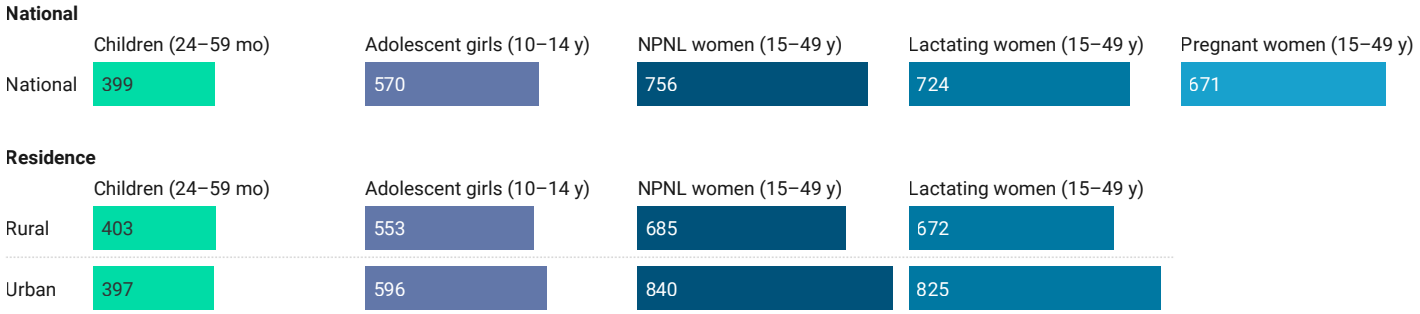
Median daily zinc intake for women (including pregnant and lactating), by province (mg/day)



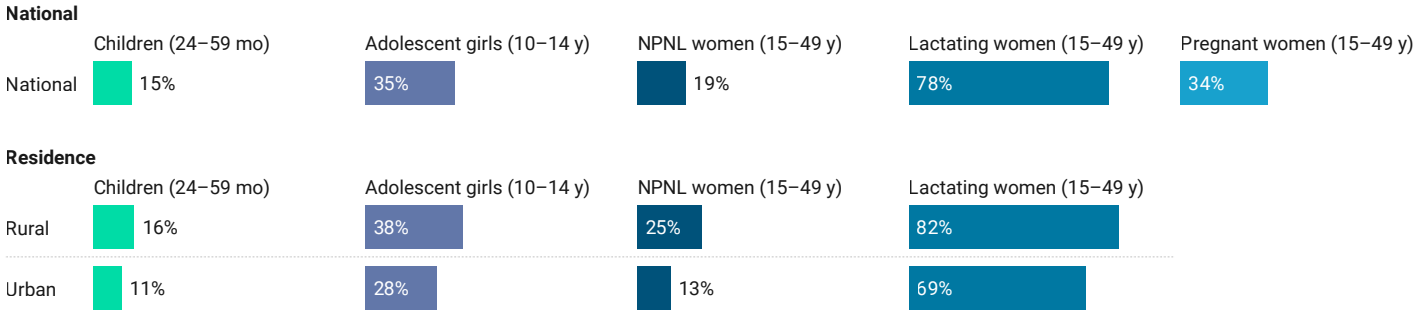
The H-AR for zinc, assuming an unrefined diet for women and a semi-unrefined diet for children and adolescents, is 3.6–4.6 mg/day for children 24–59 months, 6.2–8.9 mg/day for adolescent girls (10–14 y), 10.2 mg/day for NPNL women, 13.7 mg/day for lactating women, and 11.5 mg/day for pregnant women.

2.4.4 Vitamin A Intake and Prevalence of Inadequacy

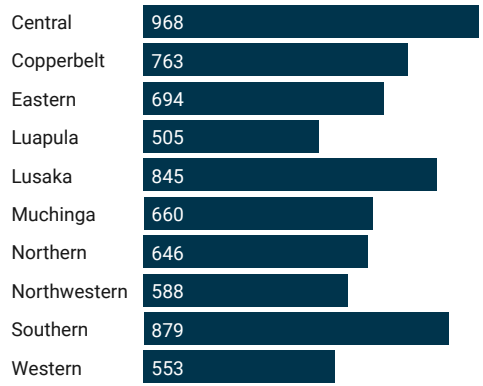
Median daily vitamin A intake (µg RAE/day)



Prevalence of vitamin A inadequacy (%<H-AR)



Median daily vitamin A intake for women (including pregnant and lactating), by province (µg RAE/day)



The H-AR for vitamin A is 205–245 µg RAE/day for children 24–59 months, 320–480 µg RAE /day for adolescent girls (10–14 y), 490 µg RAE/day for NPNL women, 1020 µg RAE /day for lactating women, and 540 µg RAE /day for pregnant women.

2.4.5 Vitamin B1 (Thiamine) Intake and Prevalence of Inadequacy

Median daily vitamin B1 (thiamine) intake (mg/day)

National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	0.4	0.6	0.7	0.7	0.7

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	0.4	0.6	0.7	0.7
Urban	0.4	0.6	0.6	0.7

Prevalence of vitamin B1 (thiamine) inadequacy (%<H-AR)

National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	60%	63%	86%	98%	98%

Residence

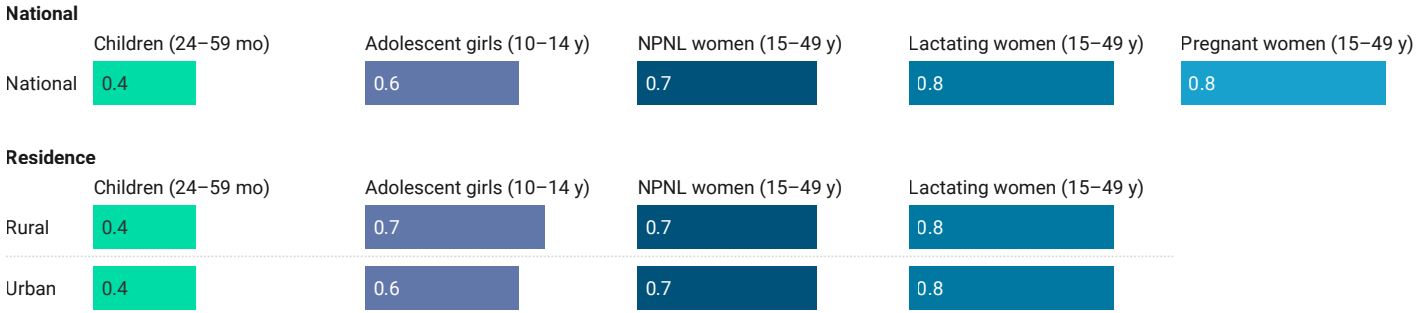
	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	60%	58%	84%	97%
Urban	62%	74%	88%	98%

Median daily vitamin B1 (thiamine) intake for women (including pregnant and lactating), by province (mg/day)

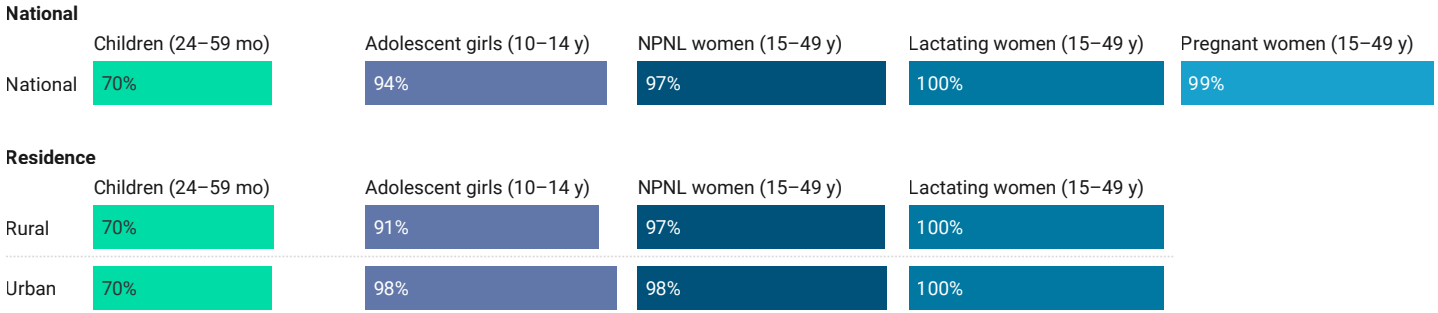
Central	0.7
Copperbelt	0.7
Eastern	0.7
Luapula	0.6
Lusaka	0.6
Muchinga	0.8
Northern	0.8
Northwestern	0.7
Southern	0.6
Western	0.7

2.4.6 Vitamin B2 (Riboflavin) Intake and Prevalence of Inadequacy

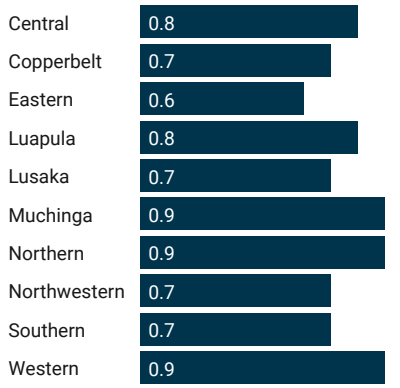
Median daily vitamin B2 (riboflavin) intake (mg/day)



Prevalence of vitamin B2 (riboflavin) inadequacy (%<H-AR)



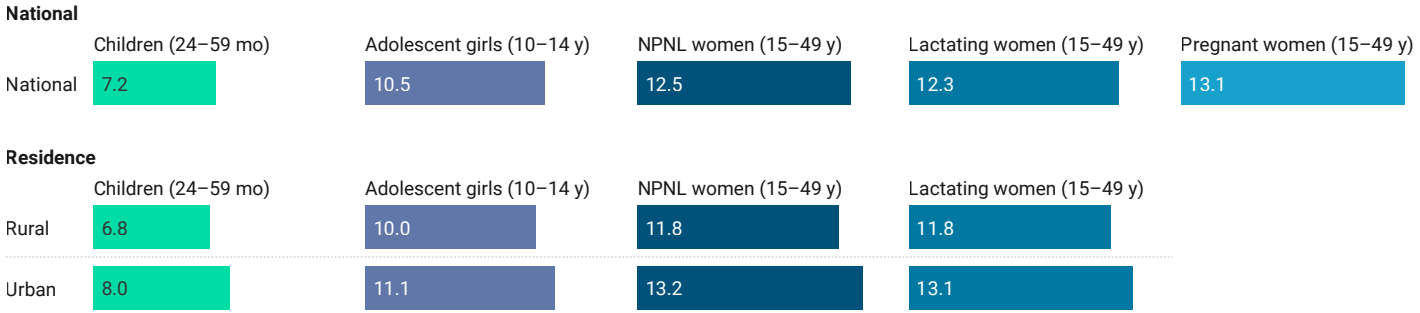
Median daily vitamin B2 (riboflavin) intake for women (including pregnant and lactating), by province (mg/day)



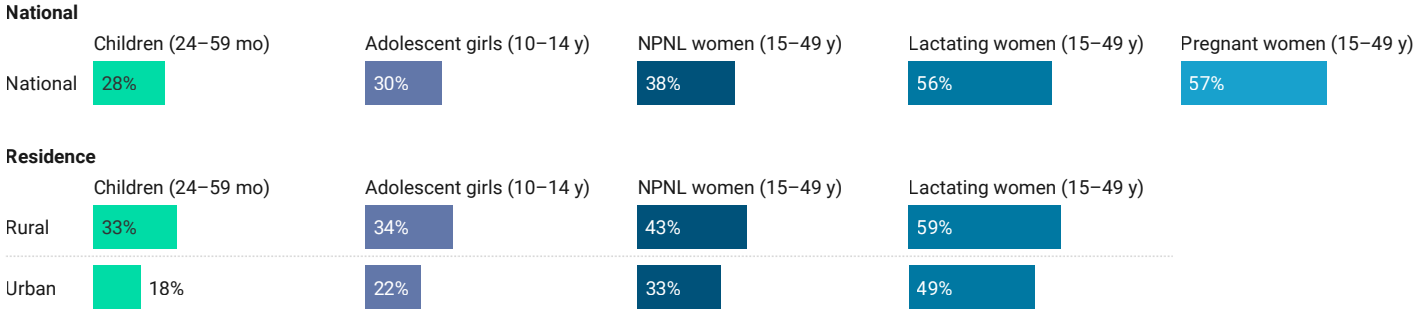
The H-AR for vitamin B2 (riboflavin) is 0.5–0.6 mg/day for children 24–59 months, 0.8–1.1 mg/day for adolescent girls (10–14 y), 1.3–1.4 mg/day for NPNL women, 1.7 mg/day for lactating women, and 1.5 mg/day for pregnant women.

2.4.7 Vitamin B3 (niacin) Intake and Prevalence of Inadequacy

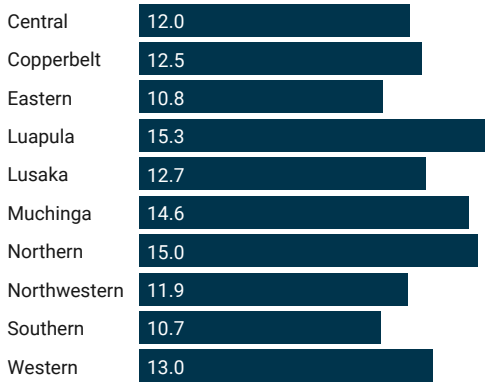
Median daily vitamin B3 (niacin) intake (mg/day)



Prevalence of vitamin B3 (niacin) inadequacy (%<H-AR)



Median daily vitamin B3 (niacin) intake for women (including pregnant and lactating), by province (mg/day)



The H-AR is 5–6 mg/day for children 24–59 months, 6–9 mg/day for adolescent girls (10–14 y), 11 mg/day for NPNL women, 13 mg/day for lactating women, and 14 mg/day for pregnant women.

2.4.8 Vitamin B6 (Pyridoxine) Intake and Prevalence of Inadequacy

Median daily vitamin B6 (pyridoxine) intake (mg/day)

National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	0.6	1.0	1.1	1.2	1.2

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	0.6	1.0	1.1	1.2
Urban	0.6	0.9	1.1	1.1

Prevalence of vitamin B6 (pyridoxine) inadequacy (%<H-AR)

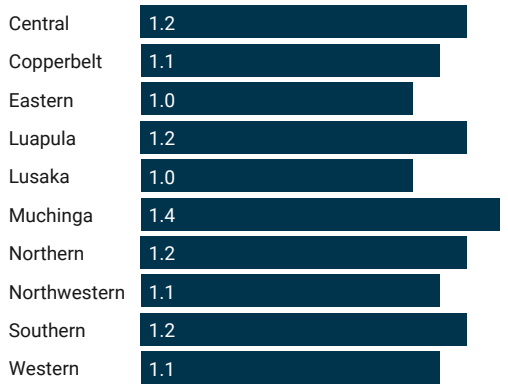
National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	32%	70%	71%	75%	82%

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	32%	64%	68%	73%
Urban	33%	80%	74%	79%

Median daily vitamin B6 (pyridoxine) intake for women (including pregnant and lactating), by province (mg/day)



The H-AR for vitamin B6 (pyridoxine) is 0.5–0.6 mg/day for children 24–59 months, 0.9–1.2 mg/day for adolescent girls (10–14 y), 1.3 mg/day for NPNL women, 1.4 mg/day for lactating women, and 1.5 mg/day for pregnant women.

2.4.9 Vitamin B9 (Folate) Intake and Prevalence of Inadequacy

Median daily vitamin B9 (folate) intake (µg DFE/day)

National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	121	175	200	222	218

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	123	179	211	231
Urban	116	169	188	206

Prevalence of vitamin B9 (folate) inadequacy (%<H-AR)

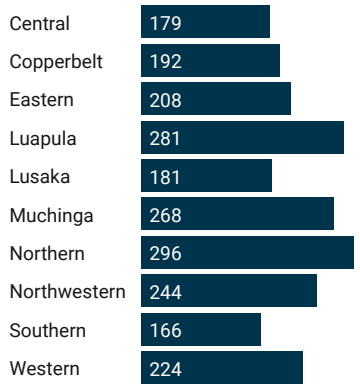
National

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
National	32%	62%	73%	94%	99%

Residence

	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)
Rural	32%	58%	68%	92%
Urban	34%	69%	78%	96%

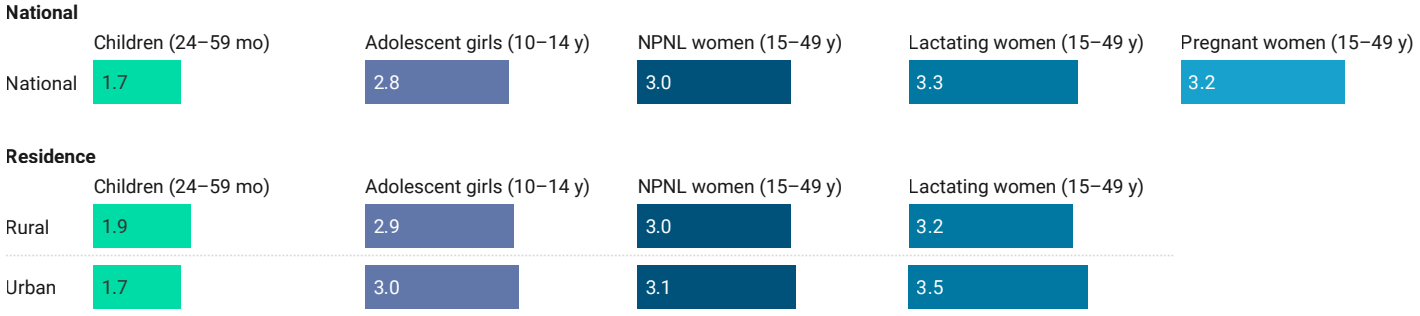
Median daily vitamin B9 (folate) intake for women (including pregnant and lactating), by province (µg DFE/day)



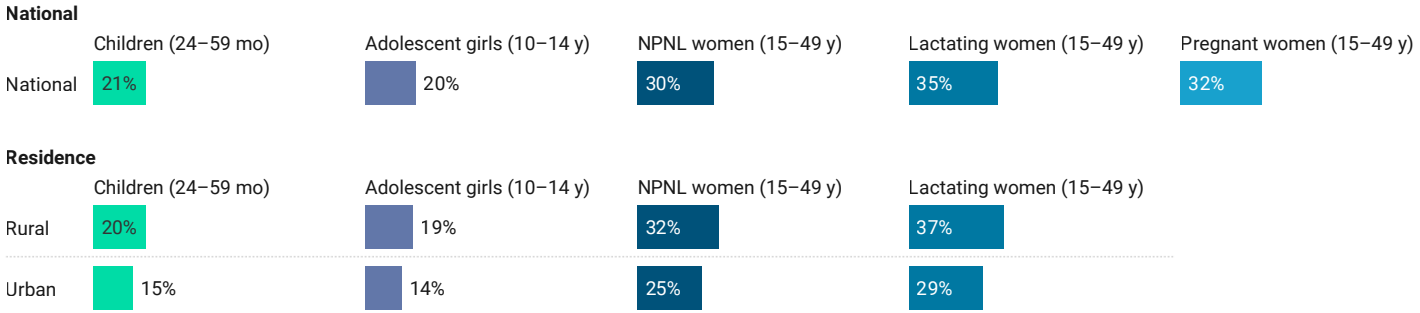
The H-AR for folate is 90–110 µg DFE/day for children 24–59 months, 160–210 µg DFE /day for adolescent girls (10–14 y), 250 µg DFE /day for NPNL women, 380 µg DFE /day for lactating women, and 520 µg DFE /day for pregnant women.

2.4.10 Vitamin B12 Intake and Prevalence of Inadequacy

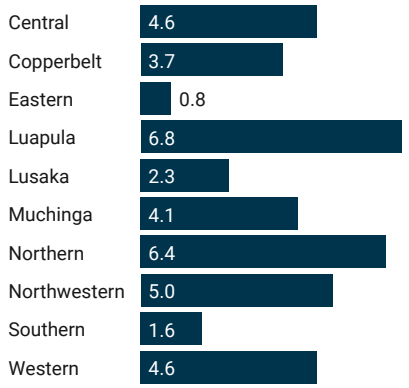
Median daily vitamin B12 intake (µg/day)



Prevalence of vitamin B12 inadequacy (%<H-AR)



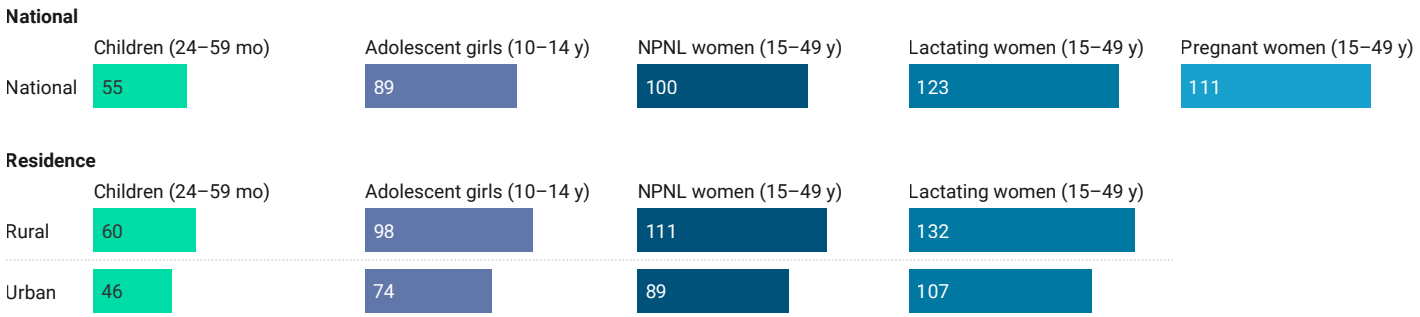
Median daily B12 intake for women (including pregnant and lactating), by province (mg/day)



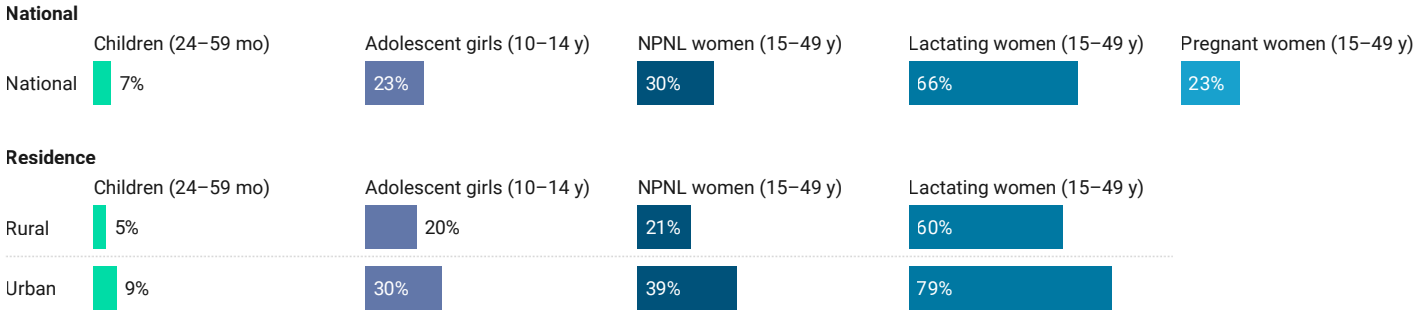
The H-AR for vitamin B12 is 0.7–1 µg/day for children 24–59 months, 1–1.5 µg /day for adolescent girls (10–14 y), 2.0 µg / day for NPNL women, 2.4 mg/day for lactating women, and 2.2 µg /day for pregnant women.

2.4.11 Vitamin C Intake and Prevalence of Inadequacy

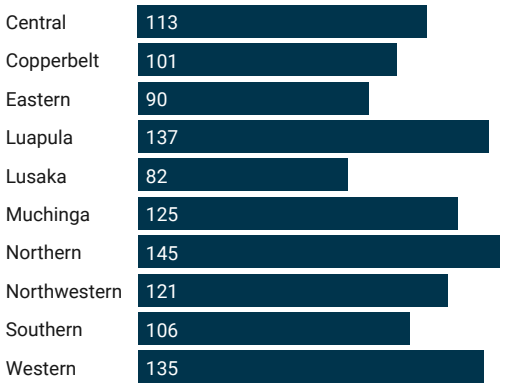
Median daily vitamin C intake (mg/day)



Prevalence of vitamin C inadequacy (%<H-AR)



Median daily vitamin C intake for women (including pregnant and lactating), by province (mg/day)

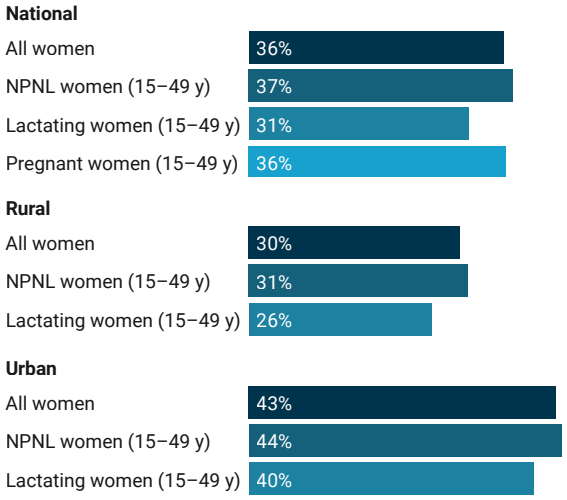


The H-AR for vitamin C is 15–25 mg/day for children 24–59 months, 40–60 mg/day for adolescent girls (10–14 y), 75–80 mg/day for NPNL women, 145 mg/day for lactating women, and 75–80 mg/day for pregnant women.

3 Diet Quality Metrics for Women

3.1 Minimum Dietary Diversity for Women (MDD-W)

The proportion of women who consumed at least 5 of 10 food groups during the previous day

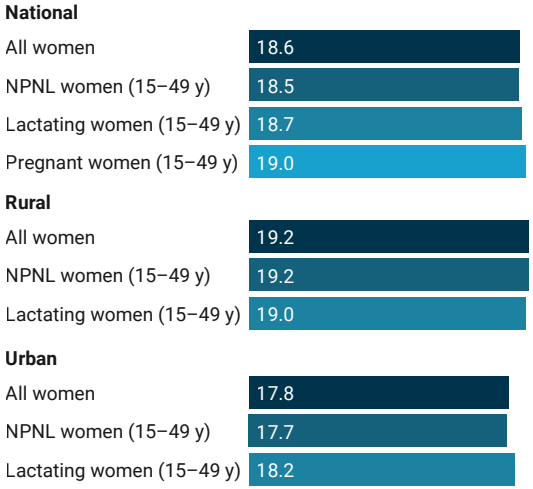


MDD-W assesses the proportion of women 15–49 years of age who have consumed at least five out of ten pre-defined food groups the previous day or night. It is a proxy indicator associated with higher micronutrient adequacy of the diet, through the measurement of diet diversity.

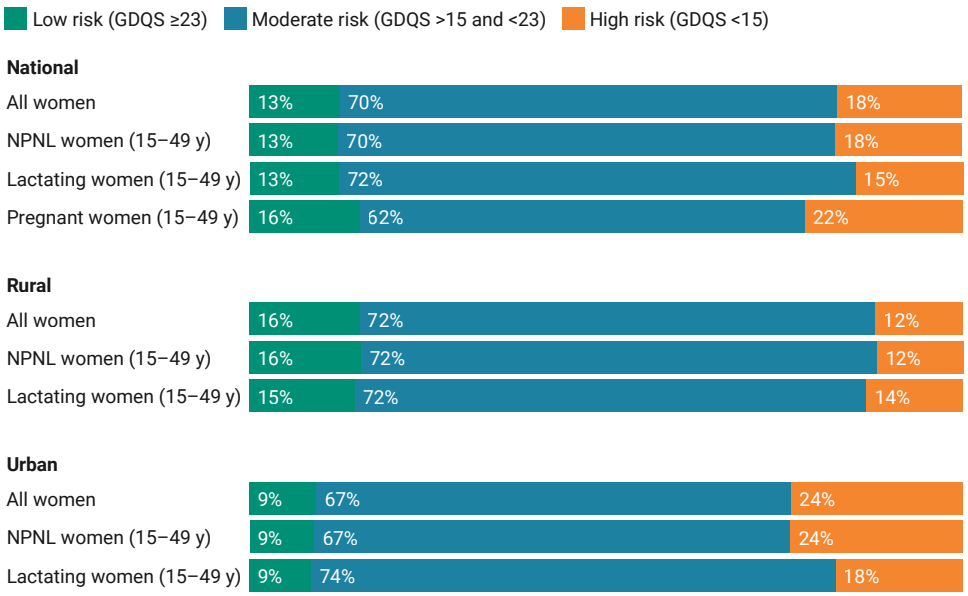
The Global Diet Quality Score (GDQS) ranges between 0 and 49. A higher GDQS, GDQS+, and GDQS- is desired and reflective of more healthy food consumption patterns. A high risk for poor diet quality outcomes is defined as a GDQS < 15, a moderate risk for poor diet quality outcomes as GDQS ≥15 and <23, and a low risk for poor diet quality outcomes as GDQS ≥ 23.

3.2 Global Diet Quality Score (GDQS)

Mean GDQS



Risk of poor diet outcomes



4 Diets of Infants and Young Children (6–23 mo)

4.1 Selected WHO/UNICEF Indicators

Definition of Indicators:

Minimum dietary diversity: percentage of children 6–23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day.

Minimum meal frequency: percentage of children 6–23 months of age who consumed solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children) at least the minimum number of times during the previous day.

Minimum acceptable diet: percentage of children 6–23 months of age who consumed a minimum acceptable diet during the previous day.

The minimum acceptable diet is defined as:

- for breastfed children: receiving at least the minimum dietary diversity and minimum meal frequency for their age during the previous day;
- for non-breastfed children: receiving at least the minimum dietary diversity and minimum meal frequency for their age during the previous day as well as at least two milk feeds.

Egg and/or flesh food consumption: percentage of children 6–23 months of age who consumed egg and/or flesh food during the previous day

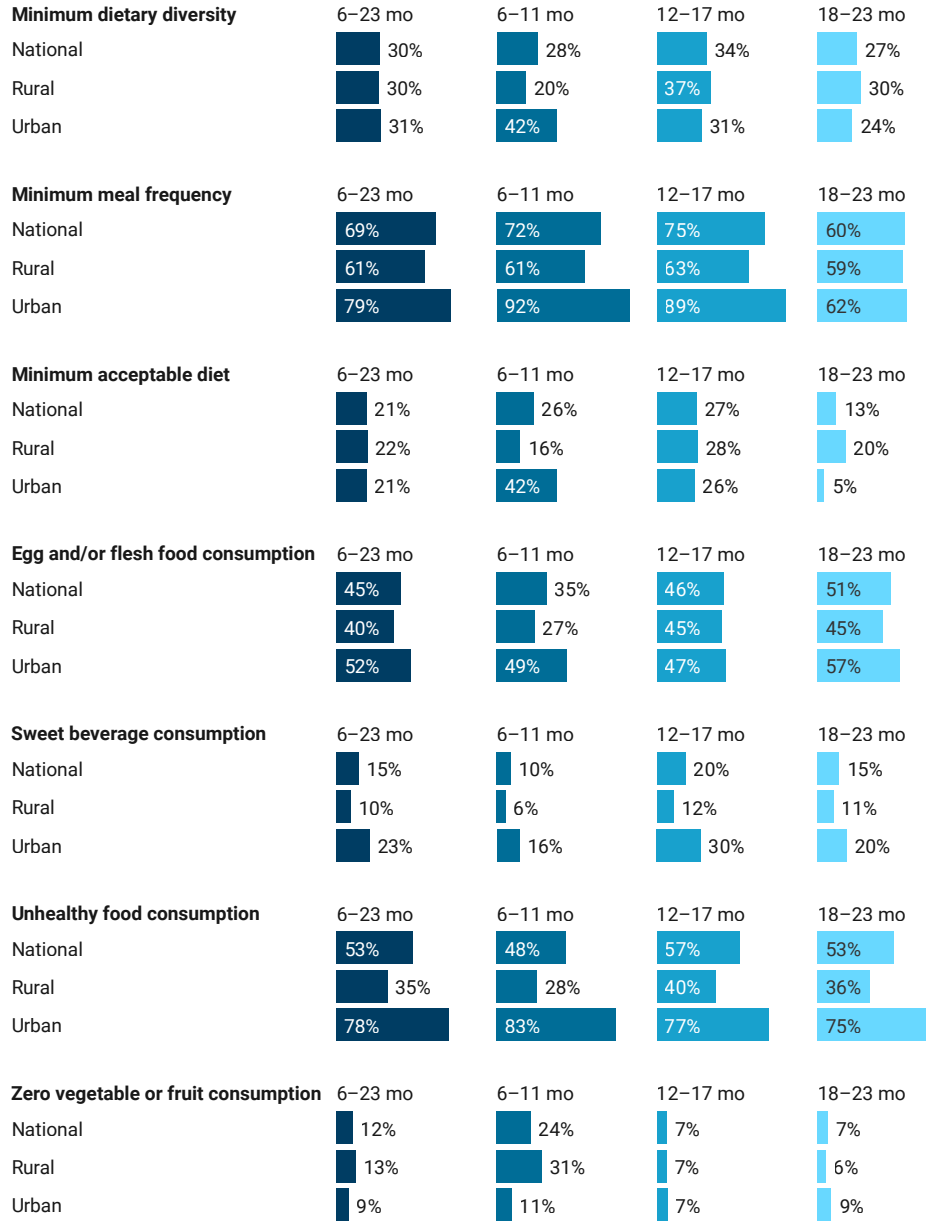
Sweet beverage consumption: percentage of children 6–23 months of age who consumed a sweet beverage during the previous day

Unhealthy food consumption: percentage of children 6–23 months of age who consumed selected sentinel unhealthy foods during the previous day

Zero vegetable or fruit consumption: percentage of children 6–23 months of age who did not consume any vegetables or fruits during the previous day.

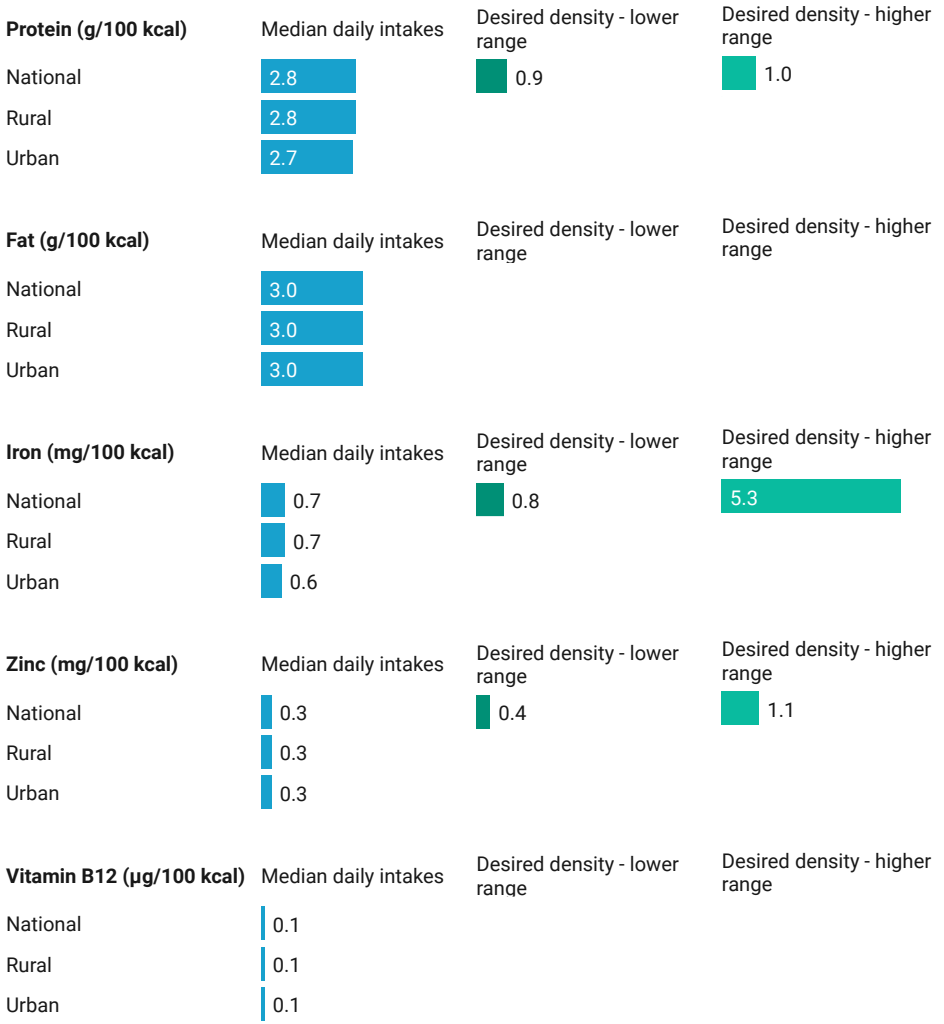
Definitions taken from: World Health Organization and the United Nations Children's Fund (UNICEF), *Indicators for assessing infant and young child feeding practices: Definitions and measurement methods*. Geneva: 2021.

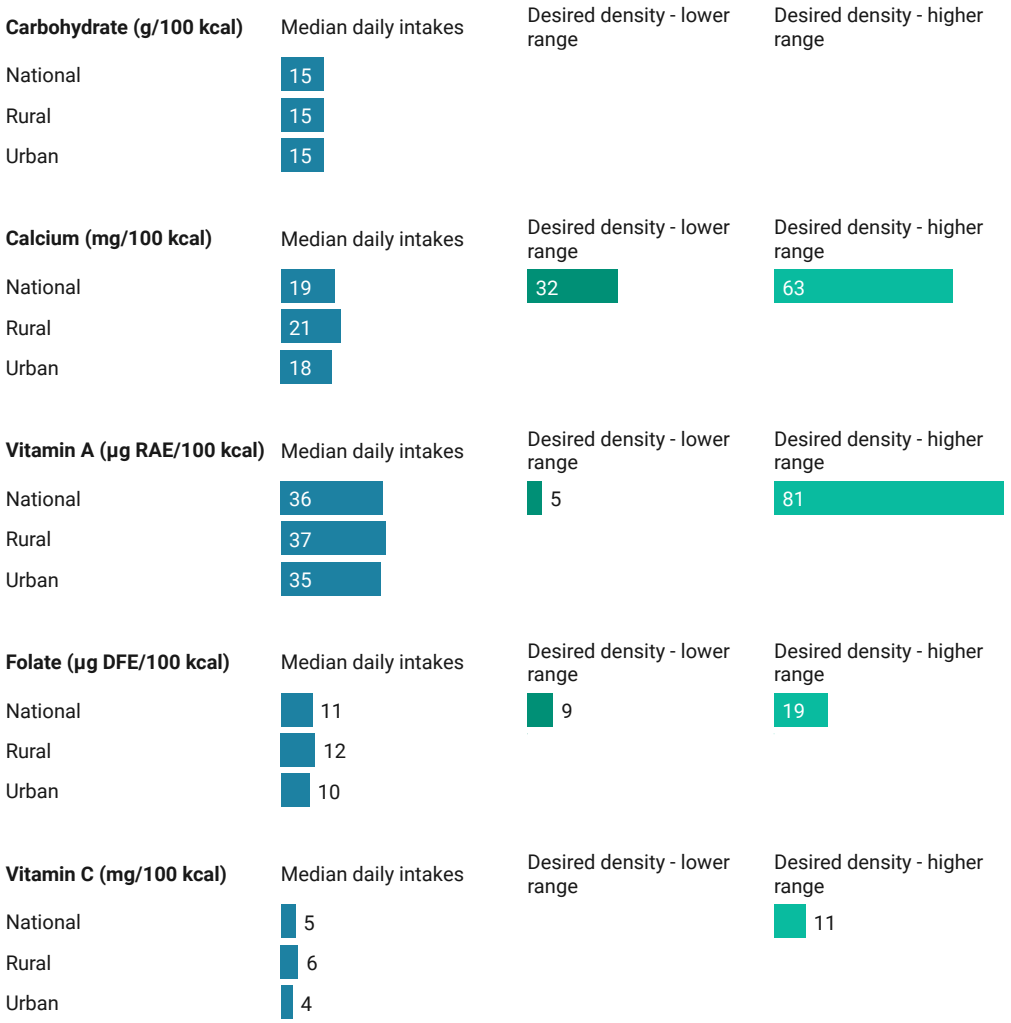
Percentage of children achieving



4.2 Nutrient Density of the Complementary Diet

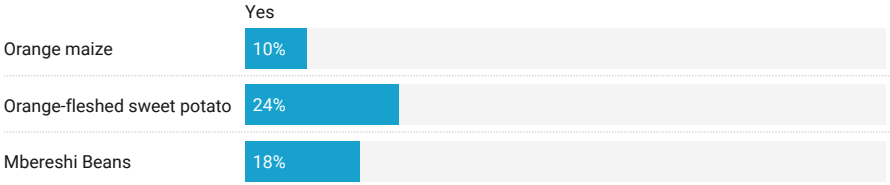
Nutrient density of the complementary diet of children 6–23 mo



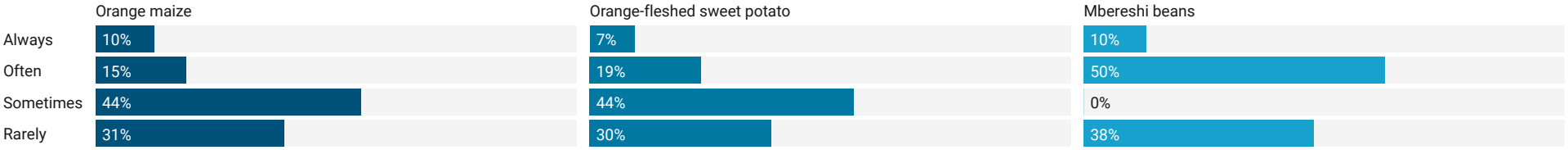


5 Biofortification Coverage

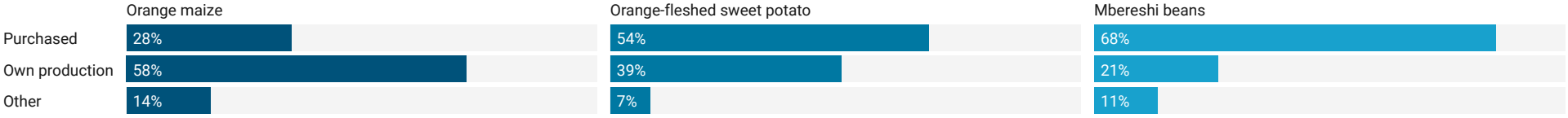
Percentage of households that consumed the biofortified food (%)



Frequency of consumption (among consumers)

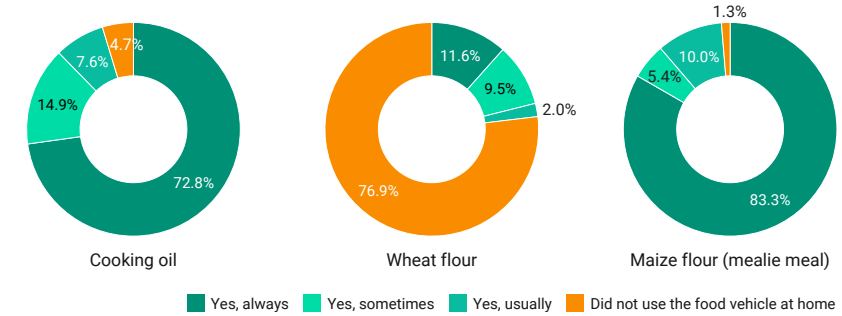


Source (among consumers)

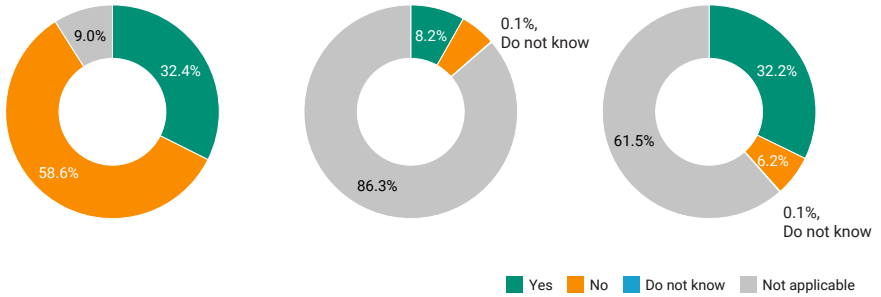


6 Fortification Coverage

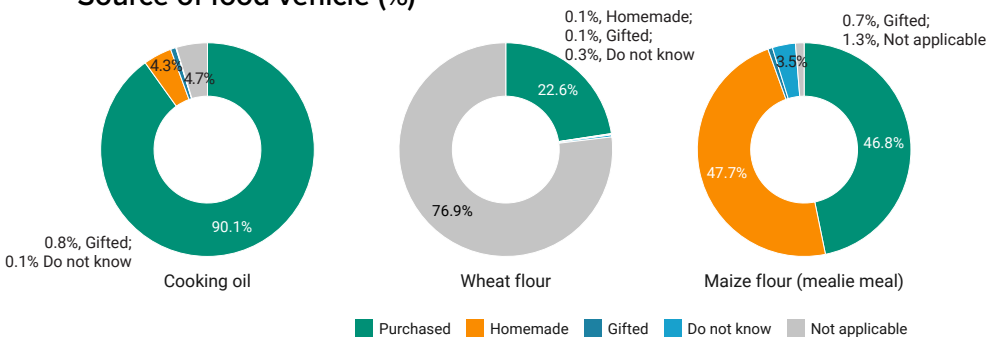
Percentage of households who used the food vehicle at home (%)



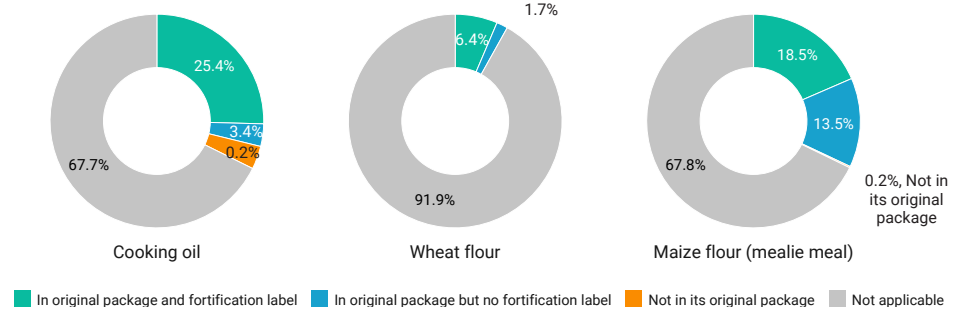
Original package available (%)



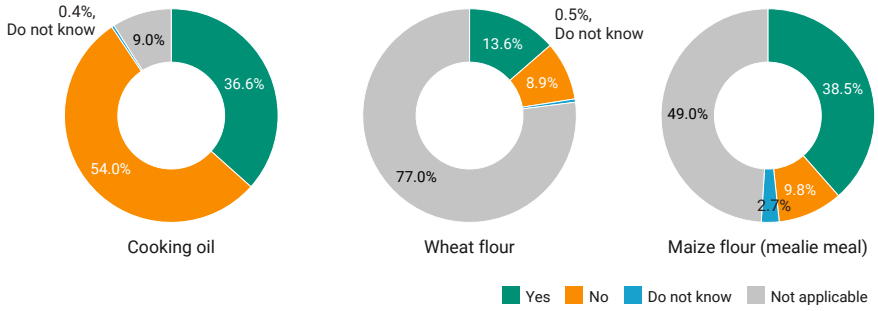
Source of food vehicle (%)



Package has fortification label (%)



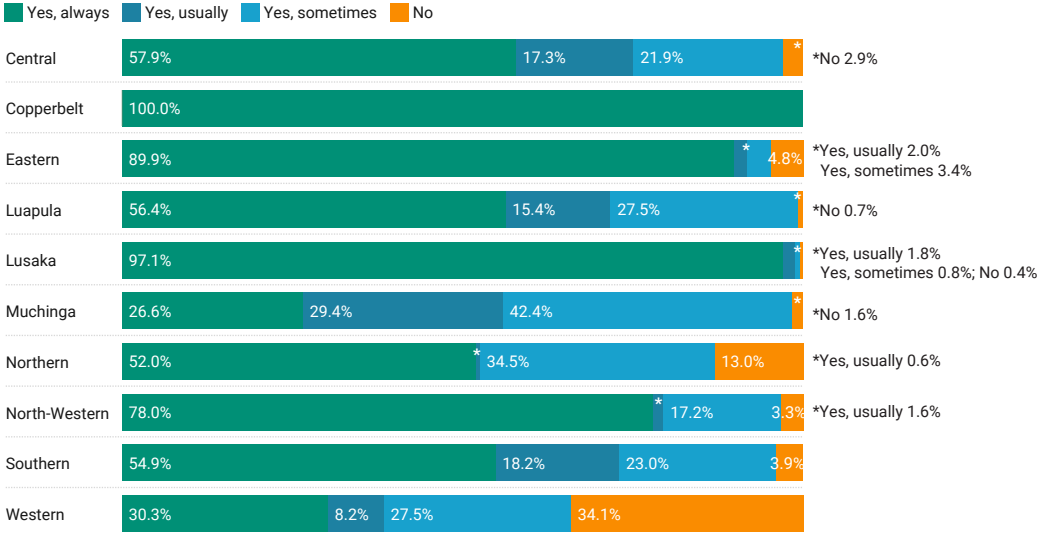
In original package (%)



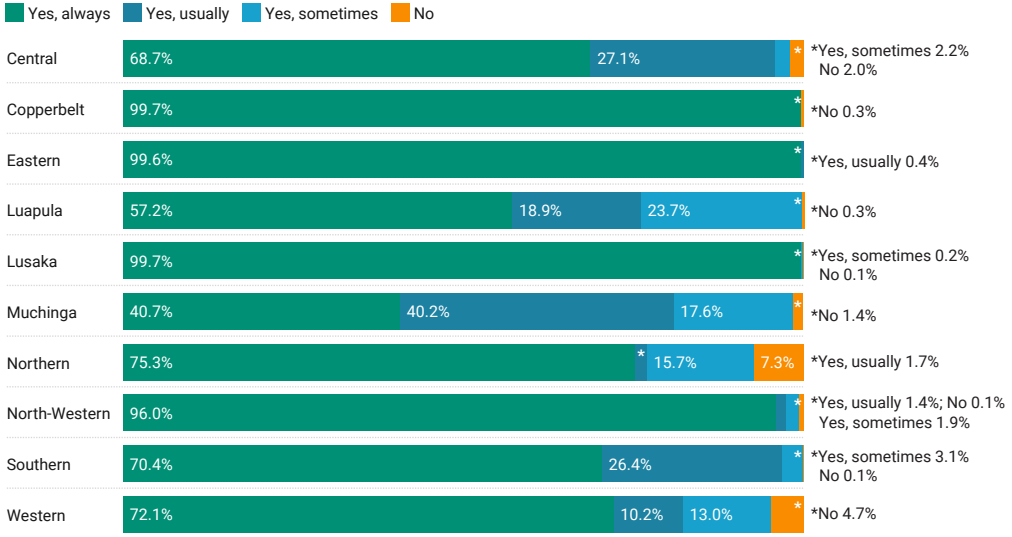
Percentage of households (%)

	Cooking oil	Wheat flour	Maize flour (mealie meal)
Used food vehicle	95%	23%	99%
Food vehicle was purchased (fortifiable)	90%	23%	47%
Food vehicle was in original package	37%	14%	39%
Food vehicle package was in the house	32%	8%	32%
Food vehicle had a fortification label (fortified)	25%	6%	19%

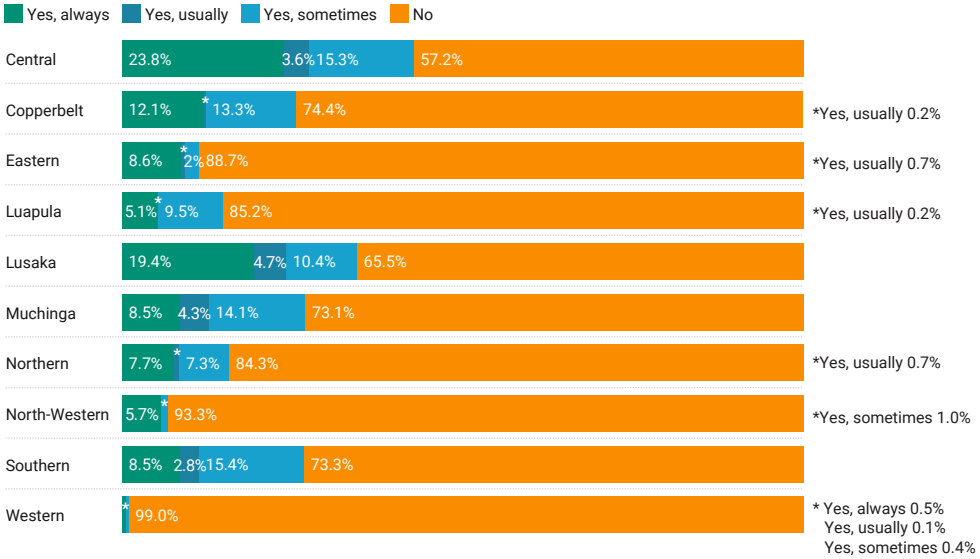
Percentage of households who used cooking oil (%)



Percentage of households who used maize flour (%)



Percentage of households who used wheat flour (%)



7 Main Food Group Sources of Energy and Nutrients

7.1 Mean Contribution to Energy and Nutrients by Food Group

Mean energy contribution from top 10 food groups (% energy)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Whole grains	26%	27%	31%	24%	31%	26%
Refined grains and baked goods	22%	19%	19%	22%	17%	19%
Liquid oils	11%	12%	11%	13%	11%	12%
White roots and tubers	7%	9%	8%	7%	11%	8%
Nuts and seeds	6%	5%	5%	5%	4%	6%
Sweets and ice cream	6%	5%	4%	5%	3%	5%
Fish and shellfish	3%	4%	4%	4%	4%	4%
Other vegetables	2%	3%	3%	3%	3%	4%
Legumes	3%	3%	3%	2%	3%	2%
Cruciferous vegetables	2%	2%	2%	2%	2%	2%

Mean protein contribution from top 10 food groups (% protein)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Whole grains	23%	21%	24%	19%	25%	19%
Refined grains and baked goods	18%	15%	14%	18%	14%	15%
Fish and shellfish	9%	14%	14%	13%	15%	14%
Nuts and seeds	9%	8%	7%	7%	6%	8%
Legumes	6%	7%	7%	6%	7%	7%
Cruciferous vegetables	5%	6%	6%	6%	7%	6%
Other vegetables	4%	4%	4%	4%	5%	4%
Poultry and game meat	3%	4%	4%	5%	3%	6%
Red meat	2%	4%	4%	5%	4%	3%
White roots and tubers	3%	3%	4%	3%	4%	3%

Mean fat contribution from top 10 food groups (% fat)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Liquid oils	35%	39%	40%	44%	40%	42%
Nuts and seeds	15%	13%	11%	12%	12%	14%
Whole grains	12%	10%	11%	8%	12%	8%
Fish and shellfish	4%	7%	7%	6%	8%	6%
Refined grains and baked goods	9%	7%	6%	6%	5%	4%
White roots and tubers	2%	3%	3%	3%	3%	2%
Red meat	1%	2%	3%	3%	3%	2%
Poultry and game meat	2%	3%	2%	3%	2%	3%
Eggs	3%	2%	1%	2%	2%	4%
Other fruits	2%	2%	2%	2%	2%	3%

Mean calcium contribution from top 10 food groups (% calcium)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Cruciferous vegetables	23%	31%	33%	33%	36%	28%
Fish and shellfish	5%	9%	9%	8%	9%	9%
Other vegetables	8%	8%	8%	8%	7%	9%
Dark green leafy vegetables	6%	7%	8%	6%	11%	9%
White roots and tubers	7%	8%	9%	7%	10%	7%
Legumes	7%	7%	7%	7%	6%	7%
Refined grains and baked goods	8%	7%	6%	8%	4%	6%
Nuts and seeds	9%	5%	4%	5%	4%	5%
High-fat dairy (in milk equivalents)	5%	4%	3%	3%	3%	3%
Whole grains	6%	2%	3%	2%	3%	2%

Mean carbohydrates contribution from top 10 food groups (% carbohydrates)

Whole grains	33%	36%	39%	32%	40%	35%
Refined grains and baked goods	29%	26%	26%	32%	24%	28%
White roots and tubers	9%	12%	11%	9%	14%	11%
Sweets and ice cream	9%	7%	6%	8%	5%	8%
Other vegetables	3%	4%	4%	4%	4%	4%
Cruciferous vegetables	2%	3%	3%	3%	3%	3%
Legumes	3%	3%	3%	3%	3%	2%
Other fruits	3%	2%	2%	2%	1%	3%
Sugar-sweetened beverages	3%	2%	1%	2%	2%	2%
Nuts and seeds	1%	1%	1%	1%	1%	1%

Mean iron contribution from top 10 food groups (% iron)

Whole grains	17%	16%	18%	14%	18%	15%
Refined grains and baked goods	17%	15%	14%	18%	13%	15%
Cruciferous vegetables	9%	12%	12%	12%	13%	11%
White roots and tubers	7%	8%	8%	7%	10%	8%
Legumes	8%	8%	8%	8%	8%	8%
Other vegetables	7%	7%	7%	8%	8%	8%
Nuts and seeds	8%	6%	5%	5%	5%	6%
Fish and shellfish	4%	6%	6%	6%	6%	6%
Dark green leafy vegetables	4%	5%	5%	4%	7%	6%
Sugar-sweetened beverages	5%	4%	2%	3%	2%	2%

Mean zinc contribution from top 10 food groups (% zinc)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Whole grains	21%	20%	23%	19%	24%	19%
Refined grains and baked goods	19%	16%	15%	19%	15%	17%
Nuts and seeds	10%	9%	7%	8%	7%	9%
Other vegetables	6%	7%	7%	7%	8%	8%
Fish and shellfish	5%	7%	7%	6%	7%	7%
Legumes	6%	6%	7%	6%	7%	6%
White roots and tubers	5%	6%	6%	6%	8%	6%
Cruciferous vegetables	5%	6%	6%	6%	7%	6%
Red meat	2%	5%	6%	6%	5%	3%
Poultry and game meat	2%	3%	3%	4%	2%	4%

Mean vitamin A contribution from top 10 food groups (% vitamin A)

Cruciferous vegetables	33%	45%	50%	47%	50%	41%
Sweets and ice cream	28%	20%	17%	23%	16%	21%
Other vegetables	11%	9%	8%	8%	7%	9%
Dark green leafy vegetables	6%	7%	9%	6%	12%	9%
Fish and shellfish	2%	4%	4%	3%	5%	3%
Eggs	4%	2%	2%	2%	2%	5%
White roots and tubers	1%	2%	3%	2%	2%	2%
Deep orange vegetables	1%	1%	1%	2%	1%	2%
High-fat dairy (in milk equivalents)	3%	1%	1%	1%	1%	1%
Deep orange fruits	1%	1%	1%	1%	1%	2%

Mean vitamin B1 (thiamin) contribution from top 10 food groups (% vitamin B1)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Whole grains	16%	14%	17%	13%	17%	14%
Refined grains and baked goods	16%	14%	13%	17%	12%	14%
Cruciferous vegetables	9%	11%	12%	11%	13%	10%
Other vegetables	10%	11%	11%	11%	11%	11%
Nuts and seeds	12%	10%	8%	9%	8%	10%
White roots and tubers	7%	9%	9%	8%	11%	8%
Legumes	5%	6%	6%	5%	6%	6%
Fish and shellfish	4%	5%	6%	5%	6%	5%
Dark green leafy vegetables	4%	4%	4%	3%	6%	5%
Other fruits	3%	2%	2%	2%	2%	3%

Mean vitamin B2 (riboflavin) contribution from top 10 food groups (% vitamin B2)

Cruciferous vegetables	11%	14%	14%	14%	16%	13%
Whole grains	15%	12%	14%	11%	14%	12%
Refined grains and baked goods	14%	11%	10%	12%	8%	9%
Dark green leafy vegetables	8%	8%	10%	8%	12%	11%
Fish and shellfish	6%	9%	10%	9%	10%	9%
Other vegetables	7%	8%	8%	8%	8%	9%
White roots and tubers	5%	6%	6%	6%	7%	5%
Eggs	6%	5%	3%	4%	4%	8%
Legumes	4%	4%	4%	4%	4%	4%
Nuts and seeds	4%	3%	3%	3%	3%	3%

Mean vitamin B3 (niacin) contribution from top 10 food groups (% B3)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Refined grains and baked goods	15%	14%	14%	16%	12%	14%
Fish and shellfish	9%	13%	14%	13%	14%	14%
Nuts and seeds	15%	13%	11%	12%	11%	13%
Whole grains	13%	11%	13%	10%	13%	10%
Other vegetables	7%	8%	8%	9%	9%	8%
Cruciferous vegetables	7%	8%	8%	8%	9%	7%
White roots and tubers	6%	7%	7%	6%	9%	7%
Poultry and game meat	3%	5%	4%	6%	3%	6%
Dark green leafy vegetables	3%	4%	4%	3%	5%	3%
Red meat	1%	3%	4%	4%	4%	2%

Mean vitamin B9 (folate) contribution from top 10 food groups (% B9)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Cruciferous vegetables	9%	12%	12%	13%	14%	12%
Legumes	11%	12%	13%	12%	12%	10%
Other vegetables	10%	11%	11%	12%	11%	13%
Nuts and seeds	14%	11%	9%	10%	9%	11%
Whole grains	12%	10%	12%	9%	12%	9%
Refined grains and baked goods	12%	11%	10%	12%	8%	9%
White roots and tubers	8%	10%	11%	9%	14%	10%
Dark green leafy vegetables	4%	5%	5%	4%	6%	5%
Fish and shellfish	3%	4%	5%	4%	4%	5%
Eggs	5%	4%	2%	3%	3%	6%

Mean vitamin B6 (pyrodoxine) contribution from top 10 food groups (% B6)

Cruciferous vegetables	14%	17%	18%	18%	19%	16%
Whole grains	15%	13%	15%	12%	15%	13%
Other vegetables	10%	11%	11%	12%	11%	12%
Refined grains and baked goods	14%	11%	10%	12%	9%	10%
White roots and tubers	7%	9%	9%	9%	10%	10%
Fish and shellfish	6%	9%	9%	8%	9%	9%
Dark green leafy vegetables	5%	5%	5%	4%	6%	5%
Nuts and seeds	7%	5%	4%	4%	4%	5%
Legumes	4%	3%	3%	3%	4%	4%
Poultry and game meat	2%	4%	3%	4%	2%	4%

Mean vitamin B12 (cobalmine) contribution from top 10 food groups (% B12)

Fish and shellfish	19%	28%	32%	31%	31%	31%
Eggs	10%	7%	5%	7%	8%	11%
Red meat	3%	7%	8%	10%	8%	6%
Poultry and game meat	5%	7%	7%	9%	6%	8%
White roots and tubers	5%	6%	6%	5%	10%	8%
Refined grains and baked goods	8%	7%	4%	5%	3%	5%
Processed meat	2%	3%	6%	4%	3%	3%
High-fat dairy (in milk equivalents)	4%	3%	3%	3%	2%	3%
Purchased deep fried foods	3%	3%	1%	0%	0%	0%
Sweets and ice cream	2%	1%	1%	1%	0%	1%

Mean vitamin C contribution from top 10 food groups (% vitamin C)

	Children (6–23 mo)	Children (24–59 mo)	Adolescent girls (10–14 y)	NPNL women (15–49 y)	Lactating women (15–49 y)	Pregnant women (15–49 y)
Cruciferous vegetables	31%	41%	43%	43%	45%	39%
Other vegetables	31%	28%	27%	29%	26%	29%
Dark green leafy vegetables	8%	9%	10%	8%	13%	10%
White roots and tubers	6%	8%	7%	7%	8%	9%
Sugar-sweetened beverages	3%	3%	2%	2%	3%	3%
Other fruits	4%	2%	2%	2%	1%	3%
Juice	3%	1%	3%	2%	1%	3%
Deep orange fruits	1%	2%	3%	2%	2%	2%
Legumes	1%	1%	1%	1%	1%	1%
High-fat dairy (in milk equivalents)	1%	1%	0%	0%	1%	0%

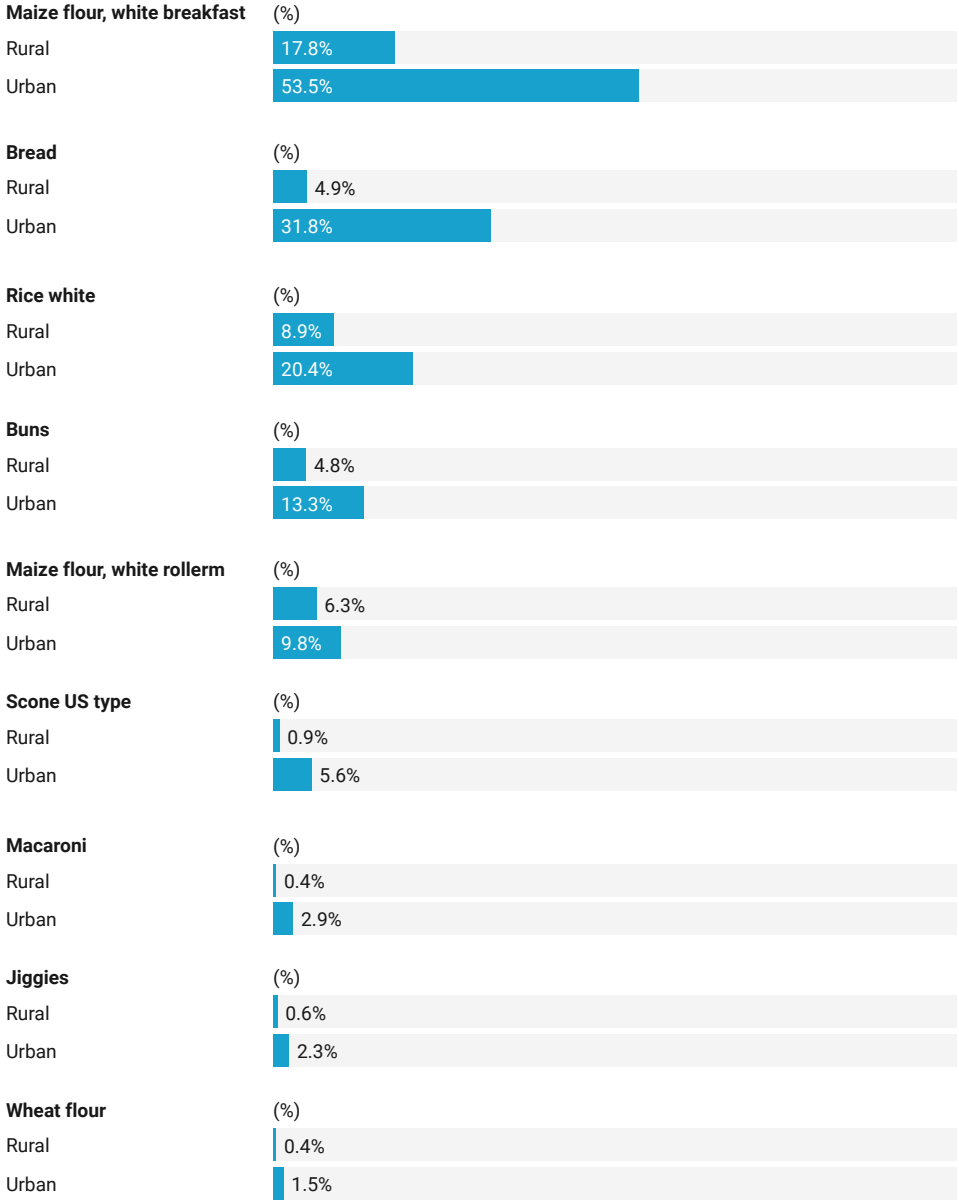
7.2 Percentage of Women Consuming Foods by Food Group

Percentage of women (including pregnant and lactating) consuming foods with the whole grains food group (%)

	(%)
Maize flour, white straight	
Rural	62.0%
Urban	35.8%
Maize grain, white whole	
Rural	3.9%
Urban	1.2%
Popcorn	
Rural	1.2%
Urban	1.4%
Millet flour	
Rural	2.0%
Urban	0.2%
Sorghum flour	
Rural	1.4%
Urban	0.0%
Bread, whole flour	
Rural	0.2%
Urban	1.1%

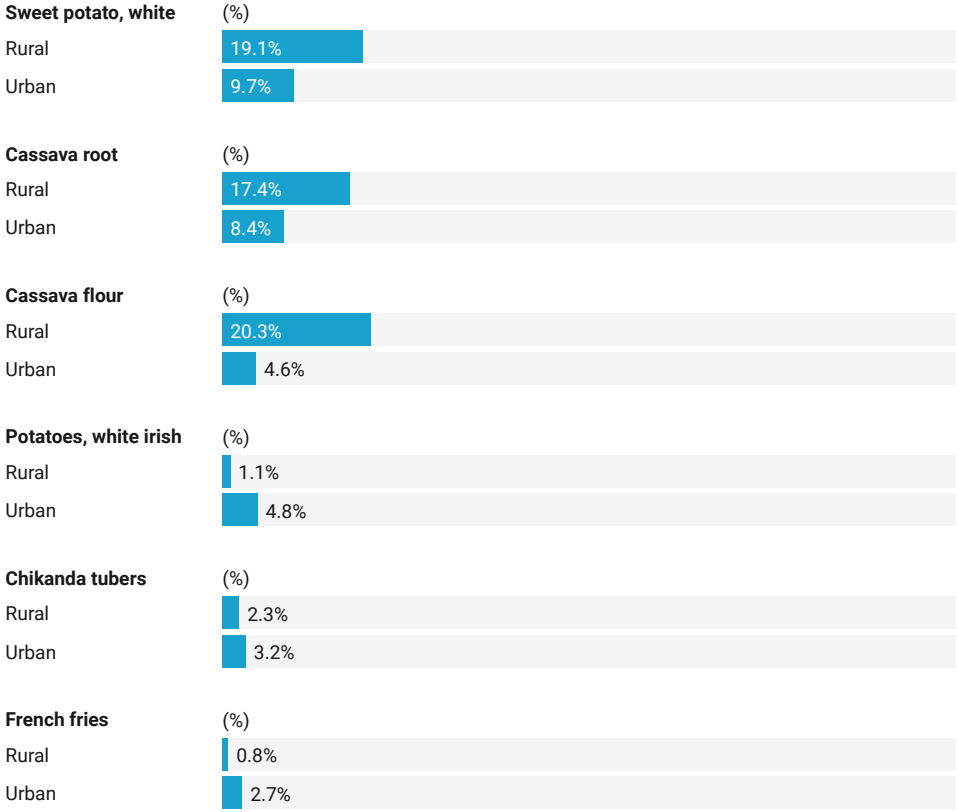
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the refined grains food group (%)



Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the white roots and tubers food group (%)

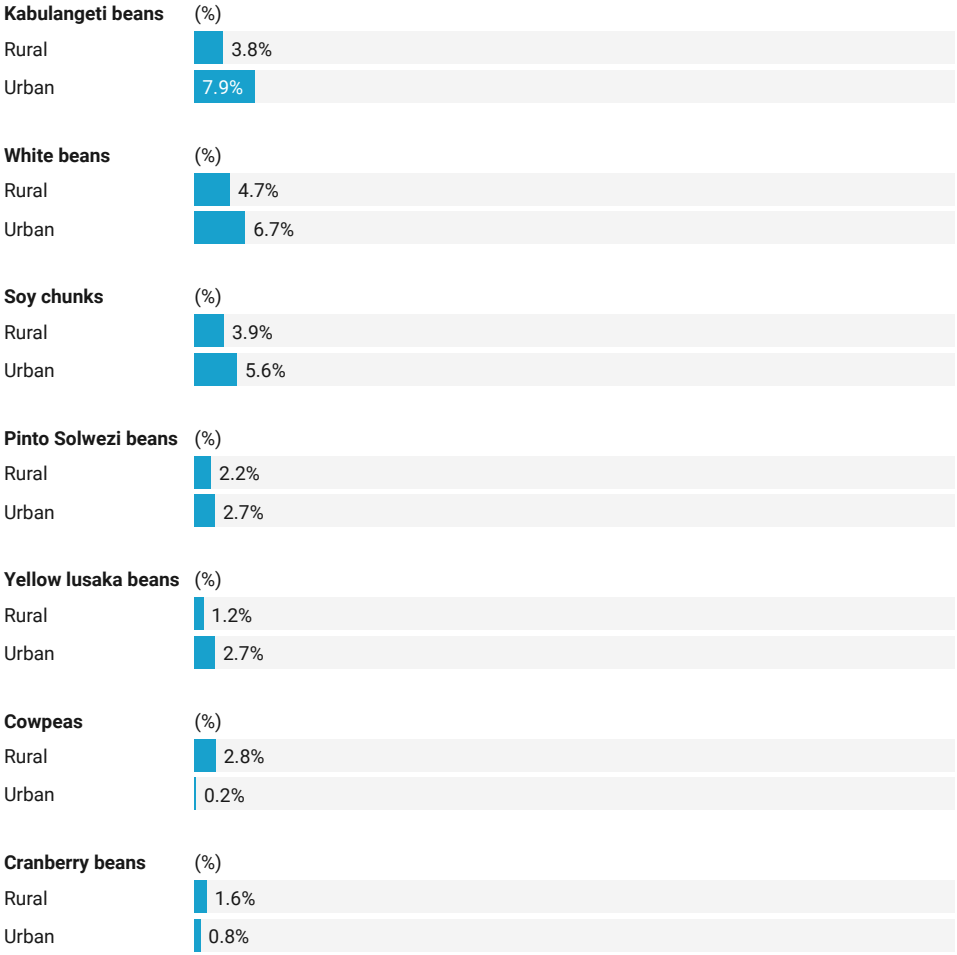


Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the deep orange tubers food group (%)

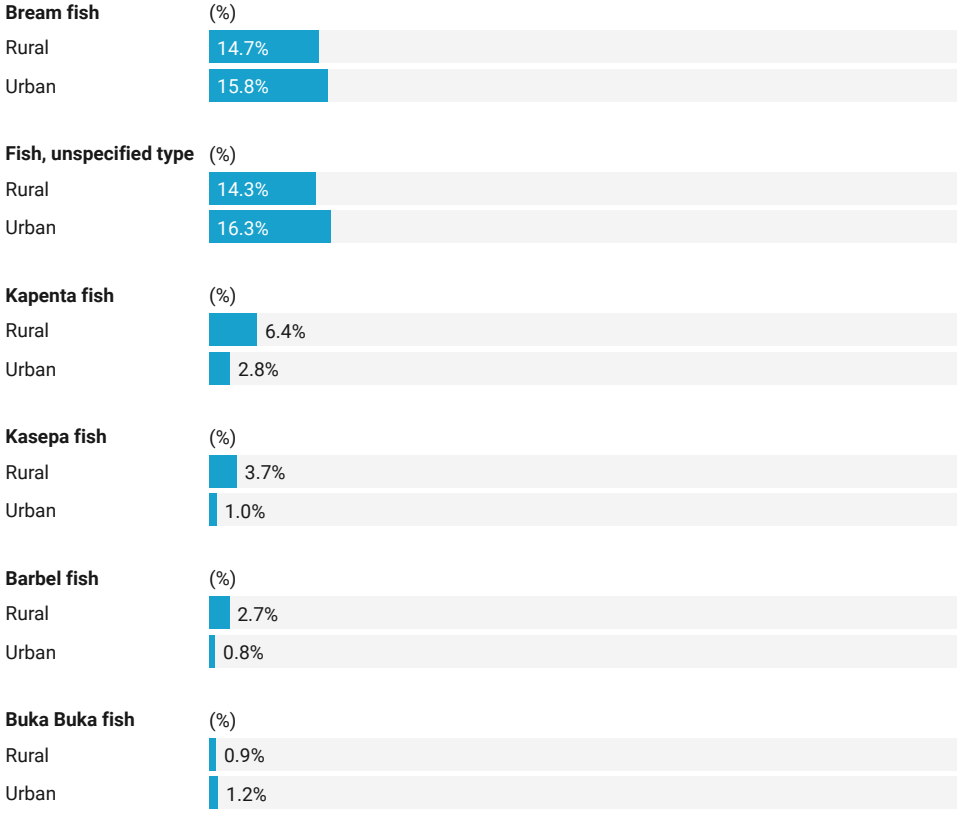
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the legumes food group (%)



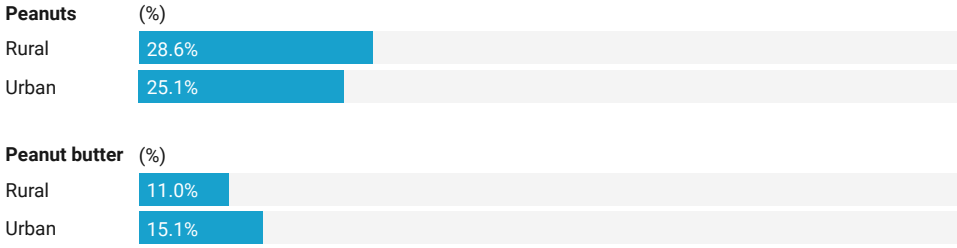
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the fish food group (%)



Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the nuts and seeds food group (%)

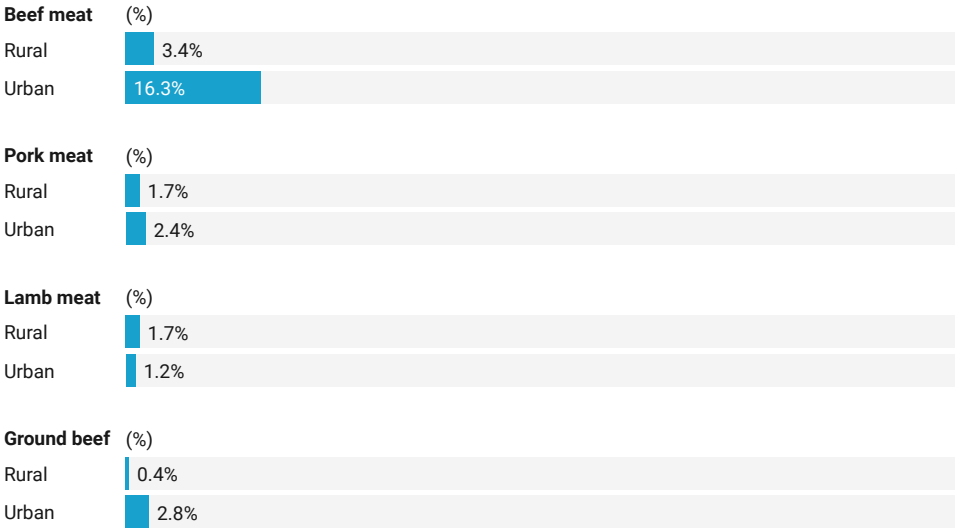


Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the poultry food group (%)

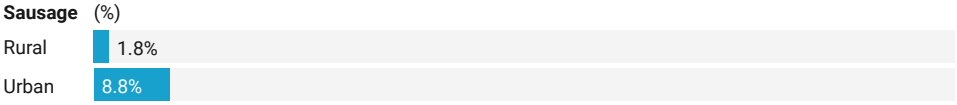
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the red meat food group (%)



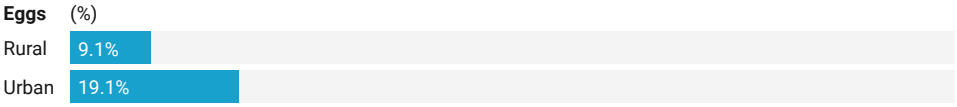
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the processed meat food group (%)



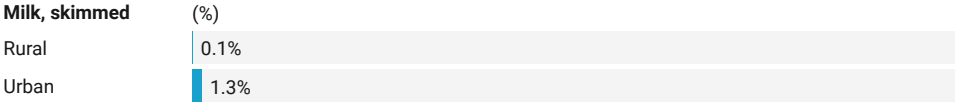
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the eggs food group (%)



Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the low fat dairy food group (%)



Only foods consumed by at least 1% of women in either the rural or urban area are presented.

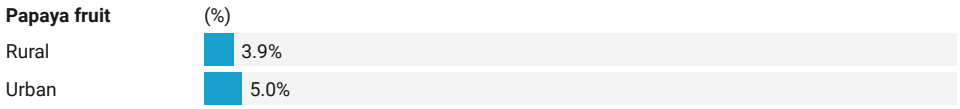
Percentage of women (including pregnant and lactating) consuming foods within the high-fat dairy food group (%)

Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the liquid oils food group (%)

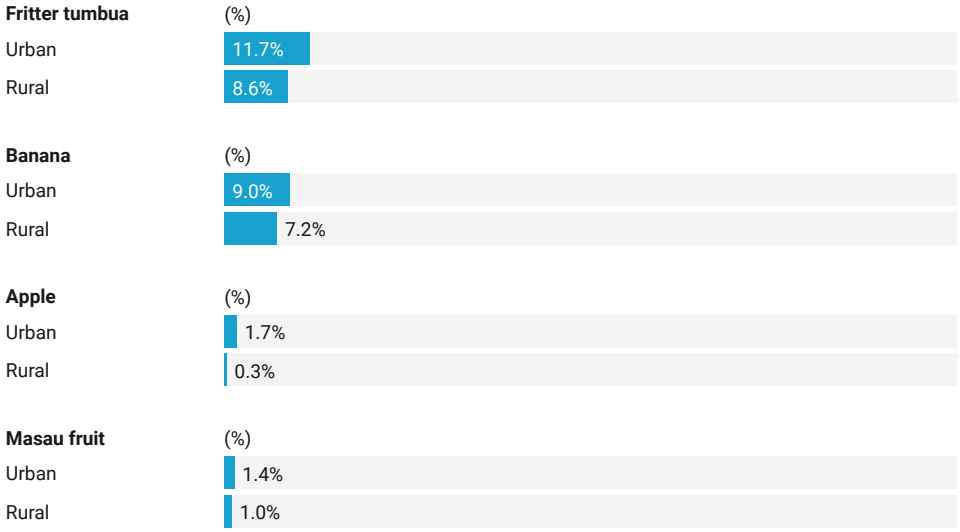
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the deep orange fruit food group (%)



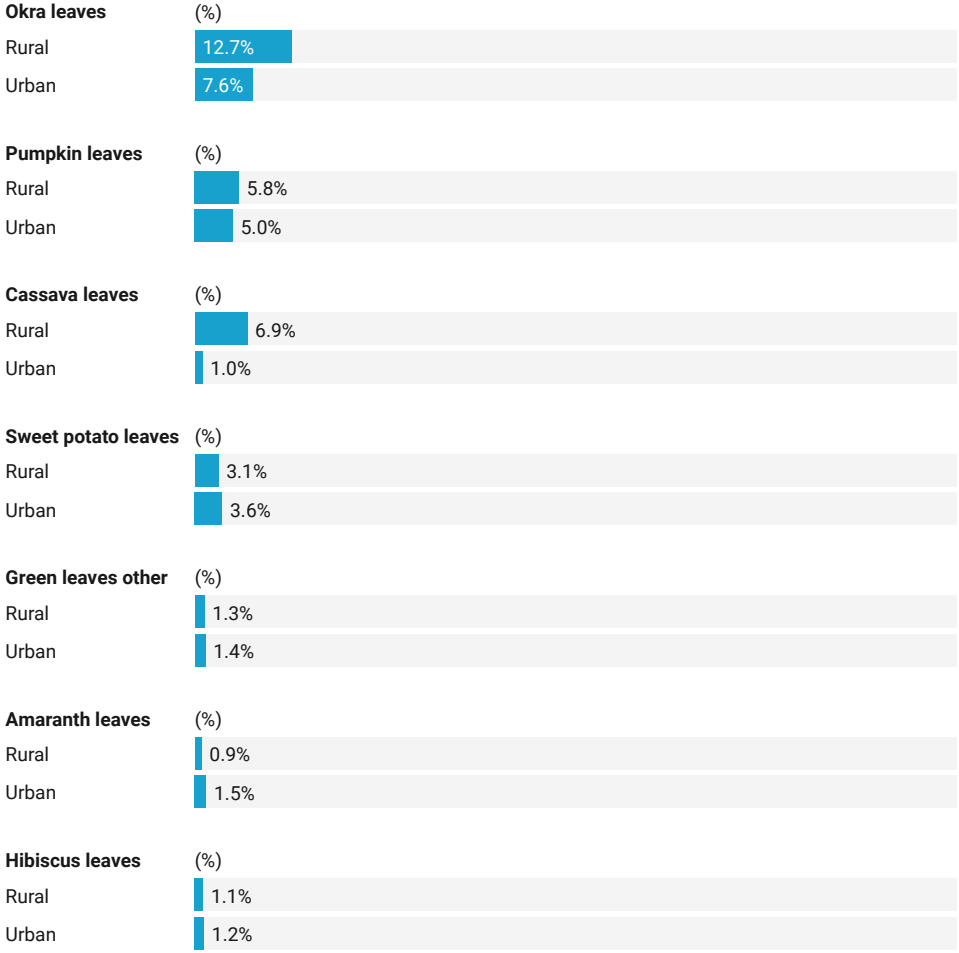
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the other fruits food group (%)



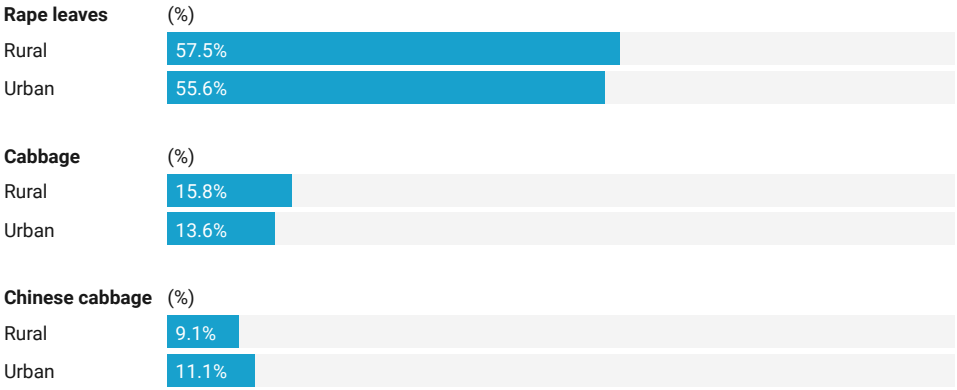
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the dark green leafy vegetables food group (%)



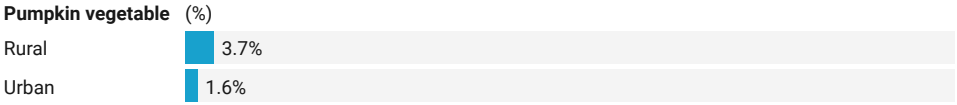
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the cruciferous vegetable food group (%)



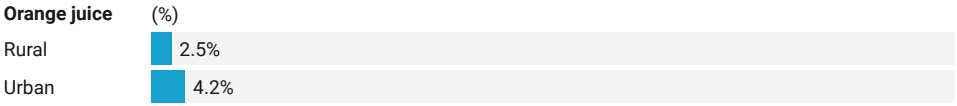
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the deep orange vegetables food group (%)



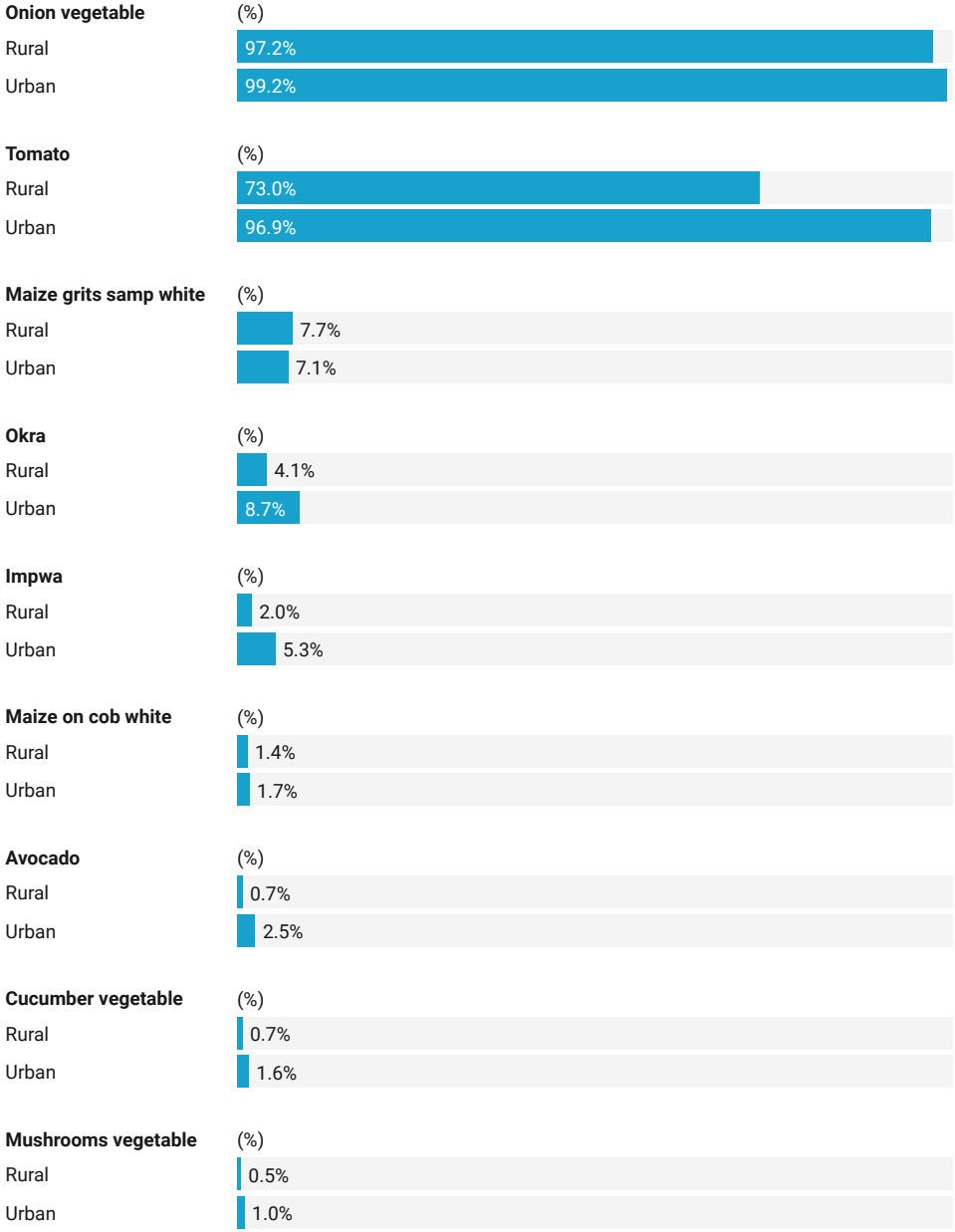
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the juice food group (%)



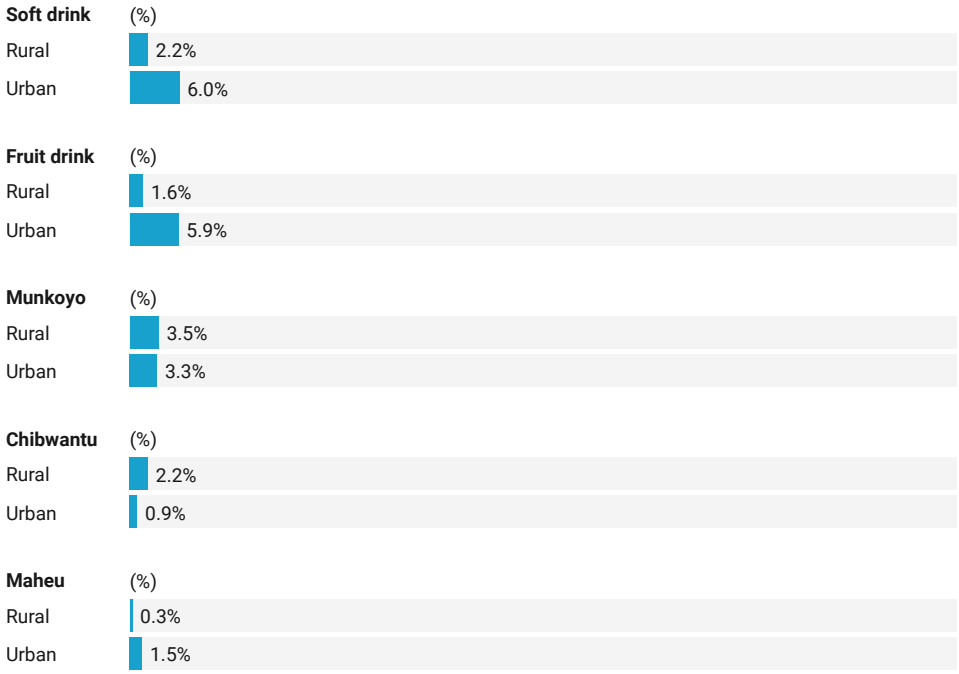
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the other vegetable food group (%)



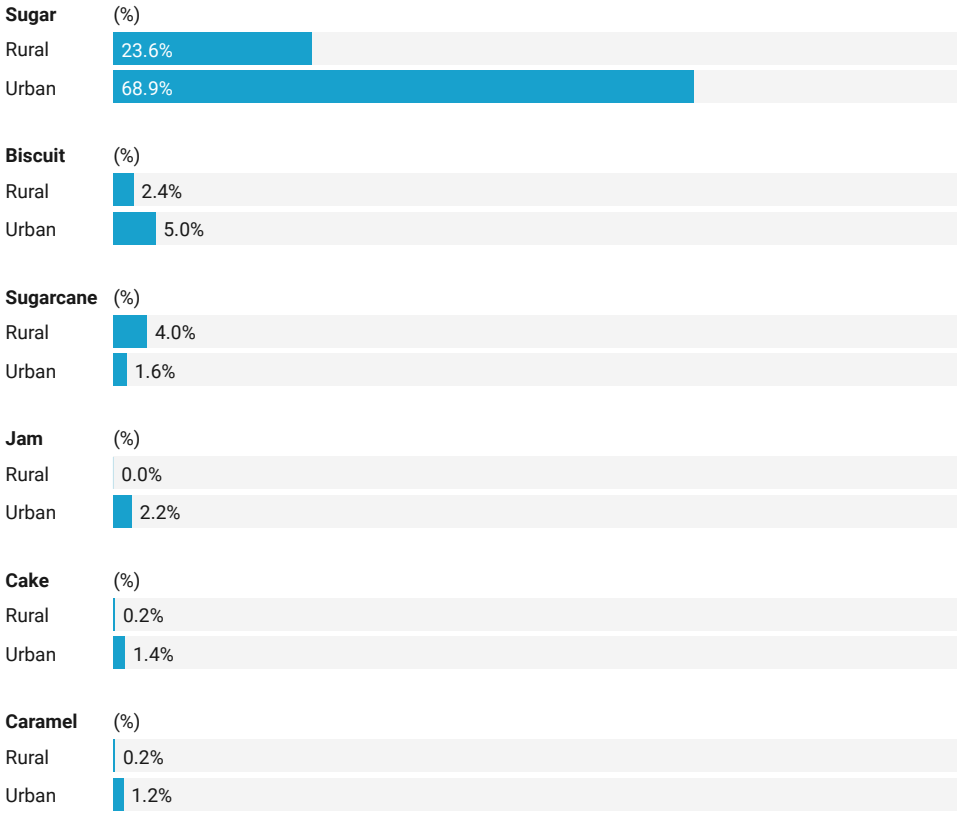
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

Percentage of women (including pregnant and lactating) consuming foods within the other sugar-sweetened beverages food group (%)



Only foods consumed by at least 1% of women in either the rural or urban area are presented.

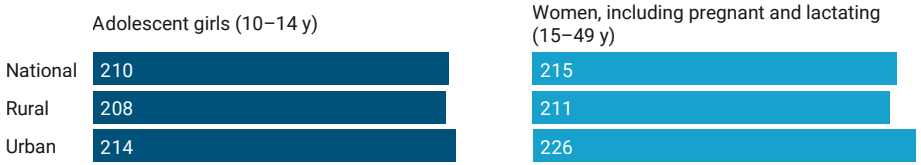
Percentage of women (including pregnant and lactating) consuming foods within the sweets and ice cream food group (%)



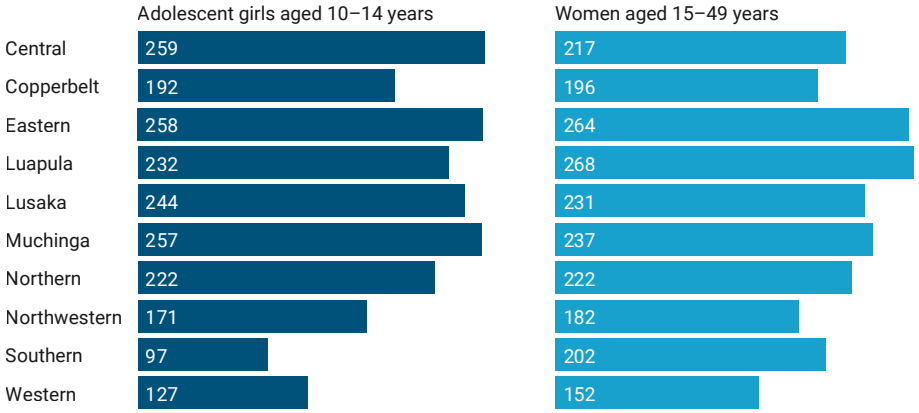
Only foods consumed by at least 1% of women in either the rural or urban area are presented.

8 Contextual Information

Median urinary iodine intake (µg/L)

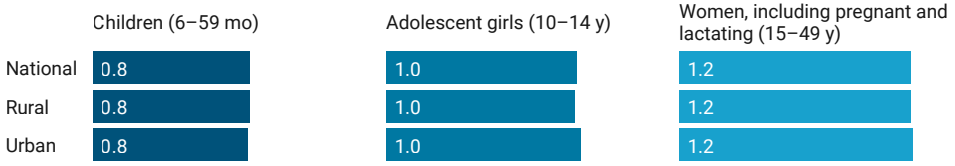


Median urinary iodine intake (µg/L), by province

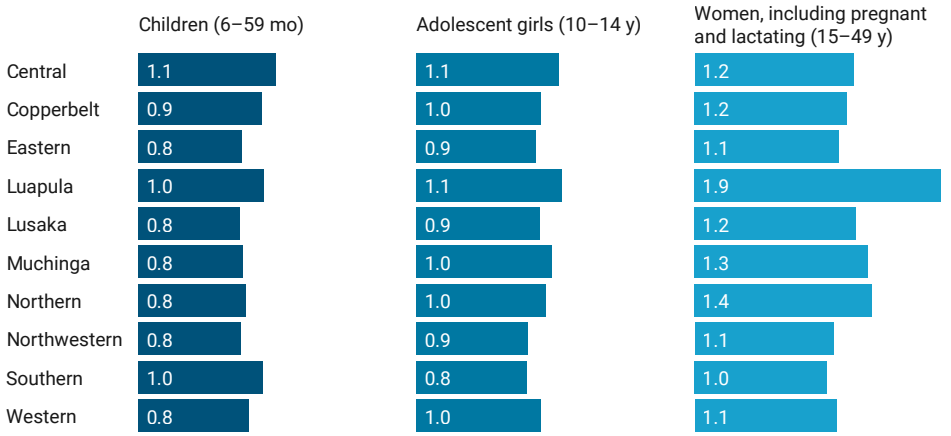


Urinary Iodine measurements indicative of adequate (100–300 µg/L), excessive (> 300 µg/L) and severe to mild levels (<100 µg/L).

Median retinol binding protein (µmol/L)*



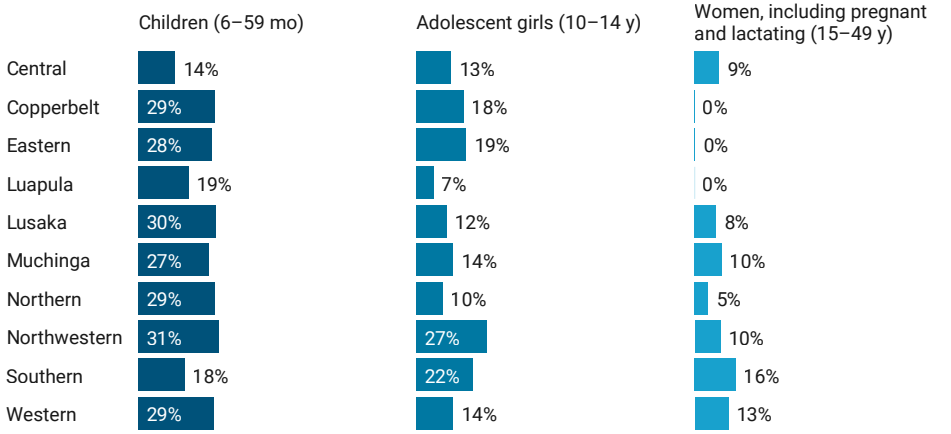
Median retinol binding protein (µmol/L)*, by province



*Adjusted for inflammatory markers AGP and CRP.

Prevalence of vitamin A deficiency

Prevalence of vitamin A deficiency, by province



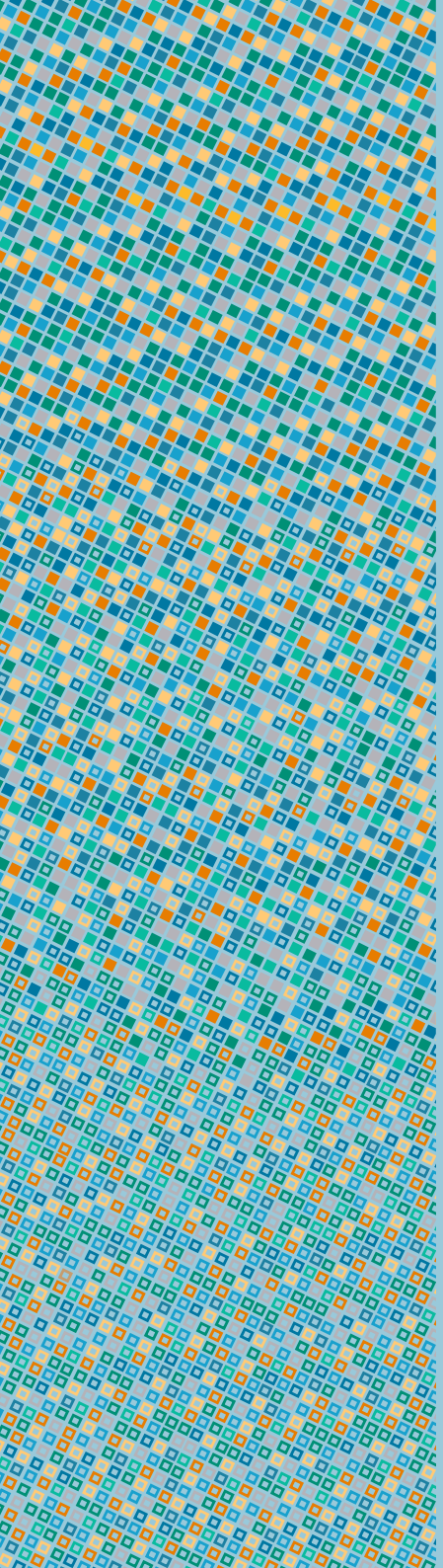
Vitamin A deficiency was defined as RBP <0.07 µmol/L.

9 References

Allen LH, Carriquiry AL, Murphy SP. Perspective: Proposed Harmonized Nutrient Reference Values for Populations. *Advances in Nutrition* 2020; 11(3):469-483. doi:10.1093/advances/nmz096.

Dewey KG and Brown KH. Update on Technical Issues Concerning Complementary Feeding of Young Children in Developing Countries and Implications for Intervention Programs. *Food Nutrition Bulletin* 2003;24:5–28.

Human Energy Requirements: Report of a Joint FAO/ WHO/UNU Expert Consultation. *Food Nutrition Bulletin* 2005;26(1):166.

World Health Organization and the United Nations Children's Fund (UNICEF), *Indicators for Assessing Infant and Young Child Feeding Practices: Definitions and Measurement Methods*. Geneva: 2021.

World Health Organization and Food and Agriculture Organization of the United Nations. *Diet, Nutrition and the Prevention of Chronic Diseases: Report of a Joint WHO/FAO Expert Consultation*. Geneva: 2003.