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A HEALTHY DIET IS COSTLY, BUT EVEN WITH LIMITED INCOME KENYANS CAN EAT BETTER

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Globally, poor-quality diets are the leading cause of all forms of malnutrition. The drivers of malnutrition have become more complex in recent decades with the simultaneous occurrence of both under- and overconsumption of food and nutrients within the same populations and even within the same households. Kenya is no exception — 19 percent of children under five years of age are stunted in their growth while simultaneously about one-third of women aged 15 to 49 are overweight or obese (UNICEF et al. 2021; KNBS et al. 2015). Malnutrition causes lifelong health challenges for those directly affected and is associated with high social and economic costs for households, communities, and societies (Popkin et al. 2006; Victora et al. 2008).

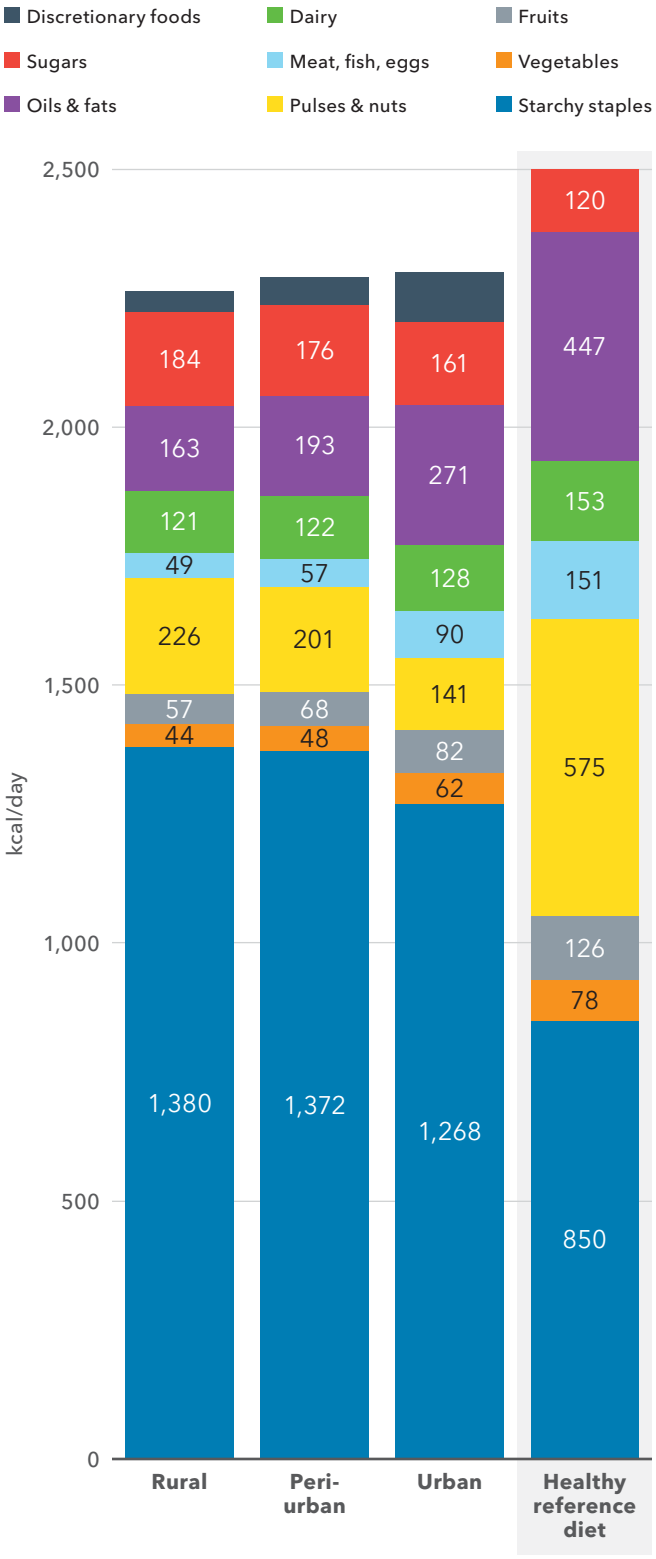
We examine the nutritional quality of Kenyan diets, the affordability of healthy diets in Kenya, and Kenyan food preferences.[1] Understanding current dietary patterns and the gaps between actual food consumption levels and healthy levels is an important starting point for identifying how those diets can be improved. For the poor across Kenya, the relatively high cost of a diverse and nutritionally adequate food basket prevents them from consuming healthy diets. However, the food preferences of Kenyans and how their food choices change when food prices or their incomes change also determine whether their diets are as healthy as they could be. These drivers of diet quality can be targeted by various policy instruments and technological innovations to shift food choices toward nutritious foods that, if consumed more, would result in diets that improve the health and quality of life of many Kenyans.

DIETARY PATTERNS AND QUALITY

In 2019, the EAT-*Lancet* Commission proposed a global reference diet that meets nutritional requirements and reduces the incidence of diet-related disease and mortality (Willet et al. 2019). This healthy reference diet provides guidelines on optimal food intake in both grams and calories for multiple food groups. The reference calorie intakes are not strict caloric thresholds that individual consumers must achieve, but rather provide benchmarks for the make-up of a diverse and balanced diet that would provide adequate amounts of essential macro- and micronutrients for most people. We use these

[1] Our analysis uses data from the nationally representative 2015/16 Kenya Integrated Household Budget Survey (KIHBS). Over 12,300 rural, 2,500 peri-urban, and 5,300 urban households make up the analytical sample. The food groups examined are constructed from 196 food items that survey households reported consuming at home.

FIGURE 1. Mean daily calorie consumption amounts per adult equivalent in Kenya by area of residence and major food group, compared to the healthy reference diet



Source: Authors' estimates based on 2015/16 KIHBS data and EAT-*Lancet* healthy reference intakes (Willet et al. 2019).

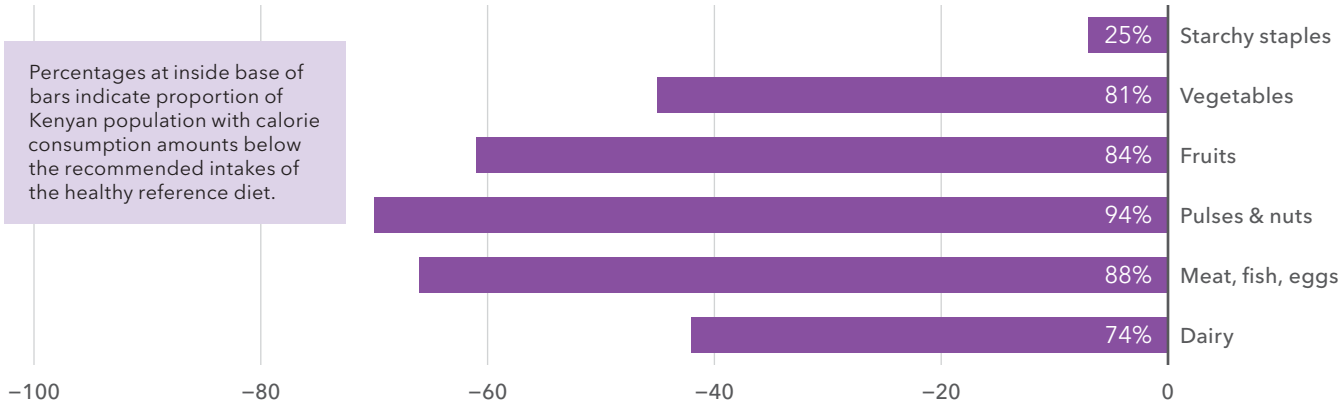
optimal, food-group-specific calorie intakes as the reference intakes for our dietary analysis.

For purposes of comparison, we use the major food groups of the EAT-*Lancet* reference diet but combine two groups (grains and starchy roots/tubers) into "starchy staples." The other groups are vegetables; fruits; plant-based proteins (i.e., pulses and nuts); animal-source proteins (i.e., meat, fish, and eggs); dairy foods; added fats and oils; and added sugars. We also added a "discretionary foods" group that includes snacks, sweets, and beverages, which is not part of the reference diet. These foods are nutritionally non-essential and possibly unhealthy. The reference diet is scaled for a total daily intake of 2,500 kilocalories (kcal) – the healthy intake of a moderately active, average-sized adult. Household food consumption in our analysis is therefore based on calories per adult equivalents in the household.

The average calorie consumption of Kenyans from each food group is presented in Figure 1, disaggregated by rural, peri-urban, and urban residence. The graph also shows the recommended consumption levels for each food group as specified in the EAT-*Lancet* healthy reference diet. Overall the differences in the average dietary patterns across rural, peri-urban, and urban groups are small. On average, Kenyans do not consume enough calories in total. Moreover, the calories they consume primarily come from starchy staples, with far smaller contributions from other food groups. As a result, the share of calories in the average Kenyan diet coming from each food group differs significantly from the healthy reference diet, suggesting their diets are unbalanced and of poor quality overall. Specifically, Kenyan diets are lacking vegetables, fruits, plant-based proteins, and animal-source proteins, in both relative and absolute quantities. However, the consumption of added sugars exceeds the guideline amount of the healthy reference diet by about one-third.

The average gaps in calorie consumption amounts for the major nutritious food groups relative to the healthy reference diet are graphed in Figure 2. The two protein food groups show the largest gaps. However, the gaps are also relatively large for fruits, vegetables, and dairy. While large proportions of the population overconsume starchy staples and calorie-rich non-required foods, underconsumption of nutritious food groups is even more prevalent – more than three-quarters

FIGURE 2. Mean calorie consumption gaps of the Kenyan population with reference to the healthy reference diet, by major nutritious food group



Source: Authors' estimates based on 2015/16 KIHBS data and EAT-*Lancet* healthy reference intakes (Willet et al. 2019).

of households have intakes of plant-based and animal-source protein foods, vegetables, and fruit that fall short of the reference intakes of the healthy reference diet.[2] Moreover, poor diet quality is common everywhere in Kenya – when examined by rural, peri-urban, and urban residence, almost all households in each area consume less than the reference intakes for at least one of these six nutritious food groups.

DIET COSTS AND AFFORDABILITY

Large consumption gaps for nutritious foods in Kenya reflect the high costs of a healthy diet relative to household incomes. The median prices for the major food groups of the healthy reference diet in Kenya, expressed in Kenyan shillings (KES) per 100 kcal, are graphed in Figure 3. Animal-source proteins are by far the most expensive food group – about 13 times the price of starchy staples and 10 times the price of plant-based proteins. While the calories provided by animal-source proteins are only a small part of the nutritional value of these foods, this price comparison demonstrates the problem of food affordability when satisfying caloric needs is the primary concern guiding the food choices of most households. Similarly, vegetables are micronutrient-dense, but generally not calorie-dense, so food-insecure households do not consume as much of these foods as is required for a healthy diet.

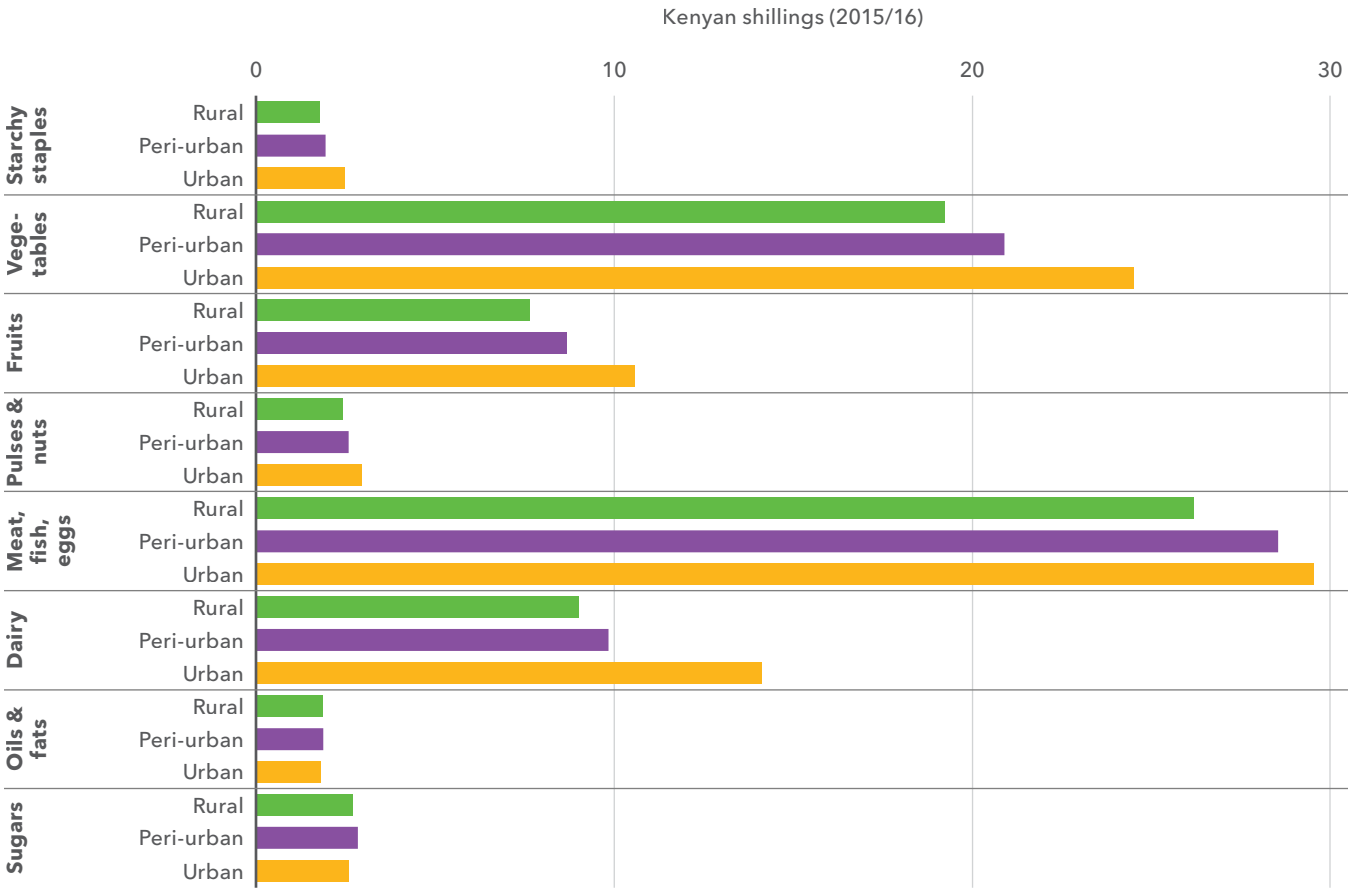
At the 2015/16 price levels shown in Figure 3, the median daily cost of the healthy reference diet is about KES 110 in rural areas, KES 123 in peri-urban areas, KES 141 in urban areas, and KES 120 nationally. These costs are considerably higher than the official food poverty lines for rural (KES 69 per adult equivalent per day) and peri-urban and urban (KES 84) areas (KNBS et al. 2018). Official estimates suggest almost one-third of Kenyans have total food expenditures below the respective food poverty lines; given the difference, it is unsurprising that many more Kenyan households cannot afford the healthy reference diet – three-quarters of both rural and peri-urban households and 65 percent of urban households reported total food expenditures below the median cost of the healthy reference diet for their area of residence (Headey et al. 2023). Healthy diets are very costly for many consumers in Kenya, as well as throughout sub-Saharan Africa (Hirvonen et al. 2020).

FOOD PREFERENCES AND CONSUMPTION RESPONSES

High prices for nutritious foods are one of the principal constraints to poor Kenyan households improving their diets, particularly when their calorie requirements are often unmet (Headey and Alderman 2019; Headey et al. 2023). However, many Kenyans

[2] For the food groups that show significant gaps in average consumption relative to the healthy reference diet, many households reported zero consumption over the survey's seven-day food consumption recall period.

FIGURE 3. Median food group prices per 100 kilocalories, by area of residence



Source: Authors' estimates based on 2015/16 KIHBS data.

Note: KES 100 ≈ USD 1.00 during the survey implementation period.

overconsume total calories, particularly "empty calories" from sugary products. Plant-based proteins such as pulses and nuts are relatively cheap sources of proteins and micronutrients, as well as calories. Yet, these foods are vastly underconsumed, especially in urban areas, reflecting weak consumer preferences for these foods relative to other food groups.

While consumer preferences cannot be observed directly, they can be inferred from how consumers change their consumption of specific foods in response to changes in incomes or prices – that is, their income and price elasticities of food consumption (demand). Higher incomes tend to result in increased food consumption, while higher prices tend to result in lower consumption. Estimated income and price elasticities of demand by food group are presented in Table 1. Differences are seen in the income elasticities between rural and urban households because of differing food environments between rural and urban areas. In contrast, the price elasticities are closer between rural and urban households for most food groups, which implies responses to food price changes will be similar across the two areas.

Several insights can be drawn from the patterns of income elasticities across food groups and between rural and urban households, including on household preferences for consuming calorie-dense staples and consuming meat rather than pulses and nuts for protein intake.

- For rural households, income elasticities for pulses and nuts are above the income elasticity of total food demand. With higher incomes, consumption of these plant-based protein foods can be expected to increase faster than the consumption of other food groups.

TABLE 1. Income and price elasticities of demand for all food and for selected food groups, by rural and urban households in Kenya

	Income elasticities		Price elasticities	
	Rural	Urban	Rural	Urban
ALL FOOD	**0.71**	**0.56**	**−0.84**	**−0.71**
Maize	0.70	0.21	−1.16	−0.65
Other cereals	0.87	0.76	−0.68	−1.09
Roots & tubers	ns	0.50	−1.16	−0.65
Dark green leafy vegetables	ns	0.53	−0.84	−0.94
Fruits, other than banana	1.04	0.75	−0.92	−1.18
Pulses & nuts	0.85	0.50	−1.06	−0.82
Meat	ns	0.75	−0.81	−0.76
Sugars	0.67	0.30	−1.02	−1.01
Beverages	0.82	0.83	−1.03	−1.22

Source: Authors' estimates based on 2015/16 KIHBS data.

Note: Urban households include both peri-urban and urban households from the 2015/16 KIHBS sample. Income and price elasticities of demand are defined as the percentage change in food demanded/consumed by a household with a 1 percent change in the income of the household or in the price of the food, respectively. "ns" indicates that the parameter estimate underlying the computed elasticity statistically was not significantly different from zero.

- Urban income elasticity estimates suggest that urban income growth will increase the consumption of meat and fruits faster than total food consumption. Slower increases will be seen for pulses and nuts – evidence of a weak preference for such foods among urban consumers.

- In urban households, maize is the food group with the smallest income elasticity. This reflects Bennett's Law – as per capita incomes rise, the share of calories from staple foods declines. However, in rural areas, the income elasticity for maize is similar to that for total food demand. This pattern confirms that assuring adequate calorie consumption is a central driver of rural consumers' food choices.

Price elasticity patterns across the food groups are less clear than for the income elasticities – for most food groups, the price elasticity estimate is close to that for the total food average. Nevertheless, there are some patterns of note.

- The consumption of beverages and sugar is sensitive to price changes. Hence, taxation of these non-essential foods may be a way to curb their overconsumption. However, because their prices per calorie are low, significant taxes would need to be applied to the price of these foods to reduce household consumption.

- Nutritious food groups for which consumption is price-sensitive include dark green leafy vegetables, fruit, and pulses and nuts. Public investments to support stable prices for these foods throughout the year would help bring their consumption closer to recommended healthy intake levels.

CONCLUSIONS

Four important implications for policy to promote and guide a transformation toward healthy diets for all Kenyans can be drawn from this research:

First, Kenya's diet problem – the underconsumption of nutritious foods and increasingly high consumption of calorie-rich but micronutrient-sparse foods – is primarily a poverty problem. Most Kenyans simply cannot afford a healthy diet. Accelerated poverty reduction will have important nutritional benefits.

Second, there are large differences between the costs of meeting dietary guidelines for highly nutritious foods and the costs of obtaining adequate amounts of calorie-dense staple foods. These cost gaps have

a strong effect on household diets because the food choices of many Kenyan households are primarily driven by a need to satisfy calorie requirements. This points to a problem of relative food prices, which interacts with the poverty problem. It is most apparent for animal-source protein foods and, to a lesser degree, for vegetables. Thus, policy interventions and technological innovations that address this relative food price problem are needed to narrow the consumption gaps for nutritious food groups, particularly animal-source foods and vegetables.

Third, the food preferences of Kenyans show that the poor-quality diets consumed by many households are not solely due to insufficient purchasing power and high prices for nutritious foods. This is most obvious for plant-based protein foods – pulses and nuts – which have low prices per calorie, but which few households consume in sufficient amounts to meet the recommended healthy intake. This weak consumer preference for such foods suggests a lack of knowledge of their nutritional value and their importance for healthy diets. Nutrition education may aid in changing consumer behavior to increase the consumption of pulses and nuts, as well as other nutritious foods that are now underconsumed relative to the healthy reference diet. Kenyans can consume more healthy diets with their current incomes. While healthy diets are costly for many Kenyan households, changes can be made in the current typical diet to achieve better and more balanced nutrient intake at the same cost.

Finally, policies aimed at promoting food systems transformation in Kenya should factor in the dietary needs of Kenyans. As agriculture is the dominant sector in Kenya's food systems, a balance must be found between traditional objectives including productivity growth, export stimulation, and farmer support, on the one hand, and the new responsibility of improving the availability of nutrient-dense foods for better nutrition and health for all Kenyans, on the other.

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