



State-level evidence on the cost and affordability of healthy diets in Nigeria to inform food systems transformation pathways¹

DRAFT - 29 November 2021

Executive Summary

A global metric “Cost of a Healthy Diet” is used to monitor how well the food systems in the states in Nigeria perform in making healthy foods and diets available and affordable. An estimated 31 percent of all households in Nigeria are unable to afford a healthy diet (Table 1).

There are stark differences across states in the costs of healthy diets. The costs are compared to income to determine unaffordability of healthy diets. Unaffordability of healthy diets is highly problematic in more affluent southeastern states of Ebonyi, Abia, Imo, Enugu because of high prices; and in northern states of Jigawa, Sokoto and Adawama, despite that low-cost options are available to consumers. The Cost of a Healthy Diet is relatively affordable in the northcentral states of Benue and Kwara and in southern states of Lagos, Oyo, Ondo and Delta.

In all states vegetable expenditures lag far behind what they would need to be based on recommendations for a healthy diet. Other major gaps in spending patterns are observed for fruits in the north, and animal-source foods in the south.

The results show the pertinence of subnational assessments of food systems and recurring monitoring on these metrics, as evidence base for developing pathways for food systems transformation.

Table 1: Mean cost of a healthy diet and affordability (per capita)

	Mean	95% Confidence Interval		Min	Max
		Lower	Upper		
Cost of a healthy diet in 2018/19 Naira (₦)	219	204	234	127 (Taraba)	291 (Imo)
Cost of a healthy diet as % of food expenditures	89	80	98	47 (Lagos)	162 (Ebonyi)
% of households with per capita food expenditures below the cost of a healthy diet	31	25	37	5 (Lagos)	77 (Ebonyi)

The following sections of this document provide the key messages and scientific justification. Comments on the draft are welcome.

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Key messages

On the metric:

- Policies and programs aiming to bring healthy diets within reach of the poor would require sub-national level analysis of the cost and affordability of healthier foods. Least-cost diets provide a conservative estimate of the cost per day, based on the cheapest foods available at a given time and place, of foods that meet the criteria of a given diet. This diet uses the mean quantities of each food group that resulted from least-cost food selections across dietary guidelines used in the United Nations *State of Food Security and Nutrition in the World* 2020 and 2021 reports.
- We use least-cost diets to monitor food system performance in making healthy foods and diets available and affordable, in all but one Nigerian state including Federal Capital Territory (FCT, Abuja).² For this purpose, the metric has been applied to food prices data and household expenditures from the Nigeria Living Standard Survey (NLSS) 2018-19. Affordability is determined by weighting Naira values for least-cost food selections against the expenditures, and by comparing current expenditure on a specific food group to the expected expenditure based on dietary guidelines.

Least-cost healthy diets specific to all states in Nigeria

The least-cost healthy diet included 11 least-cost food items in each state, drawn from 6 food groups including starchy staples; legumes/nuts/seeds; foods from animal source; vegetables; fruits; and oils. The number of food items per food group varied between 1 and 3. Cassava roots, garri, and sorghum were the most common least-cost starchy staples across the states; groundnuts and soya beans were the most common least-cost legumes/nuts/seeds; and smoked fish and local cheese (wara) were the most common least-cost animal source foods. The least-cost food items did not include rice, wheat products, yam, millet (except in Imo), meat (except bush meat in Bayelsa), and beans (except in Yobe) in any state.

Results:

- We estimate that 31 percent of households in Nigeria are unable to afford a healthy diet (Table 1). The mean daily cost of the least-cost healthy diet was 219 Naira per person per day in 2018/19 currency, which amounts to 89% of daily per-capita food expenditures, on national average. This suggests that access to healthy diets is highly problematic for poor households.³
- Which food groups are of greatest concern for making a healthy diet affordable? In terms of cost, fruits are most expensive in Northern zones and animal-source foods in Southern zones. In all states of Nigeria vegetable expenditures are below what would be needed based on recommendations for a healthy diet (91% of the population spend less than would be needed for the recommended intake of vegetables).

² Borno state is excluded from the analysis due to a lack of data in the Nigeria Living Standard Survey 2018-19.

³ Earlier results on more aggregate data at the geopolitical zone suggested that among the lower-income households (poorest 40 percent), the least-cost healthy diet is up two times more costly than they can afford (Mekonnen et al., 2021).

This is also true for fruits in the Northern states, and animal-source foods in the Southern states; current food group expenditures are below the amount needed to purchase sufficient quantities of least-cost items in those food groups.

- Food environments should offer low-cost healthy diet options to consumers, yet there are stark differences across states. The Cost of a Healthy Diet varies across states from 127 to 291 Naira, with a median of ₦219. Costs are lowest in Taraba (NE), Kebbi (NW), Plateau (NC) and Bauchi (NE). Costs are highest in Bayelsa (SS), Anambra (SE), Abia (SE) and Imo (SE).
- The costs should be offset against affluence to determine the economic access to healthy diets. We assessed this using households' current spending on food as their budget. We then compare the budget to the cost, or the expenditure that households need to purchase a healthy diet. If the budget is insufficient, a healthy diet is considered unaffordable to the household. We estimated that this is the case for 31% of households in Nigeria.
- States have been ranked by the prevalence of unaffordability. Ebonyi ranks as least affordable and Lagos as most affordable. A healthy diet is relatively affordable in southern states Lagos (SW), Oyo (SW), Ondo (SW) and Delta (SS), and in the northern states Benue (NC) and Kwara (NC). Despite the relative affluence in southeastern states, the prevalence of unaffordability is highly problematic – at least 41% of households in Ebonyi, Abia, Imo, Enugu cannot afford the healthy diet – because of high prices of recommended foods. In northern Jigawa (NW), Sokoto (NW) and Adawama (NE), the prices of recommended foods are in the low-to-mid ranges, yet the lack of affluence makes unaffordability highly problematic. In states that offer low-cost healthy diet options to consumers, unaffordability performs around the national average.

Policy implications:

- Having these metrics available will give Nigeria's decision-makers a realistic picture of state-level priorities for interventions in areas such as trade, social protection, and agriculture, and for shaping food systems transformation pathways towards healthier diets and to mitigate drivers of malnutrition in times of crisis. Recurring monitoring with shorter time intervals of the cost of a healthy diet, and other relevant indicators, is essential for evidence-based policy making.

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I. Background

Undernutrition and micronutrient deficiencies remain a significant problem in Nigeria, while the prevalence of diet related non-communicable diseases is increasing (Black et al., 2013; Nugent et al., 2020). Defining the scope of nutritional problems, understanding their causes, and improving the nutrition situation in a country require high quality, timely, and complete data that is disaggregated at appropriate levels (Piwoz et al., 2019). Strong nutrition data and information systems are ultimately needed to inform national and subnational decision-making about nutrition activities or interventions, to examine the use and targeting of resources, and to determine the impact and cost-effectiveness of programmes (IFPRI 2014; Piwoz et al 2019;). Yet, despite the nutrition challenges in Nigeria, nutrition data has been limited. Much of existing, representative dietary intake studies were based on general household surveys with limited information on individual level dietary intake; and their analysis were at the level of national and geopolitical zones (e.g. Ecker and Hatzenbuehler, 2021; Mekonnen et al., 2021a., Akerele et al., 2015). More insight is needed about Nigerians' access to nutritious food or how access varies over space and time, and on drivers of food choices (Flax et al., 2017).

Recent studies suggest that the cost of nutritious foods and healthy diets is out of reach for the world's poorest people (FAO et al., 2020; 2021; Herforth et al., 2020; Hirvonen et al., 2020; Headey and Alderman 2019), putting global progress toward achieving the hunger, food security and nutrition targets of Sustainable Development Goals 2 off track (FAO et al., 2020).

Generating scientific evidence about opportunities that would make healthy and nutritious foods more available, affordable, and accessible is one of the seven priorities that the Scientific Group for the United Nations Food Systems Summit 2021 (UNFSS) identified (von Braun et al., 2021). It is also an important priority that emerged from more than 40 UNFSS Dialogues held to identify necessary actions to transform Nigeria's food systems (FGN, 2021) and research programs including Agriculture for Nutrition and Health (A4NH). Part of this effort would be to monitor the cost and affordability of healthy diets across time and place. In addition, factors that contribute to the cost and affordability of healthy diets may differ by country, and even within country across seasons, geographic locations, and local food systems as suggested by evidence from Ghana, Tanzania, Malawi, Ethiopia, (Bai et al., 2020; Herforth et al., 2020; Masters et al., 2018) and Nigeria (Mekonnen et al., 2021). These imply that policies and programs aiming to bring healthy diets within reach of the poor would require sub-national level analysis of the cost and affordability of healthy diets.

This note summarizes findings from a state-level analysis that seeks to contribute to policy conversations about where and for whom healthy diets are out of reach, and how to improve access to healthy diets through food system changes in Nigeria. The analysis was conducted by a team of researchers from the Federal Ministry of Agriculture and Rural Development (FMARD), University of Ibadan, Federal University of Agriculture, Abeokuta (FUNAAB), the Food Prices for Nutrition project at Tufts University, and Wageningen University and Research.

II. Methods

We use least-cost diets to monitor food system performance in making healthy foods and diets available and affordable, in each Nigerian state and Federal Capital Territory (FCT, Abuja). We use least-cost diets because for the poorest people, the price and affordability of sufficient calories, essential nutrients, and nutritious food groups are barriers that must be overcome before food preferences or convenience become salient. Least-cost diets provide a conservative estimate of the cost per day, based on the cheapest foods available at a given time and place, of foods that meet the criteria of a given diet.

The cost of a healthy diet, our main outcome indicator, moves beyond nutrients to recommended diets, as the minimum cost to meet food-based dietary guidelines (FBDGs). FBDGs are a behaviorally realistic way to meet nutrient needs and other needs, including proportionality, norms, culture, and protection of health against non-communicable disease. While Nigeria has its own FBDGs, they do not provide the quantitative information necessary to estimate the cost of a healthy diet, for example the number of servings recommended per day for each food group, or reference sizes for each serving.

Therefore, this work relies on the Healthy Diet Basket, a compilation of ten quantitative FBDGs developed by Herforth et al., (*forthcoming*). The Healthy Diet Basket uses the mean quantities of each food group recommended across dietary guidelines from diverse countries and regions used in the SOFI 2020 report (Herforth et al., 2020). These amounts represent an average food basket across dietary guidelines, for the purpose of monitoring cost of healthy diet.

The steps to calculate the cost of a healthy diet are as follows (Herforth et al., 2020):

1. Categorize each food in food price list according to the food groups in the dietary guidelines.
2. Remove items not required for a healthy diet (e.g., sweets) and duplicate items (e.g., multiple varieties of rice).
3. Calculate price per day for each item, using the price per kilogram or other standard unit multiplied by the recommended quantity per day, accounting for edible portion.
4. Take the average of the 1-3 lowest cost items (price/day) in each food group.
5. Sum the cost for all food groups.

Data for this analysis came from the 2018/19 Nigeria Living Standards Survey (NLSS), a household survey conducted by the National Bureau of Statistics with technical support from the World Bank as part of the Living Standards Measurement Survey (LSMS) program. The 2018/19 NLSS sample is representative at the national and zonal levels, as well as representative of the 36 states and the Federal Capital Territory (FCT), Abuja. In total, the final sample covered 22,110 households from 60 enumeration areas (EA) per state and the FCT, Abuja. However, due to higher level of nonresponse, the sample from Borno State is non-representative (NBS, 2020a), hence excluded from the analysis.

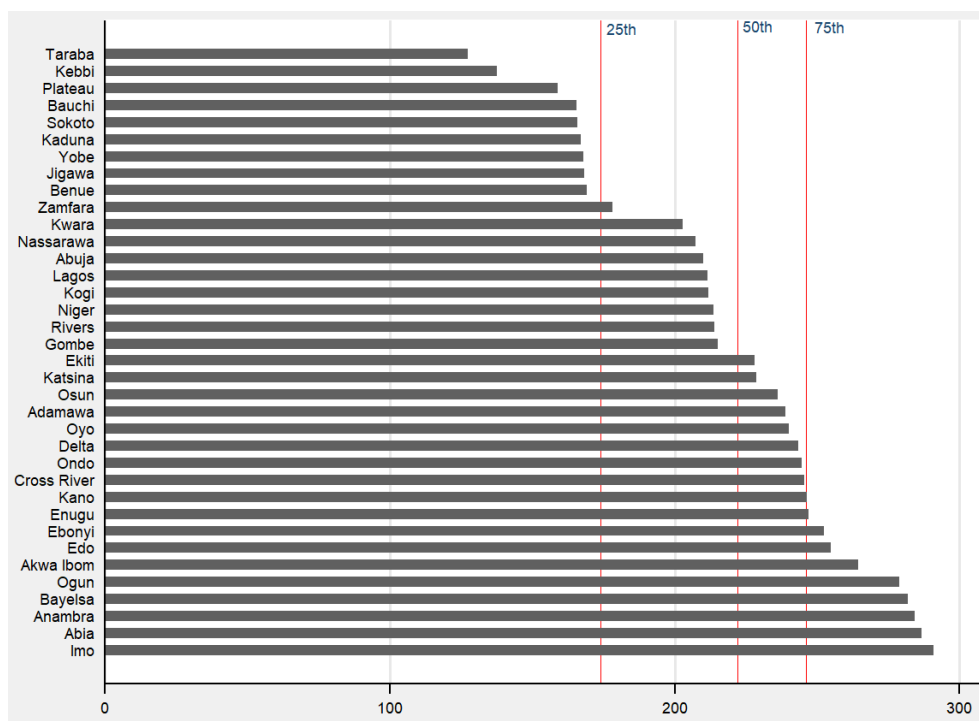
Food expenditures were obtained from the food consumption module that contains up to 116 different food and beverage items consumed in the household in the previous week. Local retail food prices were obtained from the community survey module that covered a total of 2213 markets (682 urban and 1531 rural, one market per EA). To keep comparability of prices over time and space, both spatial and temporal price deflators were applied before state level median food prices were calculated. Future work will incorporate monthly retail prices from the National Bureau of Statistics.

III. Results from recent analysis of the cost of a healthy diet using 2018/19 NLSS

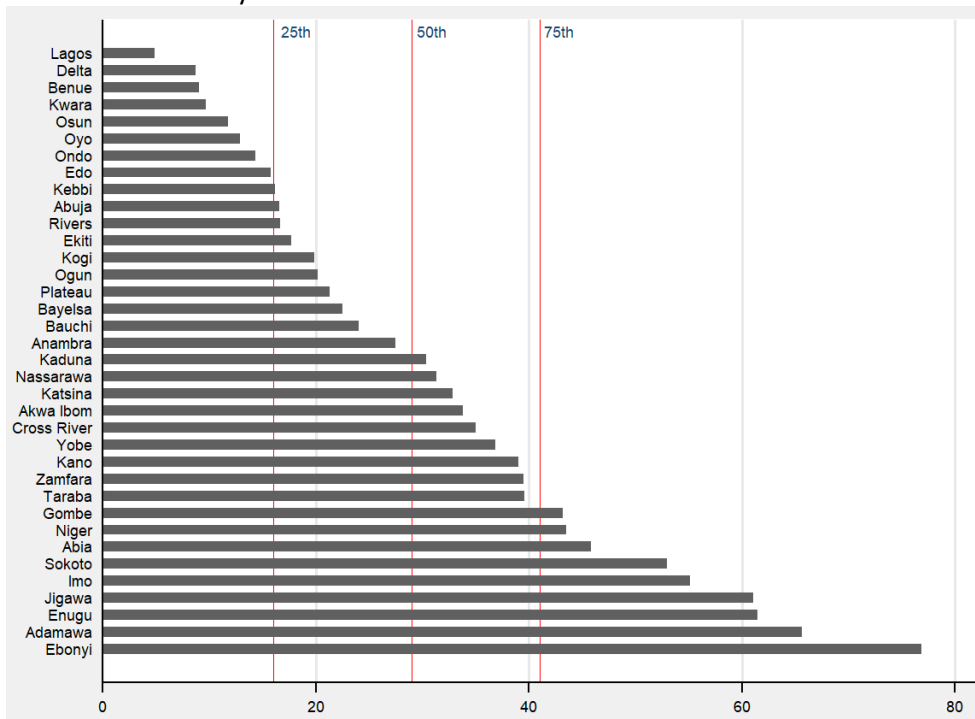
The healthy diet basket included 11 least-cost food items in each state, drawn from 6 food groups including starchy staples; legumes, nuts, and seeds; foods from animal source; vegetables; fruits; and oils. The number of food items per food group varied between 1 and 3. Cassava roots, garri, and sorghum were the most common least-cost starchy staples across the states; groundnuts and soya beans were the most common least-cost legumes/nuts/seeds; and smoked fish and local cheese (wara) were the most common least-cost animal source foods. The least-cost food items did not include rice, wheat products, yam, millet (except in Imo), meat (except bush meat in Bayelsa), and beans (except in Yobe) in any state.

The mean cost of a healthy diet was 219 Naira (Table 1). This amounts to 89% of daily per-capita food expenditures, on national average. Here, affordability is evaluated with respect to the household expenditures on food. Similarly, the cost is disaggregated to assess the affordability of each food group with respect to the household expenditures on each food group. Affordability is presented in terms of the share of households whose per capita food expenditures fell below the cost of a healthy diet.

Results (national level) suggest that about 31% of households in the country cannot afford the cost of a healthy diet (Table 1). The healthy diet was the least and most affordable in Ebonyi and Lagos states, with corresponding shares of households failing to meet the cost of a healthy respectively being 77% and 5% (Figure 1). Among 9 states where the cost of a healthy diet was above the 75th percentile, only 4 of them (i.e., Ebonyi, Abia, Imo, and Enugu) have the largest shares of households who cannot afford it (i.e., the share is above 41% or above the 75th percentile). On the other hand, among 8 states where the cost of a healthy diet was below the 25th percentile, Benue state has the smallest share of households who cannot afford it (i.e., the share is below 16% or below the 25th percentile). These findings highlight that affordability is a function of both food prices and income.



1a. Cost of a healthy diet

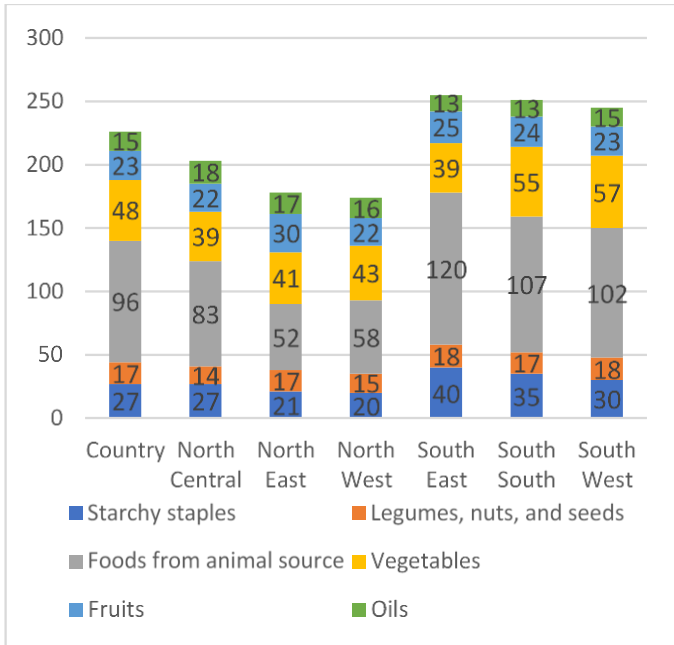


1b. % of households whose per capita food expenditure is below the cost of a healthy diet

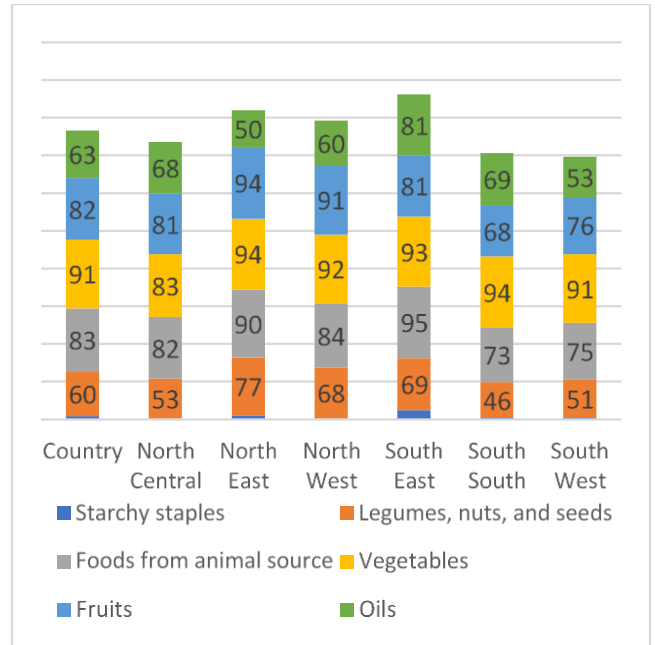
Figure 1. The cost and affordability of a healthy diet across Nigerian States. Red vertical lines mark the 25th, 50th and 75th percentiles.

Figure 2 presents the cost of each food group by geopolitical zones. As shown in Figure 2a., the cost of animal source foods was higher than the cost of each of the other food groups across all zones; twice the cost of vegetables in North-Central and the southern zones; and more than twice the cost of each of the remaining food groups across all zones. Figure 2b. shows that over 80% of households across all zones spent less on vegetables than the amount needed to meet recommendations; the figure was similar for fruits, and animal source foods in the southern zones. A majority of households across regions also spent less on legumes, nuts and seeds, and oils compared to what would be needed to meet recommendations for a healthy diet. Expenditures on starchy staples were adequate (or excessive) for meeting starchy staple recommendations regardless of location.

In general, despite the higher costs of food in the southern zones, consumers in the South-South and South-West zones did not seem to be worse off in terms of affordability than those in the northern zones. The South-East zone was an exception where both the cost and unaffordability of the diet was higher than that of the remaining zones. Closer examination of the data shows that while the per-capita expenditures on food in South-East zone was higher than that of the North-East and North-West zones, the cost of the healthy diet in South East was higher than each of the other 5 zones.



a. Median cost of healthy diet per food group at geopolitical zones



b. % households whose expenditures on food group is below the cost of healthy diet of that food group

Figure 2. Median cost of a healthy diet per food group and affordability at geopolitical zones

Further disaggregating the cost and affordability of food groups by state shows that more than 90% of households in each state could afford starchy staples, apart from Imo and Enugu where the share of households that fell short of the reference diet cost for starchy staples was 20% and 25%, respectively (Figure 3). In contrast, vegetables remained the least-affordable food group in most of the states followed by animal source foods and fruits. Legumes, nuts and seeds appeared to be the second most affordable food group in 21 of the 36 States as well as the FCT, followed by the oils food group. Over 90% of households had expenditures below the expense needed for adequate vegetables in about two-thirds of the states, below the expense needed for animal source foods in one-third of the states, and below the expense needed for fruits in one quarter of the states.

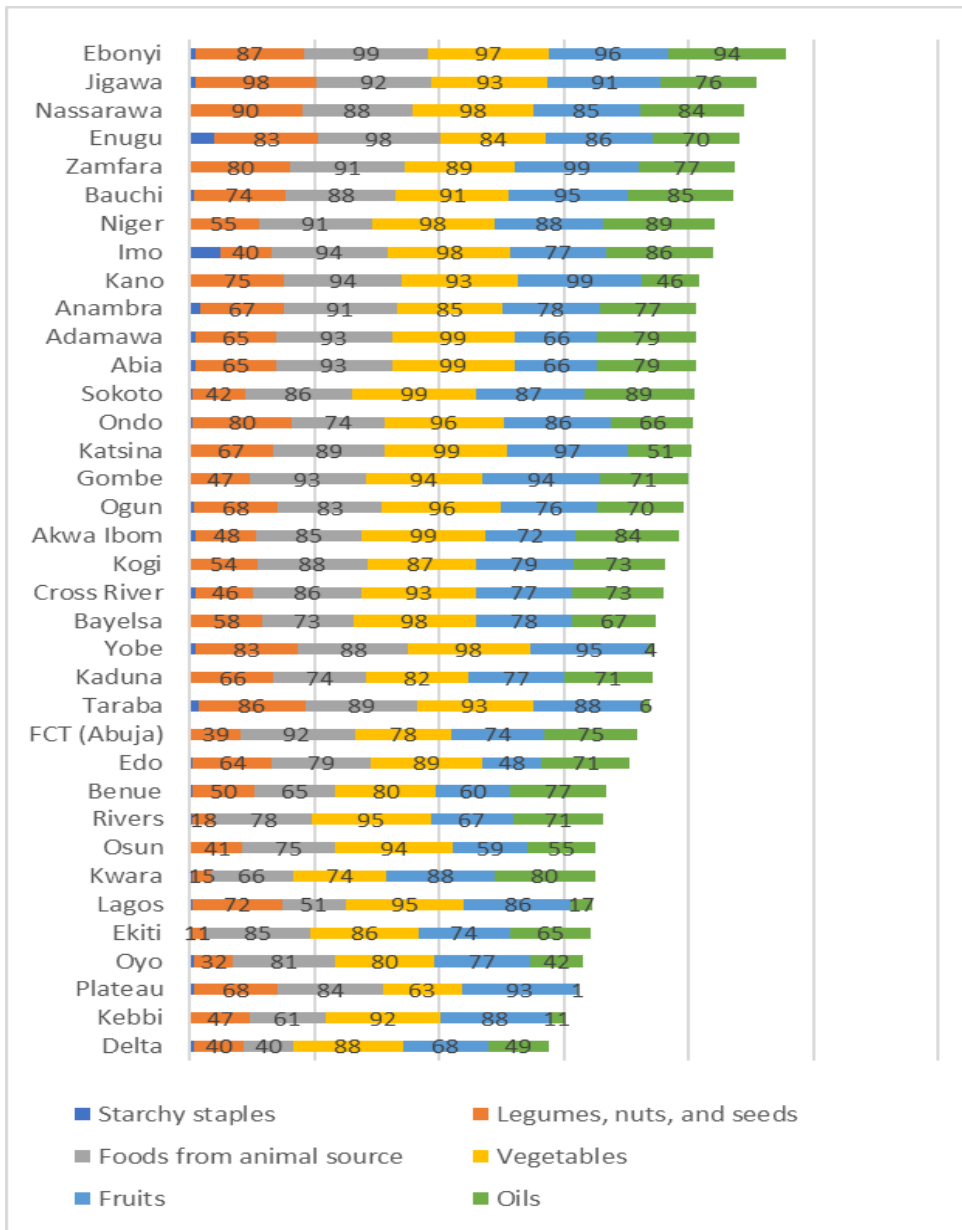


Figure 3. The share of households whose expenditures on food group is below the cost of the food group

iv. Conclusions and policy implications

This work highlights the importance of subnational/state level appraisal and monitoring of the Cost of a Healthy Diet. There are marked differences in the cost of a healthy diet and extent of affordability across states. Affordability of specific food groups such as animal source foods, and fruits and vegetables are of serious concern, with more attention required to ensure stable availability and affordability by the households. There are also cases where affordability remains high in the face of comparatively lower cost healthy diets and vice versa. These findings reveal the need to focus on food access in terms of reducing cost

of healthy diets while also reducing poverty. Attention is required toward wages, employment, income inequalities, and social safety nets, at the same time as improved availability and affordability of the more expensive food groups: that is, the non-staple foods. These metrics are calculated entirely based on market prices, but for some people, particularly in farming households, own-produced foods will also play a role while devising interventions on food prices for healthy and nutrition foods in the country.

Information about the cost and affordability of healthy diets and the food groups that make up such diets is very important for policymaking to address dietary intakes, incomes, markets, and supply chains. In future studies, the role of self-production and market purchases of farm households for the interpretation of results will be addressed.

High cost of a healthy diet indicates that food supply chains are not sufficiently efficient and/or effective. Food supply chains include agricultural production systems, as well as storage, postharvest handling, transportation, and marketing systems (FAO et al., 2020). Higher prices of food groups (or food items within groups) relative to others tends to shift consumption to foods with lower prices. Also, when prices of starchy staples increase, consumption of other food groups generally decreases to maintain the consumption of staples. However, lowering the prices of starchy staples alone will not increase the consumption of other food groups, the prices of nutritious foods will need to meaningfully decrease to facilitate increased consumption (Cornelsen et al., 2015; Herforth and Ahmed 2015; Herforth et al., 2020). In our study, wide variations existed in cost of a healthy diet across states, highlighting the need for more efficient and equitable food supply systems. In the short term, actions that encourage greater market integration across the country should be harnessed so that food prices are similar across states and the cost of a healthy diet is reduced in states where it is currently high. In the medium- to long-term, it is necessary to implement policies and actions to improve the supply chain of a variety of food items within each food group. The unaffordability of vegetables, fruits, legumes, and animal source foods within the healthy diet implies a need for actions that improve the supply chain of such foods and reduce their costs for the poor – who often have the least access.

Second, low affordability of healthy diets reflects insufficient purchasing power and the need for higher incomes (FAO et al., 2020). As has been emphasized by other authors (FAO et al., 2020) and was observed in our study, populations with higher per capita food expenditure (reflecting higher incomes) have fewer households unable to afford healthy diets, even where the cost is relatively higher. In Nigeria, households with a head involved in agriculture only income generating activities have the highest rates of poverty, regardless of whether the head is male or female, and regardless of whether the household lives in an urban or rural area (NBS, 2020b). This implies that the cost of a healthy diet is most unaffordable among households with livelihoods dependent on food production. Increasing the incomes of food producers will therefore have to occur concurrently with reduced prices of nutritious foods, alongside support to agricultural households for own-production of diverse foods and market integration. Supports to food producers can include leveraging technology and innovation in food production, minimizing seasonality in food production, reducing pre-harvest and postharvest losses, and increasing/improving market access for food producers (FAO, 2017).

In Nigeria's Agriculture Promotion Policy (APP) 2016 – 2020 (FMARD, 2016), the most recent ratified agricultural policy, priority crops to support for domestic consumption were rice, wheat, maize, fish, milk, soya beans, poultry, fruits and vegetables, and sugar; while priority crops for export promotion were cowpeas, cocoa, cashew nuts, cassava, ginger, sesame, oil palm, yams, fruits and vegetables, beef, and cotton. The policy further specified tomato as a priority vegetable for domestic food security, while bananas,

avocado, and mango were specified as priority fruits for export. If priority domestic and export crops are similar in the updated agriculture policy in progress, it will be especially important to ensure that the export of foods from more nutrient-dense groups, including cowpeas, beef, and fruits and vegetables, is not done to the detriment of the affordability of these items in domestic markets. The Nigeria Agricultural Sector Food Security and Nutrition Strategy 2016 – 2025 (AFSNS) elaborates the nutrition component of the APP (FMARD, 2017). This AFSNS includes reduced domestic prices and increased affordability of maize, millet, rice, groundnuts, cowpeas, cassava, yam, beef, dairy, fish, chicken eggs, fruits and vegetables, as explicit outputs. However, the interventions to achieve these outputs do not address potential threats due to increased exports. Depending on the type and extent of trade policies, cross border trade of nutritious food items has been shown to affect domestic prices and affordability of such foods (Herforth et al., 2020). Deliberate efforts to align trade policies with national nutrition priorities are therefore needed.

Third, our study reported high unaffordability of vegetables, but it is important to recall that affordability was defined as per capita food group expenditure that is at least equal to the cost of the food group in the healthy diet. Costs are not the only drivers of food choices. Even where a healthy diet basket is affordable, households may not select such a basket if they do not have the requisite nutrition knowledge, or the food items are not preferred or convenient (Herforth et al., 2020). However, while other factors can cause households to consume less than recommended quantities of a food group, unaffordability presents an insurmountable barrier to consumption; and affordability has been consistently mentioned as the major barrier to adequate fruits and vegetables consumption in Nigeria (De Filippo et al., 2021). Moreover, our study was only able to include the direct costs of food. Indirect costs such as transportation costs to markets and costs of fuel for meal preparation could not be assessed, but these costs may influence purchase behavior of households and reduce consumption of a food group. Nutritious food groups such as fruits and vegetables and animal source foods are also highly perishable and may not be sold in community markets because demand is low and/or there is a lack of storage infrastructure (de la Peña & Garrett, 2018). Regular physical access to such foods may therefore be limited for households who do not live close to markets where such items are sold, or transportation costs to markets could prohibitively increase prices. Other studies have found that distance to markets is a barrier to fruit and vegetable consumption, including in Nigeria (De Filippo et al., 2021).

Finally, policies can focus on lowering the costs of preferred nutritious food items within each food group, while intensifying efforts to encourage consumption of a wide range of items within each food group. The findings further support a recent decision by the Federal Government of Nigeria to promote widespread home gardens for increased household access to and affordability of nutritious food groups (as part of priority actions towards national food systems transformation).

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